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# Impact of a Resident-Guided Rounding Initiative on the Hospital Consumer Assessment of Healthcare Providers and Systems Survey Scores in Orthopaedic Surgery Inpatients

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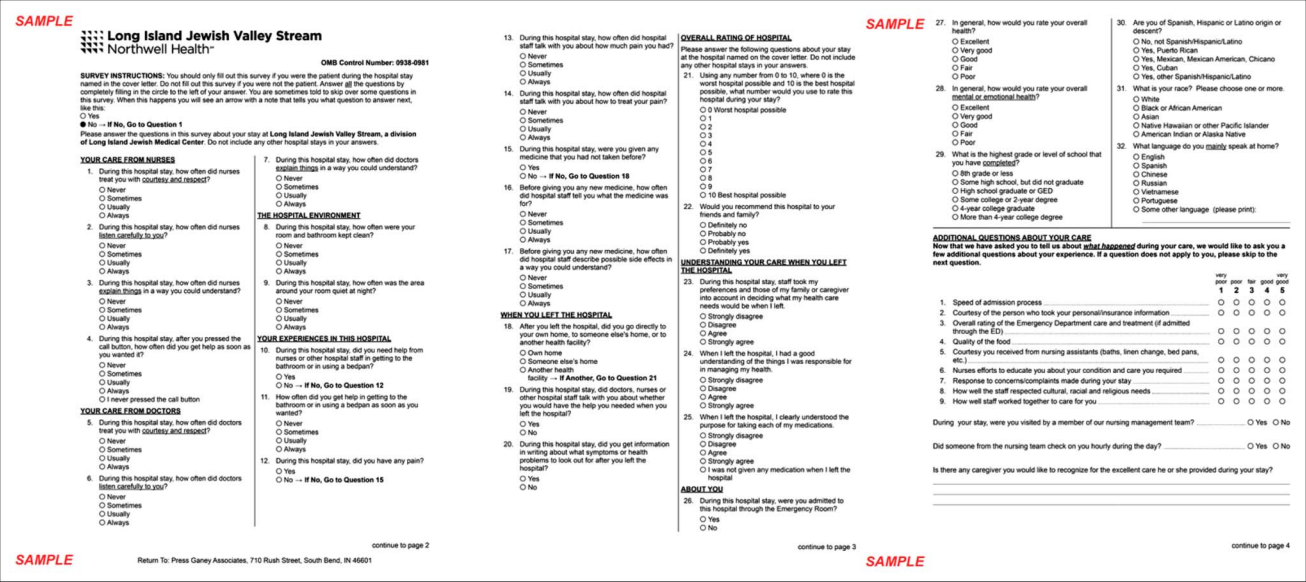
## Abstract

Patient-centered medicine is becoming the main focus of many healthcare systems, and the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey is a tool used to track patient satisfaction. In this study, we evaluate the HCAHPS scores in orthopaedic surgery inpatients before and after implementation of a resident-guided rounding protocol. Analyses of the HCAHPS surveys for 154 orthopaedic surgical inpatients at one community hospital were compared 6 months before and after implementation of a resident-guided rounding initiative. Specific questions of the HCAHPS survey were analyzed using the top box, mean, and positive scores. Implementation of the rounding initiative resulted in an increase in the top box, mean, and positive scores for all questions evaluated; however, no significance was noted in the results, with the exception of the positive score for a staff cohesiveness question ( $P = 0.046$ ). Physician and hospital recommendation questions showed a 5-point increase (91st to 96th percentile) compared with 42-point increase (21st to 63rd percentile) by publicly reported national data. Implementation of the rounding initiative resulted in increases in HCAHPS scores across multiple questions and domains; however, these were not significant. These results suggest that simple interventions can help increase the overall patient satisfaction and promote future investigations.

When a patient is admitted to the hospital, their quality of care is based not only on clinical outcomes but also on their perception of care. Recently, the field of medicine has evolved into the electronic and social

media era, enabling the patient to more thoroughly evaluate their in-hospital experience. In addition to positive clinical outcomes, the concept of a patient-centered experience has been increasingly a key focus and

Figure 1



Sample HCAHPS survey. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems

strategy of many hospital systems. Patient satisfaction is measured using a survey known as the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), which helps standardize care in hospitals at a national level.<sup>1</sup> On discharge from the hospital, patients are sent a survey to be completed within 6 weeks. The survey consists of 32 questions divided among eight domains: Communication with Nurses, Communication with Doctors, Staff Responsiveness, Pain Management, Communication About Medications, Discharge Information, Cleanliness and/or Quietness, and Overall Hospital Rating (Figure 1). Credit is then awarded when a “top box” response is marked, which is the top selection for the respective question. Once completed, the information is then made public and shared to a national online database ([www.medicare.gov/hospitalcompare](http://www.medicare.gov/hospitalcompare)). This method gives a platform to empower the patient, with

overall goals of hospital accountability and improved patient care.

Along with providing an objective clinical reputation, the HCAHPS surveys affect financial reimbursement from state and federal governments. The HCAHPS survey is the main tool used for value-based purchasing, which is an initiative required under the Patient Protection and Affordable Care Act of 2010 to allocate funds for Medicare/Medicaid spending based on the total performance score (TPS).<sup>2</sup> The TPS is broken down into divisions, where 70% come from basic core measures in clinical care and 30% come from patients’ perception of their hospital stay, measured using the HCAHPS survey. In October 2012, the Center for Medicare and Medicaid Services reduced the base operating diagnosis-related group payments by 1% to create an incentive fund, estimated at \$850 million, which increased to 2% in 2017.<sup>1,3</sup> These incentive funds are then allocated to

top-performing hospitals and withheld from underperforming hospitals based on their TPS.

Mixed results have been reported with the application of the HCAHPS surveys and their relation to clinical outcomes for the surgical patients.<sup>4-9</sup> Some studies have found patient satisfaction to be independent of hospital compliance with surgical processes of quality of care, hospital safety culture, surgical complications, and readmissions,<sup>7-9</sup> whereas other studies have supported the use of patient satisfaction surveys.<sup>4,6</sup> Critics of the HCAHPS argue that most patients are medically undereducated, and whereas aiming to address deficiencies of the HCAHPS/TPS may temporarily allay superficial deficiencies, fixing larger, underlying problems may not be incentivized. There is a paucity of literature regarding the use of the HCAHPS in surgical patients, and because of this, we evaluated the implementation of an orthopaedic

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surgery resident rounding initiative on all orthopaedic surgery inpatients at one community hospital and its effect on the HCAHPS surveys.

We sought to find a simple and direct intervention to enhance our patients' perception of their hospital stay and in turn increase the HCAHPS survey scores. At our institution, similar to many teaching hospitals, orthopaedic surgery patients are seen every day by orthopaedic surgery residents between the hours of 5:00 and 6:30 AM. During this time, the patient is often woken up, asked to participate in a simple physical examination, informed of the treatment plan for the day, and given the opportunity to discuss any questions or concerns. Understandably, this interaction can be somewhat limited due to the early hour, patient fatigue, and time constraints of the rounding physician. Patients may not have recollection of their morning examination, and at discharge, they may leave the hospital feeling dissatisfied with their post-operative care. In an effort to ameliorate possible dissatisfaction, we instituted the measured intervention of this study, an evening rounding regimen that included specific questions created by the authors.

We hypothesize that an additional and consistent regimented rounding intervention will positively affect a patient's overall perception of care as measured through the HCAHPS scores at our institution, most notably in the Communication with Doctors and Overall Hospital Rating domains.

## Methods

This study was approved by the Institutional Review Board as a quality initiative. Beginning May 1, 2017, a structured rounding protocol was instituted. A retrospective review of the HCAHPS surveys for all orthopaedic surgical patients dis-

**Table 1**

### Quantity of Survey Responses From Studied and Control Hospitals

Site	Group	Pre-intervention Returned Surveys (n)	Post-intervention Returned Surveys (n)	Total N
LJVS	Study	60	94	154
HH	Control	458	540	998
PVH	Control	213	262	475

HH = Huntington Hospital, LJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

**Table 2**

### Demographics of Study Population

Factor	Age Range (yr)	Median Age (yr)	Mean Age (yr)	Female Responses (%)	Male Responses (%)
Pre-intervention	30-95	61	60.7	51.7	48.3
Post-intervention	28-90	67	65.9	63.4	36.6

nated to a specific unit at one community hospital (Long Island Jewish Valley Stream) was evaluated 6 months before (November 1, 2016, to April 30, 2017) and 6 months after (May 1, 2017, to November 30, 2017) implementation of the study protocol. The pre-intervention group included 60 patients and the post-intervention group included 94 patients for a total of 154 completed patient surveys (Table 1). Demographic data of the intervention group are shown in Table 2.

All rounding were undertaken by orthopaedic surgery residents instructed to the specific protocol, consisting of traditional daily morning rounds and an additional evening round between 5:00 and 9:00 PM. During the rounds, each patient was asked the following questions:

- (1) How are you doing overall?
- (2) How is your pain?
- (3) How is physical therapy going?
- (4) Is there anything else I can help you with?

The resident physician then addressed any events from the day and confirmed any changes in the plan with

the patient and nursing staff. No formal documentation was made during the rounds in the electronic medical record, such that the physician-patient interaction was not interrupted by documentation of the encounter.

The authors chose five questions from the HCAHPS survey for statistical analysis to capture the effect of an additional rounding session (Figure 2). For each question, three sets of data were evaluated using the top box score, mean score, and a specific study devised measure labeled the "positive score." The top box score is a measure of the top option selected for each question in the survey. For example, if a question had four choices (Never, Sometimes, Usually, Always), only the option "Always" would be recorded as a positive response. The mean score is the numerical average of the corresponding question of the HCAHPS survey. Again, using the same sample as mentioned earlier, if a question had four choices (Never, Sometimes, Usually, Always), the choice is given a numerical value<sup>1-4</sup> and is divided by the total number of

**Figure 2**

5. During this hospital stay, how often did doctors treat you with courtesy and respect?

1 Never  
 2 Sometimes  
 3 Usually  
 4 Always

6. During this hospital stay, how often did doctors listen carefully to you?

1 Never  
 2 Sometimes  
 3 Usually  
 4 Always

7. During this hospital stay, how often did doctors explain things in a way you could understand?

1 Never  
 2 Sometimes  
 3 Usually  
 4 Always

22. Would you recommend this hospital to your friends and family?

1 Definitely no  
 2 Probably no  
 3 Probably yes  
 4 Definitely yes

**ADDITIONAL QUESTIONS ABOUT YOUR CARE**  
 Now that we have asked you to tell us about what happened during your care, we would like to ask you a few additional questions about your experience. If a question does not apply to you, please skip to the next question.

	very poor	poor	fair	good	very good
	1	2	3	4	5

9. How well staff worked together to care for you .....

○ ○ ○ ○ ○

HCAHPS survey questions selected for the study. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems

points possible.<sup>4</sup> The “positive score” is a measure devised by the authors, which looked at whether the top two options for a question are selected; that is, for a question with four choices (Never, Sometimes, Usually, Always), the third or fourth choices (Usually, Always) are recorded as a positive response. In this way, favorable responses are included, which otherwise would not be captured by the top box score.

As a control, the HCAHPS survey data were also collected from two similar community hospitals (Plainview Hospital and Huntington Hospital). These hospitals have a dedicated orthopaedic surgery unit, similar surgical case diversity, and the

same orthopaedic surgery residents from the tested institution. At the control hospitals, the traditional early morning rounding regimen was maintained. The intervention hospital results were then compared with both hospital controls and statistical analysis was undertaken. Inclusion criteria for the study were based on diagnosis-related group codes (460, 468, 470, 472 to 473, 480 to 482, 488, 494, 501, 502, 517) for both elective and nonelective orthopaedic surgical procedures that required inpatient admission. All adult orthopaedic surgery patients admitted to the hospital were eligible for the study. Patients deemed not to have medical capacity were excluded. An

interpreter service was used for the rounding initiative for all non-English-speaking patients. Patients who did not return their HCAHPS surveys were excluded from the analysis.

Last, to evaluate changes in a larger and more relevant context, we compared our top box scores with those of the national database to obtain a percentile rank before and after our intervention. These types of measurements are how the HCAHPS surveys are used by the government and other institutions to assess hospital quality, rankings, and financial reimbursement.

A chi-square test was used to detect statistical significance for the top box and positive scores. A Mann-Whitney *U* test was used to assess the mean scores. Statistical significance was defined as  $P < 0.05$ . A power analysis was also performed to detect the effect size.

**Results**

After reviewing the HCAHPS surveys before and after implementation of our rounding protocol, the positive score measure for the question “How well staff worked together to care for you” was the only statistically significant result ( $P = 0.046$ ). There was no statistically significant difference in the other HCAHPS questions we chose for the analysis. Table 3 displays the pre- and post-intervention HCAHPS response results and statistical analysis.

The top box results for all three physician domain questions (questions 5, 6, and 7) were averaged and compared with the national database. Our study population went from 85.9% pre-intervention to 87.9% post-intervention, which correlated to the change in percentile ranking from 91st to 96th (Table 4). The national average for the Communication with Doctors top box domain was 80.2%, with SD of 4.18.<sup>10</sup> The top box

**Table 3****Results for all Questions Evaluated**

Question	Measure	Site	Group	Pre-intervention (%)	Post-intervention (%)	Delta (%)	P Value	Test
During this hospital stay, how often did doctors treat you with courtesy and respect?	Top box	LIJVS	Study	90.0	93.7	3.7	0.529	Chi-square
During this hospital stay, how often did doctors treat you with courtesy and respect?	Top box	HH	Control	90.9	89.2	-1.7	0.400	Chi-square
During this hospital stay, how often did doctors treat you with courtesy and respect?	Top box	PVH	Control	87.8	88.8	1.0	0.776	Chi-square
During this hospital stay, how often did doctors treat you with courtesy and respect?	Positive	LIJVS	Study	98.3	100.0	1.7	0.387	Chi-square
During this hospital stay, how often did doctors treat you with courtesy and respect?	Positive	HH	Control	100.0	99.8	-0.2	1.000	Chi-square
During this hospital stay, how often did doctors treat you with courtesy and respect?	Positive	PVH	Control	100.0	99.6	-0.4	1.000	Chi-square
During this hospital stay, how often did doctors treat you with courtesy and respect?	Mean score	LIJVS	Study	95.0	97.2	2.2	0.401	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors treat you with courtesy and respect?	Mean score	HH	Control	96.9	95.7	-1.2	0.327	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors treat you with courtesy and respect?	Mean score	PVH	Control	95.5	95.9	0.4	0.727	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors listen carefully to you?	Top box	LIJVS	Study	86.4	85.3	-1.2	1.000	Chi-square
During this hospital stay, how often did doctors listen carefully to you?	Top box	HH	Control	83.9	81.4	-2.6	0.317	Chi-square

*(continued)*

HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

**Table 3 (continued)**

Results for all Questions Evaluated								
Question	Measure	Site	Group	Pre-intervention (%)	Post-intervention (%)	Delta (%)	P Value	Test
During this hospital stay, how often did doctors listen carefully to you?	Top box	PVH	Control	84.0	80.3	-3.7	0.338	Chi-square
During this hospital stay, how often did doctors listen carefully to you?	Positive	LIJVS	Study	98.3	100.0	1.7	0.383	Chi-square
During this hospital stay, how often did doctors listen carefully to you?	Positive	HH	Control	99.8	99.3	-0.5	0.382	Chi-square
During this hospital stay, how often did doctors listen carefully to you?	Positive	PVH	Control	100.0	99.6	-0.4	1.000	Chi-square
During this hospital stay, how often did doctors listen carefully to you?	Mean score	LIJVS	Study	93.2	94.4	1.2	0.907	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors listen carefully to you?	Mean score	HH	Control	94.1	92.5	-1.6	0.244	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors listen carefully to you?	Mean score	PVH	Control	93.7	92.2	-1.5	0.304	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors explain things in a way you could understand?	Top box	LIJVS	Study	81.4	84.8	3.4	0.655	Chi-square
During this hospital stay, how often did doctors explain things in a way you could understand?	Top box	HH	Control	80.3	81.4	1.1	0.687	Chi-square
During this hospital stay, how often did doctors explain things in a way you could understand?	Top box	PVH	Control	81.1	80.5	-0.7	0.907	Chi-square
During this hospital stay, how often did doctors explain things in a way you could understand?	Positive	LIJVS	Study	98.3	100.0	1.7	0.391	Chi-square
During this hospital stay, how often did doctors explain things in a way you could understand?	Positive	HH	Control	99.6	99.4	-0.1	1.000	Chi-square

(continued)

HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

Table 3 (continued)

## Results for all Questions Evaluated

Question	Measure	Site	Group	Pre-intervention (%)	Post-intervention (%)	Delta (%)	P Value	Test
During this hospital stay, how often did doctors explain things in a way you could understand?	Positive	PVH	Control	100.0	99.6	-0.4	1.000	Chi-square
During this hospital stay, how often did doctors explain things in a way you could understand?	Mean score	LIJVS	Study	92.1	93.8	1.8	0.587	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors explain things in a way you could understand?	Mean score	HH	Control	92.7	92.6	-0.1	0.747	Mann-Whitney <i>U</i>
During this hospital stay, how often did doctors explain things in a way you could understand?	Mean score	PVH	Control	92.3	92.9	0.6	0.967	Mann-Whitney <i>U</i>
How well staff worked together to care for you?	Top box	LIJVS	Study	62.7	75.5	12.8	0.193	Chi-square
How well staff worked together to care for you?	Top box	HH	Control	76.0	76.5	0.4	0.881	Chi-square
How well staff worked together to care for you?	Top box	PVH	Control	76.2	74.5	-1.7	0.646	Chi-square
How well staff worked together to care for you?	Positive	LIJVS	Study	88.1	96.8	8.7	0.046	Chi-square
How well staff worked together to care for you?	Positive	HH	Control	96.9	96.4	-0.5	0.725	Chi-square
How well staff worked together to care for you?	Positive	PVH	Control	96.1	96.1	0.0	1.000	Chi-square
How well staff worked together to care for you?	Mean score	LIJVS	Study	86.4	93.1	6.6	0.056	Mann-Whitney <i>U</i>
How well staff worked together to care for you?	Mean score	HH	Control	92.8	92.9	0.1	0.913	Mann-Whitney <i>U</i>
How well staff worked together to care for you?	Mean score	PVH	Control	92.8	92.4	-0.5	0.685	Mann-Whitney <i>U</i>
Would you recommend this hospital to your friends and family?	Top box	LIJVS	Study	65.0	75.5	10.5	0.201	Chi-square

(continued)

HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

**Table 3 (continued)****Results for all Questions Evaluated**

Question	Measure	Site	Group	Pre-intervention (%)	Post-intervention (%)	Delta (%)	P Value	Test
Would you recommend this hospital to your friends and family?	Top box	HH	Control	80.6	79.3	-1.3	0.635	Chi-square
Would you recommend this hospital to your friends and family?	Top box	PVH	Control	76.1	70.6	-5.4	0.212	Chi-square
Would you recommend this hospital to your friends and family?	Positive	LIJVS	Study	90.0	97.9	7.9	0.057	Chi-square
Would you recommend this hospital to your friends and family?	Positive	HH	Control	96.7	97.4	0.7	0.573	Chi-square
Would you recommend this hospital to your friends and family?	Positive	PVH	Control	97.2	96.6	-0.6	0.796	Chi-square
Would you recommend this hospital to your friends and family?	Mean score	LIJVS	Study	83.3	91.1	7.8	0.102	Mann-Whitney <i>U</i>
Would you recommend this hospital to your friends and family?	Mean score	HH	Control	91.8	91.9	0.1	0.662	Mann-Whitney <i>U</i>
Would you recommend this hospital to your friends and family?	Mean score	PVH	Control	90.8	88.7	-2.1	0.187	Mann-Whitney <i>U</i>

HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

**Table 4****Top Box Score Percentile Changes Pre- and Post-intervention**

Question	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Communication with doctors <sup>a</sup>	85.9	87.9	91	96
Recommend hospital	65	75.5	21	63

HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems

<sup>a</sup> Average of HCAHPS questions 5, 6, and 7.

Top box score (%) national percentile rank.

responses for question 22, “Would you recommend this hospital to your friends and family?”, went from 65% pre-intervention to 75.5% post-intervention, which

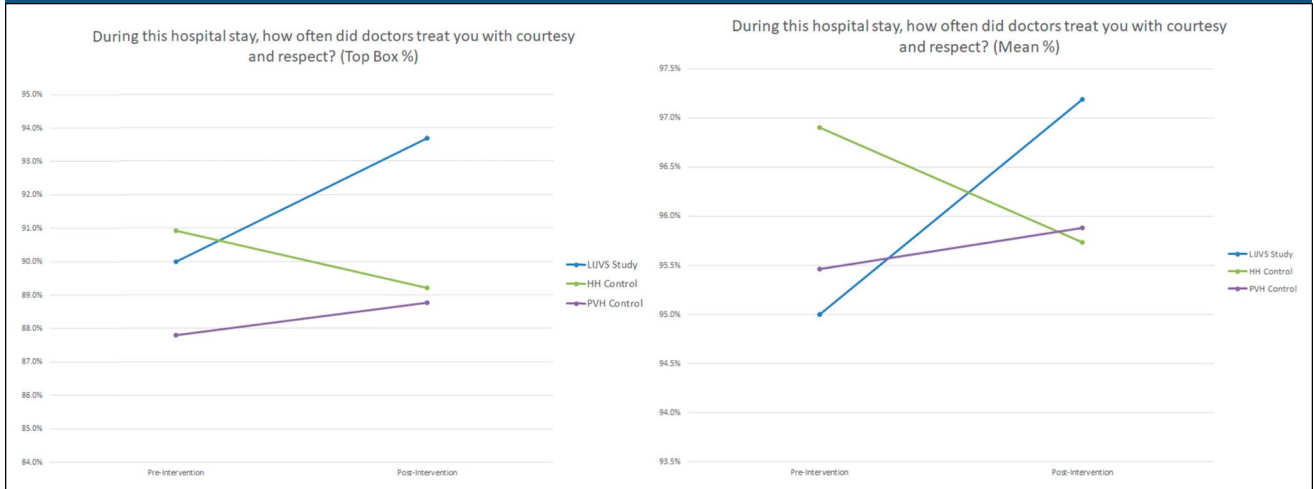
was a national percentile ranking increase from 21st to 63rd (Table 4). The national average was 72%, with SD of 9.5.<sup>10</sup> Graphical representation of the results for each

question is shown in Figures 3-7 (<http://links.lww.com/JG9/A48>).

Power analysis performed on the study population to detect small, medium, and large effect sizes was

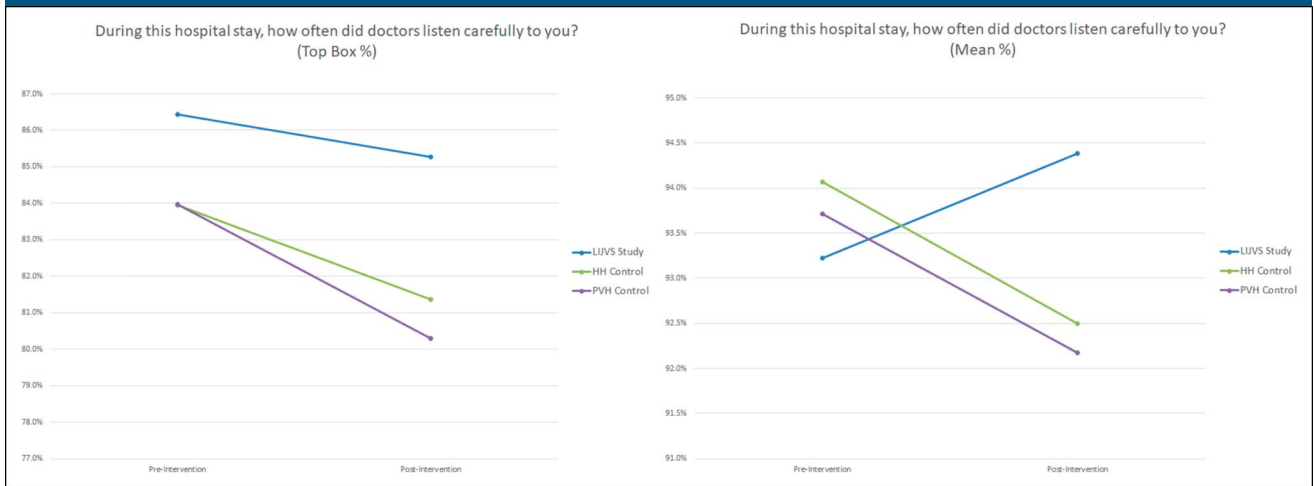


**Figure 3**



HCAHPS survey question 5 responses. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems, HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

**Figure 4**



HCAHPS survey question 6 responses. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems, HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

found to be 0.237, 0.961, and 1.0, respectively.

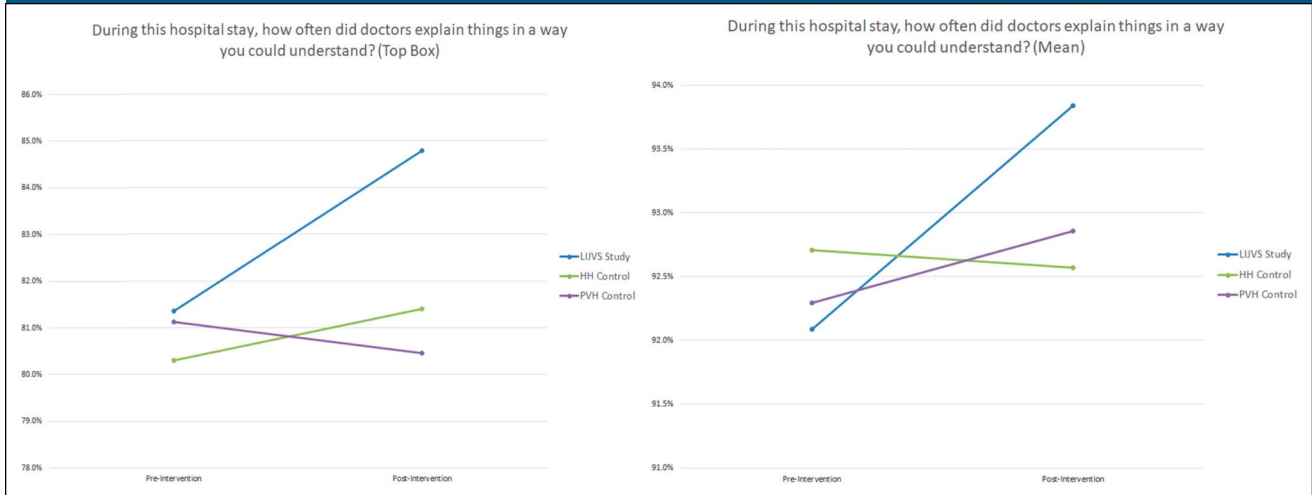
## Discussion

Our study targeted orthopaedic surgical inpatients at a community hospital to determine whether a consistent rounding protocol would have any influence on their perception of care and result in changes in

the HCAHPS survey scores. In our study, we found statistical significance in the positive score for the question “How well staff worked together to care for you?”. The positive score for “Would you recommend this hospital to your friends and family?” and the mean score for “How well the staff worked together?” approached statistical significance at 0.057 and 0.056, respectively. Positive trends toward

statistical significance were demonstrated in almost all questions evaluated, as well as corresponding decreases at the control hospitals. Important results of note, when comparing our change in the top box score with the national database average for the question “How likely are you to recommend this hospital to friends and family?”, we showed a substantial increase in national percentile ranking going from 21st

Figure 5



HCAHPS survey question 7 responses. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems

Figure 6



HCAHPS survey question 22 responses. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems, HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

percentile pre-intervention to 63rd percentile post-intervention. This significant improvement suggests that simple interventions can improve rankings, which, in turn, could lead to increased financial reimbursement for the hospital.

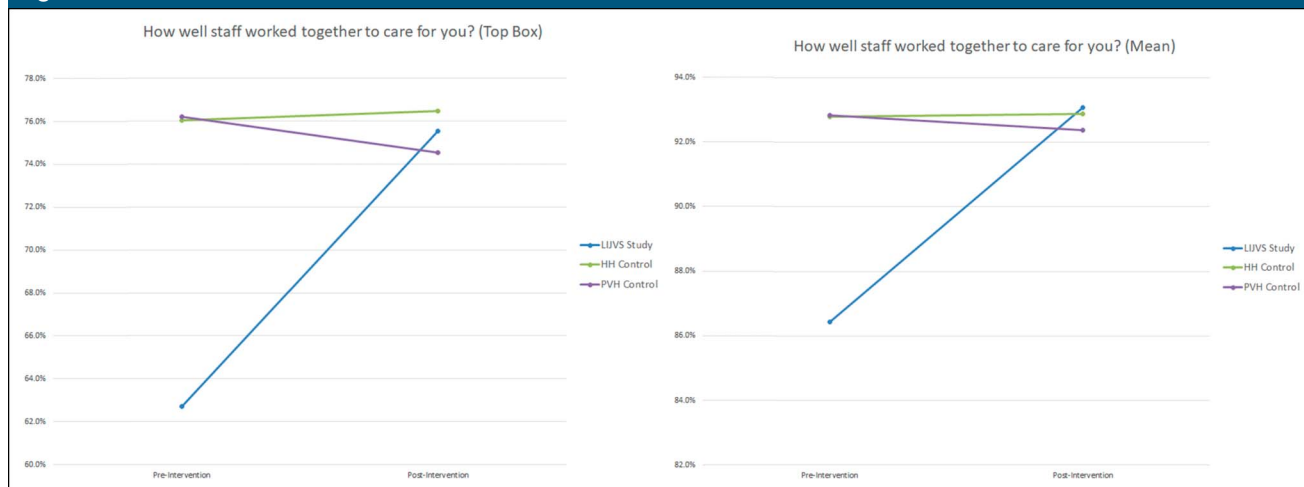
Across the United States, hospitals are investing great time and expenses on different strategies to improve patient care such as interdisciplinary rounding, but there is little published

evidence suggesting that these types of interventions result in improvements in patient satisfaction.<sup>11,12</sup> It is difficult to detect changes in specific domains of the scoring system and correlate these changes to targeted interventions due to many confounding factors. This leads to hospitals investing significant resources to improve the HCAHPS scoring with the hope of generating reimbursements from the Center for

Medicare and Medicaid Services, likely based primarily on anecdotal evidence.<sup>13</sup>

In the literature, studies have focused on modifiable interventions and their influence on inpatients. Mistry et al<sup>14</sup> provided meta-analyses of factors influencing patients' hospital rating after total joint arthroplasty. They determined that the Overall Hospital Rating was significantly influenced by the

Figure 7



HCAHPS survey question 9 responses. HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems, HH = Huntington Hospital, LIJVS = Long Island Jewish Valley Stream, PVH = Plainview Hospital

Communication with Nurses, Responsiveness of Hospital Staff, Communication with Doctors, and Hospital Environment. Interestingly, they found no difference in the survey scores when comparing patients with and without postoperative complications. These specific domains have the most influence and weight on the overall HCAHPS score, and because of this, most published studies have looked at modifiable interventions that target these specific domains. Harper et al<sup>15</sup> looked at the use of therapy dogs before physical therapy sessions on patients who underwent hip or knee replacement surgery. They found significant improvement in the Pain Management ( $P = 0.024$ ), Communication with Nurses ( $P = 0.035$ ), and Overall Hospital Rating ( $P < 0.001$ ) domains. Other studies looked at the use of communication skill training for physicians and the use of face cards and found positive results but with no statistical significance.<sup>16,17</sup>

The doctor-physician interaction has primarily been the main focus in patient satisfaction studies. With a similar aim, Gross et al<sup>18</sup> found that

longer visits with patients led to higher patient satisfaction and a better perception of their overall care. A study by Lin et al<sup>19</sup> reiterated the concept of patient-centered medicine and found that patient satisfaction was affected by the patient's perceived duration of the physician visit, along with if their visit expectations were met. Similarly, the intervention in our study increased the doctor-patient interaction and lead to positive trends in the HCAHPS survey question responses.

Our study demonstrates that with a simple intervention, positive trends in the HCAHPS scores within our study population were achieved. However, despite these trends, most scores did not show statistically significant improvement. This study has several important limitations. Assessing specific interventions is difficult due to many confounding variables, such as simultaneous quality improvement measures. At our institution, quality improvements are often made at the system level, and two similarly sized hospitals in the same system were therefore used as controls. Compared with the control hospitals, the differ-

ence in improvement was greater in the study population in all questions assessed. Another limitation was our smaller cohort of patients. In the study population, our HCAHPS surveys response rate was 26.6%, which is below the New York state and national average for response rate, which is 31% and 33%, respectively. A power analysis was performed for the study hospital, and the power to detect a large effect was 1.0, meaning a 100% chance to detect any large effect in the study population if it truly existed, which was not found. Similarly, the power to detect a small effect for the study population was 0.23. This indicates that small effects would only be detected 23% of the time, and it is possible that this effect was missed due to the small sample size. Last, another limitation is the use of the HCAHPS survey as a surrogate for patient satisfaction, which has shown to be variable within the literature.<sup>20,21</sup>

The concept of patient-centered medicine can be applied across all medical fields, and the use of the HCAHPS survey is gaining popularity as a useful tool to assess satisfaction. Despite some variability in the

literature for its efficacy, the use of the HCAHPS survey has been shown to have many benefits, such as increased financial reimbursement, decreased readmission rates, and shorter length of stay,<sup>21</sup> which will undoubtedly be useful for surgeons in the future.

This study shows that simple interventions can influence positive trends in the HCAHPS surveys for orthopaedic surgical inpatients. Further research is needed to better define the impact of physician-patient interaction on patient satisfaction scores and on the overall quality of patient care.

## Acknowledgments

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## References

- Hospital value-based purchasing centers for Medicare & Medicaid services. <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/hospital-value-based-purchasing/index.html>; 2013. Accessed November 10, 2017.
- The Patient Protection and Affordable Care Act [HR 3590]. 111th Congress. Public Law 111-148. March 2010; 23.
- Rau J: Medicare to begin basing hospital payments on patient-satisfaction scores. Kaiser Health News. <http://www.kaiserhealthnews.org/stories/2011/april/28/medicare-hospital-patient-satisfaction.aspx>. Accessed November 10, 2017.
- Sacks GD, Lawson EH, Dawes AJ, et al: Relationship between hospital performance on a patient satisfaction survey and surgical quality. *JAMA Surg* 2015;150:858-864.
- Kemp KA, Santana MJ, Southern DA, McCormack B, Quan H: Association of inpatient hospital experience with patient safety indicators: A cross-sectional, Canadian study. *BMJ Open* 2016;6:e011242.
- Anhang Price R, Elliott MN, Zaslavsky AM, et al: Examining the role of patient experience surveys in measuring health care quality. *Med Care Res Rev* 2014;71:522-554.
- Tevis SE, Kennedy GD, Kent KC: Is there a relationship between patient satisfaction and favorable surgical outcomes? *Adv Surg* 2015;49:221-233.
- Lyu H, Wick EC, Housman M, Freischlag JA, Makary MA: Patient satisfaction as a possible indicator of quality surgical care. *JAMA Surg* 2013;148:362-367.
- Kennedy GD, Tevis SE, Kent KC: Is there a relationship between patient satisfaction and favorable outcomes? *Ann Surg* 2014;260:592-598.
- Official Medicare Website For hospital compare: <https://www.medicare.gov/hospitalcompare/search.html?>. Accessed March 8, 2018.
- Mitchell MD, Lavenberg JG, Trotta RL, Umscheid CA: Hourly rounding to improve nursing responsiveness: A systematic review. *J Nurs Adm* 2014;44:462-472.
- Townsend-Gervis M, Cornell P, Vardaman JM: Interdisciplinary rounds and structured communication reduce re-admissions and improve some patient outcomes. *West J Nurs Res* 2014;36:917-928.
- Davidson KW, Shaffer J, Ye S, et al: Interventions to improve hospital patient satisfaction with healthcare providers and systems: A systematic review. *BMJ Qual Saf* 2017;26:596-606.
- Mistry JB, Gwam CU, Chughtai M, et al: Factors influencing patients' hospital rating after total joint arthroplasty. *Orthopedics* 2017;40:377-380.
- Harper CM, Dong Y, Thornhill TS, et al: Can therapy dogs improve pain and satisfaction after total joint arthroplasty? A randomized controlled trial. *Clin Orthop Relat Res* 2015;473:372-379.
- Boissy A, Windover AK, Bokar D, et al: Communication skills training for Physicians improves patient satisfaction. *J Gen Intern Med* 2016;31:755-761.
- Simons Y, Caprio T, Furiasse N, Kriss M, Williams MV, O'Leary KJ: The impact of face cards on patients' knowledge, satisfaction, trust, and agreement with hospital physicians: A pilot study. *J Hosp Med* 2014;9:137-141.
- Gross DA, Zyzanski SJ, Borawski EA, Cebul RD, Stange KC: Patient satisfaction with time spent with their physician. *J Fam Pract* 1998;47:133-137.
- Lin CT, Albertson GA, Schilling LM, et al: Is patients' perception of time spent with the physician a determinant of ambulatory patient satisfaction? *Arch Intern Med* 2001;161:1437-1442.
- Farley H, Enguidanos ER, Coletti CM, et al: Patient satisfaction surveys and quality of care: An information paper. *Ann Emerg Med* 2014;64:351-357.
- Tsai TC, Orav EJ, Jha AK: Patient satisfaction and quality of surgical care in US hospitals. *Ann Surg* 2015;261:2-8.