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A multifaceted study of hospital variables and interventions to improve inpatient satisfaction in a multi-hospital system

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Abstract

Knowing the areas of service, actions, and parameters that can influence patient perception about a service provided can help hospital executives and healthcare workers to devise improvement plans, leading to higher patient satisfaction.

To identify inpatient satisfaction determinants, assess their relationships with hospital variables, and improve patient satisfaction through interventions.

We studied the inpatient population of an eight-hospital tertiary medical center in 2015. The satisfaction determinants were based on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey answers and included clinical and organizational variables.

Interventions began at the end of 2016 included bedside care coordination rounds (BCCR), medications best practices alert (BPA), connect transitions post-discharge calls (CONNECT Transitions) and a framework for provider-patient interactions called AIDET (Acknowledge, Introduce, Duration, Explain, and Thank). Substantial impact upon patient satisfaction was observed after the introduction of these interventions.

Three groups were identified:

1. high satisfaction, which correlated with race, surgery, and cancer care;
2. low satisfaction, correlated with elderly, emergency room, intensive care unit, chronic obstructive pulmonary disease, and vascular diseases; and
3. neutral, correlated with hospital-acquired complications, several diagnostic procedures, and medical care delay.

Significant improvements in the 3 groups were achieved with interventions that optimize care provider interactions with patients and their families.

Based on the HCAHPS-based analysis, we implemented new measures and programs for addressing coordination of care, improving patient safety, reducing the length of stay, and ultimately improving patient satisfaction.

Abbreviations: AIDET = acknowledge introduce duration explain and thank, AVS = afterv summary, BCCR = bedside care coordination rounds, BPA = best practices alert, CONNECT = connect transitions, COPD = chronic obstructive pulmonary disease, ER = emergency room, HAC = hospital acquired conditions, HCAHPS = hospital consumer assessment of healthcare providers and systems, HMH = houston methodist hospital, ICARE = integrity compassion, accountability respect and excellence, ICU = intensive care unit, LoS = length of stay, METEOR = methodist environment for translational enhancement and outcomes research.

Keywords: care delivery, communication, health analytics, health services research, patient satisfaction

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1. Introduction

Inpatient satisfaction correlates with service quality, patient-provider relationship, instruction clarity and understandability, recovery time, and treatment type. The most common instrument to measure patient satisfaction is the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), a standardized national survey created to report the patients hospital care perspective among recently discharged patients.[1] Based on these surveys, hospitals can either gain or lose up to 2% of their Medicare payments.[2] Healthcare organizations monitor areas with low patient satisfaction and devise new approaches to address any issue.[3] This continuous assessment gives hospitals various insights about their effectiveness in care delivery and their level of empathy with patients, which can improve patient retention rates, secure a positive reputation, and prevent malpractice lawsuits if addressed adequately.

To this end, healthcare organizations need to understand what influences how patients rate a service. Healthcare organizations also need to identify the areas where they need improvement and track changes once a new intervention measure is introduced.[4]

Here at Houston Methodist Hospital (HMH) system, which is home to 8 hospitals and multiple outpatient clinics and service centers in the Greater Houston metropolitan area, we studied the inpatient population to identify structural and clinical determinants of patient satisfaction and assessed their relationship with hospital system variables. Identifying these clinical and organizational variables resulted in a variety of new interventions, measures, and programs in our service delivery that led to observable improvement in patient satisfaction and organizational performance.

2. Methods

2.1. HCAHPS patient scores

The HCAHPS survey is emailed, mailed, or sent via short message service (SMS) text to all the hospitalized patients recently discharged from the hospital and asks about important aspects of their hospital experience. Despite reminders, often, the response rate is often poor.

We constructed the overall patient satisfaction scores using raw data from HCAHPS. Based on HCAHPS questions, the Centers for Medicare & Medicaid Services (CMS) reports individual hospital performance on ten measures: 6 clinical, 2 hospital environments, and 2 global measures of the patient experience. The composite clinical measures cover communication with doctors and nurses, staff responsiveness, pain management, communication about medication, and discharge planning. The 2 environmental items focus on hospital cleanliness and quietness. The 2 global items represent an overall hospital rating and the patients willingness to recommend the hospital to family members.[5]

2.2. Tools for HCAHPS survey results retrieval

Retrospective medical record retrieval was performed using Methodist Environment for Translational Enhancement and Outcomes Research (METEOR) clinical data warehouse.[6] METEOR integrates existing business data and patient records across the HMH system to support clinical research studies. The patient data obtained includes demographics, admission type, inpatient discharge disposition, length of stay (LoS), admitting facility location, comorbidities, provider, and insurance information.

2.3. Study population

In 2015, the number of inpatient admissions was 37,543. Of these, 8805 completed the HCAHPS survey, which is a total response rate of 23.50%. The number of patients admitted from clinics was 10,183, with 3626 survey respondents (35.60% response rate). The number of patients admitted through the emergency room (ER) was 17,611, and only 3242 patients responded to the survey (18.40% response rate). Additionally, 3581 patients were admitted from non-health facilities, with 1185 survey respondents (33.10% response rate). There were 11,219 surgical admissions, with 4065 survey respondents (36.20% response rate). There were 26,324 medical admissions, with 4,740 survey respondents (18.00% response rate), and 7610 patients that stayed in the Intensive Care Unit (ICU), with 1568 survey respondents (20.60% response rate).

2.4. Interventions

Based on the analyses of patient satisfaction determinant variables, since 2016, the hospital has introduced new interventions including bedside care coordination rounds (BCCR), medications best practices alert (BPA), and connect transitions post-discharge calls (CONNECT Transitions), measures striving to reduce LoS rates and improve the patient satisfaction scores. Additionally, a directed specific framework for provider-patient interactions called AIDET (Acknowledge, Introduce, Duration, Explain, and Thank) was implemented.

Piloted around the end of 2016 by an internal medicine unit (Jones 9) of HMH Texas Medical Center, BCCR is a departure from the earlier nurses station care coordination rounds which were conducted away from the patients and their families. The purpose of BCCR is to involve patients and their families in healthcare decision making, facilitate better coordination of care, ensure patient safety, reduce the length of stay, and ultimately improve patient/employee satisfaction.

The BPA system teaches side effects and purpose of new medications to patients, thus, potentially increasing medication communication scores. The current recommendation for health care providers is to spend more time with non-adherent patients, teaching them about proper use regimen, thus decreasing the risk of acute exacerbation.[7] CONNECT Transitions is post-discharge program where patients are called 24 to 72 hours after being discharged to assess their recovery. If patients have questions regarding their medical treatment, the automated discharge system alerts a care navigator nurse to place a call.

To mitigate ER wait times, HMH offers extended clinic hours, telemedicine, more ER resources, fast registration, and fast ordering of lab tests and x-ray. After triage, the ER department ensures that a mid-level provider or physician examines patients within 30 minutes. Also, HMH staff engages with patients following the AIDET[8] framework. Here, health providers greet the patient by name, make eye contact, smile, and acknowledge family or friends in the room. They introduce themselves with their names, skills, certifications, etc. They are mandated to give an accurate time expectation for the several steps of patients visit or encounter and, when not possible, provide a time to expect an update. They explain what to expect next, take questions, and

provide information on how to contact them. The whole episode ends with a thank you to the patient and family. Furthermore, to support communication and expectations, a "plan of care card" that explains medical steps during hospitalization and follow-up actions after test results are provided to patients.

2.5. Statistical analysis

We used descriptive analysis and statistics to present quantitative descriptions of the measures found. Data were analyzed using the Stata software package v.9 (StataCorp, College Station, TX). The answers to the 10 patient care measures were converted into a linear score (0 to 100 range) and were averaged to a single mean score to show overall satisfaction. Multivariate linear regression analysis was used to assess the relationships between independent variables. Patients were classified into 3 categories: satisfied patients (scores between 80 and 100), unsatisfied patients (scores between 0 and 60), and neutral patients (scores between 60 and 80). A significance level of P value $>.05$ was used for all statistical tests.

The Institutional Review Board (IRB) approved the study protocol, and a waiver of written informed consent was obtained. However, this study is a quality improvement project and does not require IRB oversight.

3. Results

The multivariate regression analysis of patient satisfaction revealed positive (high satisfaction), negative (low satisfaction), and neutral (neutral satisfaction) correlations with the variables analyzed (Fig. 1). Variables with positive correlation were: race, surgical admission, and cancer patients. Those with negative correlation were: elderly (age >65 years), extended LoS (stay >7 days), several room transfers, emergency room (ER) visits, ER holding times, ICU stays, and chronic conditions (Chronic Obstructive Pulmonary Disease (COPD), vascular diseases) while neutral correlation variables were: hospital-acquired complications, number of diagnostic procedures, and time to see a physician.

African Americans gave high satisfaction scores (P value = .001). They were more satisfied than any other race, and their level of satisfaction was maintained throughout different age groups (Fig. 2A). Moreover, they were the only group with reported satisfaction among patients admitted through the ER. However, they were the least represented in the survey when compared to their hospital population. Surgical patients also reported a high satisfaction, with gynecological operations ranking the highest (P value = .001) (Fig. 2B). The third group of patients that had high satisfaction scores are cancer patients (Fig. 2C). The most satisfied cancer patients were those affected

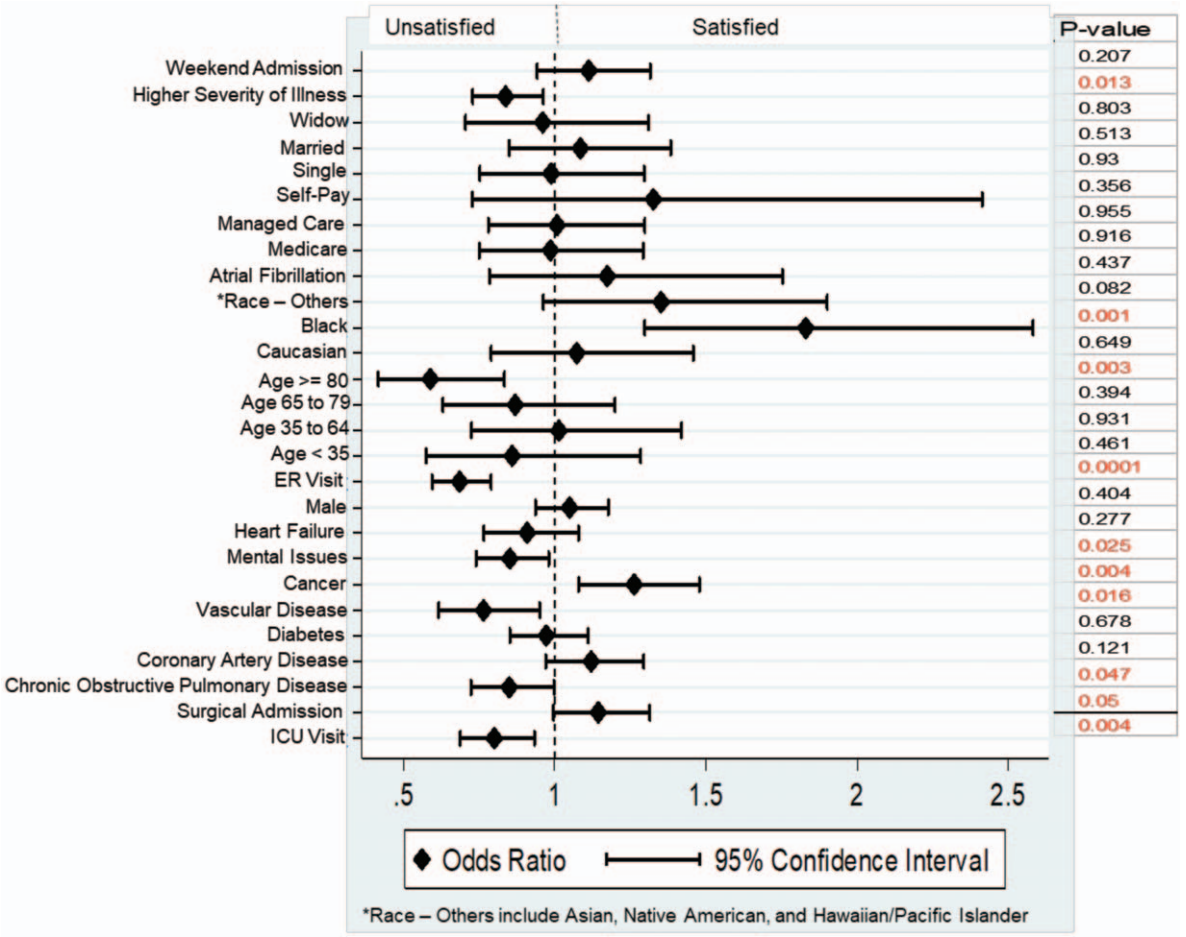

Figure 1. Variables and results of multivariate regression analysis. Positive, negative, and neutral correlations revealed with the multivariate regression analysis of patient satisfaction. Patients were classified into 3 categories: satisfied patients, unsatisfied patients, and neutral patients.

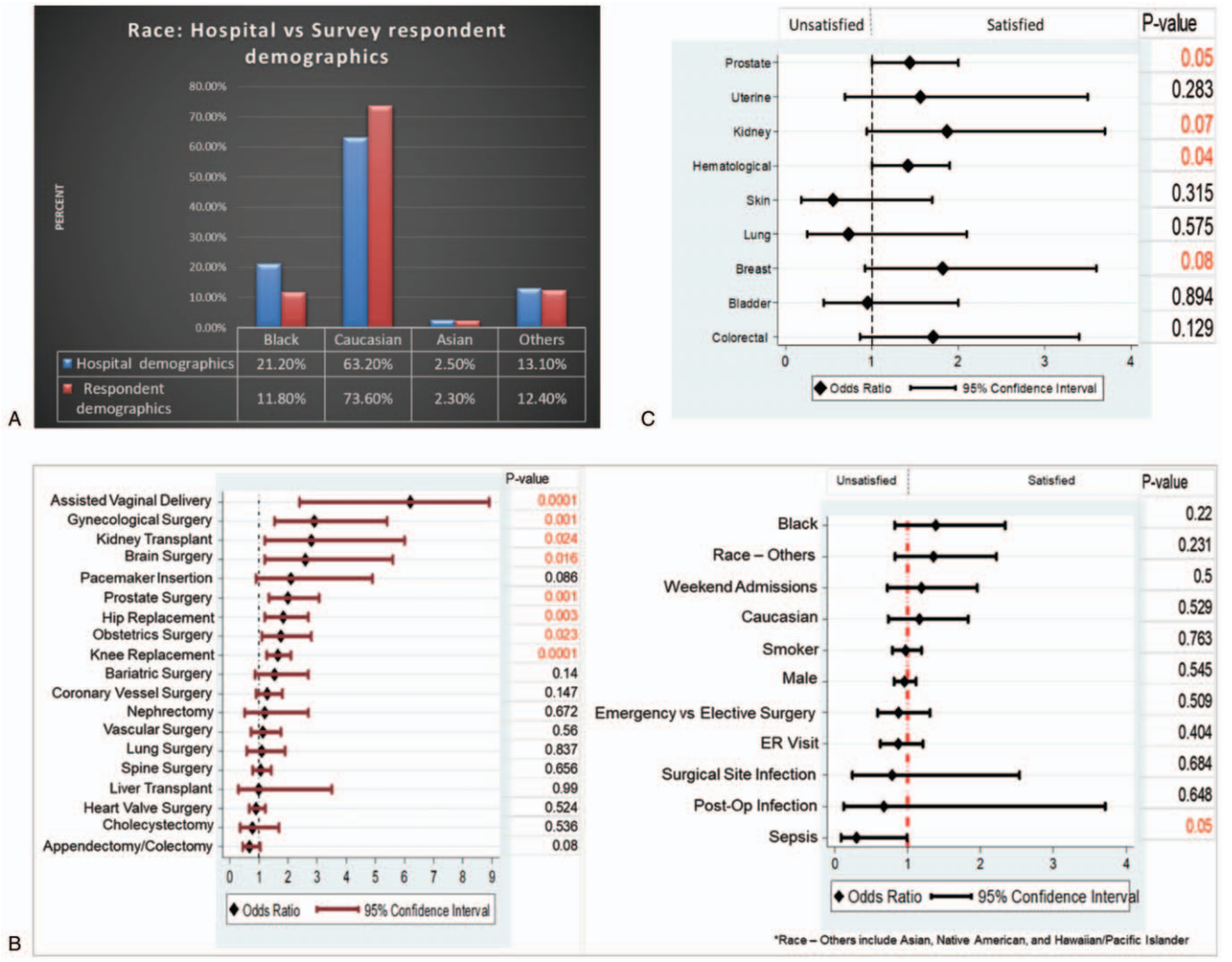

Figure 2. Variables with high satisfaction score. Patients reported high levels of satisfaction correlated with race, surgery and cancer care.

with hematological (*P* value = .04), prostate (*P* value = .05), kidney (*P* value = .07), and breast cancers (*P* value = .08).

As age increases, patient satisfaction scores reduce (*P* value <.0001). The very elderly (age > 80 years) scored the hospital lower on HCAHPS questions, except for questions focused-on courtesy, respect, and pain control. Moreover, this group gave disproportionately lower scores on communications-related questions such as explaining things, listening carefully, describing medical information, and making sure the patient understands what has been explained. The very elderly admitted to the ER department gave low scores, except on questions focusing on medical information and whether they recommend this hospital to family and friends. Compared to their age group not admitted to the ER, they gave lower scores in questions that focus on nurse assistance and help to use the bathroom. In the very elderly, waiting time inside the ER is not correlated with satisfaction (Fig. 3A). However, short ER stay and transfers to another hospital unit increase patient satisfaction score (*P* value = .034).

Patients with COPD (*P* value = .05) and vascular diseases (*P* value = .049) reported low levels of satisfaction (Fig. 3B). Among COPD patients, admission through ER and age ≥80 worsened the satisfaction level. Vascular disease patients are generally dissatisfied with the care received, especially with peripheral vascular diseases and aneurysm. Other patients dissatisfied were those that had ICU visits (*P* value = .003). In this group, dissatisfaction varied according to the severity of their condition. Patients with extended LoS also had low levels of satisfaction (*P* value <.001). As LoS started to increase (>3 days), satisfaction decreased; however, this correlation changes after 15 days, when satisfaction scores increased (Fig. 3C).

Lastly, we have areas that did not influence patient satisfaction scores (Fig. 4). These were the number of procedures a patient underwent during their stay (*P* value = .561), hospital-acquired condition (*P* value = .125), time of first intervention in the ward (*P* value = .685), and first-time physician consultation (*P* value = .515).

To address the variables that led to lower or no satisfaction scores, the hospital implemented various programs, including BCCR, BPA, CONNECT, and AIDET among others. The results of these interventions were measured by comparing the post-intervention HCAHPS scores. BCCR boasts of a multidisciplinary team approach that prepares for patients discharge from day

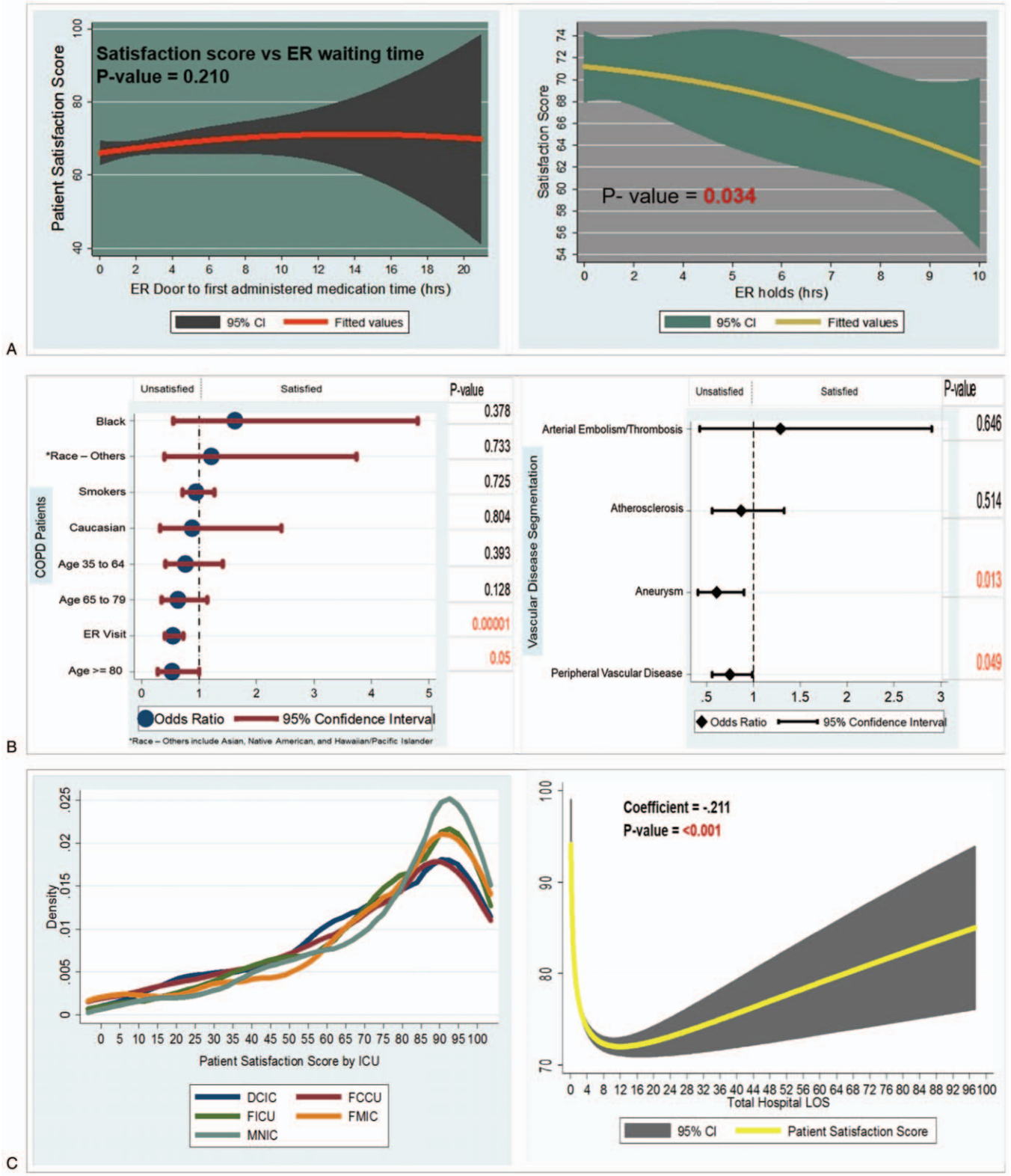

Figure 3. Variables with low satisfaction score. Patients reported low levels of satisfaction correlated with elderly, emergency room visits, intensive care unit stay, and chronic diseases.

1, impacts on our registered nurse communication composite, and provides patients and their families with daily access to the care team, even on weekends. These actions promote effective communication and overall satisfaction for patients and their families. The units scores were in the red and below threshold in all 3 areas before implementing bedside care coordination rounds. After implementation, we observed improvement in scores (Fig. 5A). To mitigate the ER holding times, implementing

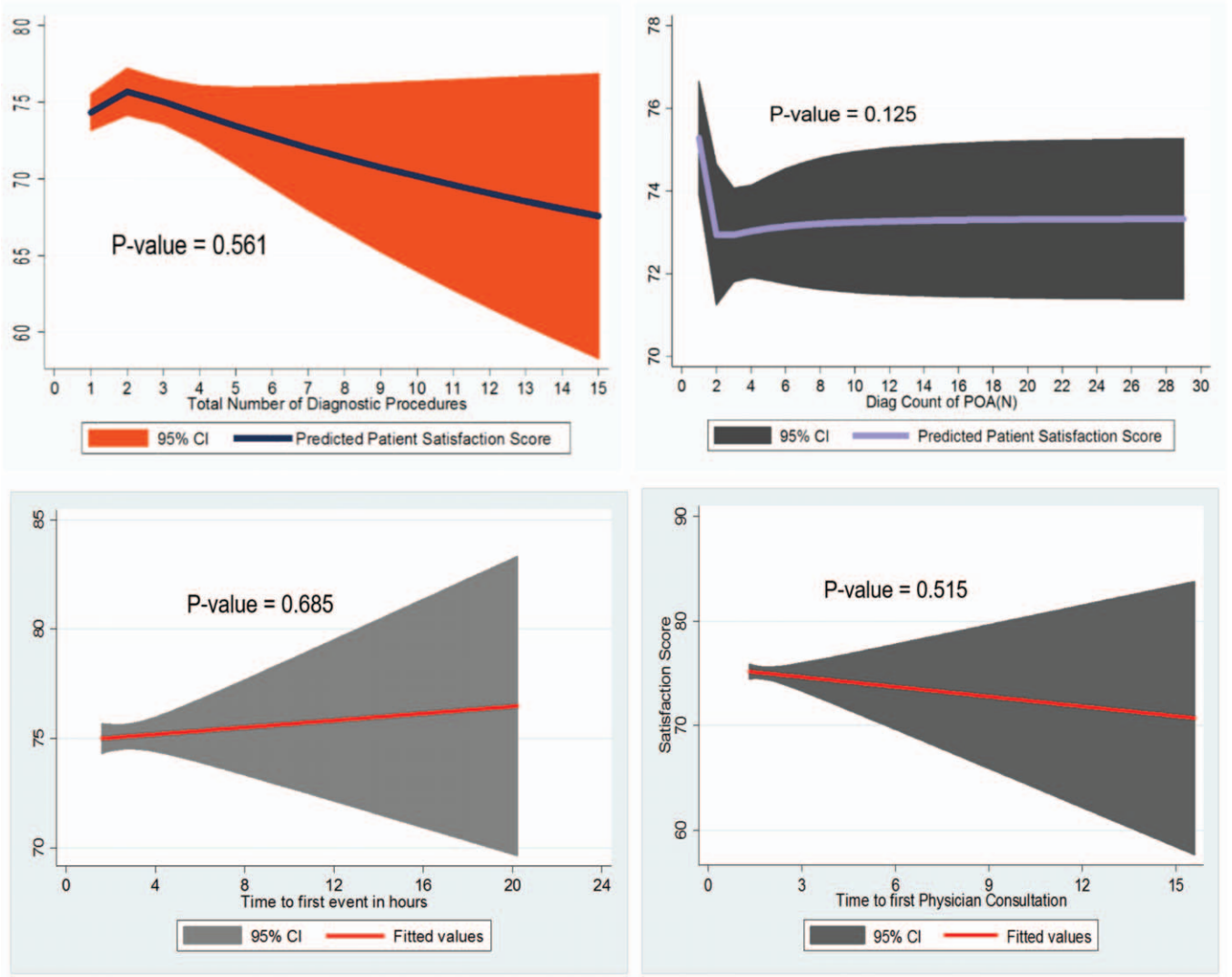

Figure 4. Hospital variables that did not affect the patient satisfaction score. Top (Left to right): Number of procedures performed on the patients while hospitalized; Hospital-acquired conditions during patient hospitalization. Bottom (Left to Right): Time the first event/action while hospitalized took place; Time after hospitalization that patient saw a physician.

the AIDET framework has improved patient-provider communication in our hospital. We believe they have equally contributed to improving patient satisfaction. When an RN scans a new medication during medication administration, the BPA displayed on the screen prompts the nurse to speak to the purpose and side effects, which increases RN Communication scores. Patients who participate in the CONNECT Call report higher satisfaction with multiple experience components versus those who did not participate (Fig. 5B).

4. Discussion

Patient satisfaction correlates with the use of health services, influences patient compliance, and promotes continuity of care. Houston Methodist has created the ICARE value system (Integrity, Compassion, Accountability, Respect, and Excellence), supporting key practice elements that provide for successful, positive patient experience.

4.1. Variables associated with low satisfaction scores

The elderly groups with lowest satisfaction score were those admitted through ER, experienced long waiting times, or had chronic diseases (especially COPD). Other patients reporting low scores were also associated with these factors, as well as ICU admissions and extended LoS. Long wait times in the ER was found to impact satisfaction scores negatively. Patients satisfaction is sensitive to the examination room waiting time, which is heavily influenced by overcrowding services.[9] Patients with chronic conditions with several degrees of complexity such as COPD and vascular diseases also showed low satisfaction scores. The main causes of COPD patients hospitalization are acute exacerbations caused by suboptimal treatment adherence, the presence of concomitant conditions leading to complex medication regimens, and insufficient understanding of drug use.[10] The level of patient satisfaction heavily depends on the adequacy of communication between clinician and patient.[11]

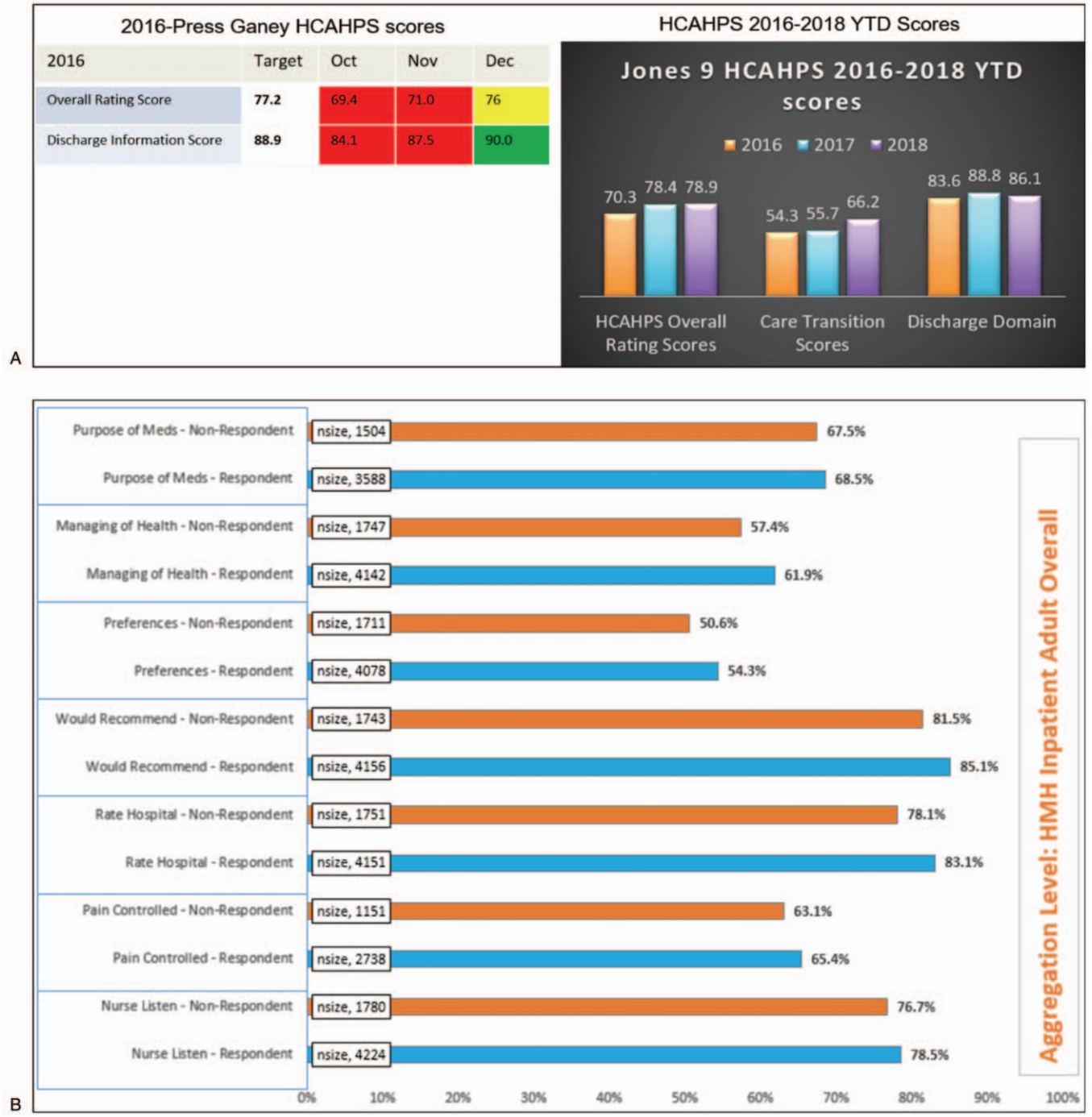

Figure 5. Implementation of programs to improve patient satisfaction. A. Before implementation of bedside care coordination rounds in a hospital unit (Jones 9), the scores were declining and inconsistent (red) but after implementation the scores have been trending in positive directions between threshold and target. B. Higher scores obtained all through from CONNECT Transitions call responders (blue) against non-responders (orange).

In our study, a LoS between 3 and 15 days was associated with low scores, with a peak at 10 days of hospitalization. Previous studies have found that these patients source of dissatisfaction was comfort, visiting options, and cleanliness. Our hospitals current recommendations and approaches for the elderly population are geared to improve communication with these patients. Examples of these actions are a detailed discussion of the treatment plan, and encouraging patients to ask questions and for prompt assistance. Meanwhile, for patients with vascular diseases, it is recommended to provide more synchronized care and education about their condition to treat associated conditions such as hypertension and hyperlipidemia.[12] Our institution schedules post-discharge follow up to better serve patients with chronic conditions while patients are still hospitalized. A discharge educational material called After Visit Summary (AVS) is provided to detail follow up appointments and medical care information.

Patients in the ICU gave low satisfaction scores. Potential factors are the ICU environment, disease severity, and family receiving contradictory information.[13] In many situations, ICU patients cannot make decisions due to unconsciousness or extreme sedation, and the family ends up becoming surrogate decision-makers.[14] Areas of concern for the family are the ICU environment, the care process, sufficient information, and quality communication with medical professionals. ICUs are staffed with patient liaisons who coordinates with care providers and facilitate a centered care environment to patients and their families. This approach responds to a new tendency to change critical care delivery from paternalistic to more family-centered. Multidisciplinary meetings can improve communication between family members and the healthcare team and facilitate end-of-life decisions if needed.[15]

To shorten LoS, it is recommended to use checklists and improve communication, teamwork, continuity of care, and coordination among care providers to ensure efficient patient discharge process.[16] The BCCR described above is also designed to reduce LoS as discharge plans are made and coordinated among the care team from the first day of admission.

4.2. Variables associated with neutral satisfaction scores

It is important to identify factors that can be implemented to avoid a negative satisfaction score and promote a positive one. For example, unlike in our findings, the number of procedures usually correlates with negative satisfaction.[17] A high number of procedures translates to multiple care providers and risks deficient communication with them. From these findings, we can conclude that to have positive satisfaction when a patient needs multiple procedures, it is important to maintain strong continuity and coordinated care to avoid any conflicting information and keep the patient and family well informed throughout the treatment.[18] To address this issue, Houston Methodist medical teams are reminded to have a clear communication and an integrative, interdisciplinary approach to address patient and family needs.

Hospital-acquired conditions (HAC) did not impact patient satisfaction. This could be explained by the actions of the care team after the HAC was detected and how it was handled.[19] At Houston Methodist, these actions are grouped in service recovery that includes addressing the situation fast and aggressively, apologizing to the patient, and ensuring the patients are satisfied with the rest of their care. Therefore, to improve satisfaction in the case of HACs, it is recommended to reinforce existing protocols to avoid HAC in the first place and when they happen to deploy a strong service recovery protocol and act quickly to decrease any major complication.

Increased waiting times can set a negative impression on the hospital and healthcare workers, affecting the perception of information, instructions, and treatment provided.[20] Studies have shown that to improve the patient experience, all the steps before a medical event should be minimized while the time spent on the procedure and with the doctor maximized.[21] To address issues resulting in service delays, several strategies have been developed and recommended, including advancing exams and lab tests, preparing care with a personal assistant, and proper communication about the cause of any delay.[22] The practice at Houston Methodist is the use of service recovery, delay acknowledgment, and individualized solution aid while employing our ICARE values and the AIDET principles.

4.3. Variables associated with high satisfaction scores

Patients from minority communities usually feel more comfortable with care providers from a similar culture and racial background, awareness or sensitivity. The ICARE values place an important focus on cultural awareness and offering service that is culturally sensitive.

Hospitals with high surgical volume, like Houston Methodist, tend to have high overall patient satisfaction.[23] This can be explained by patients impression of the systems in places as well as a greater number of providers, nurses, and other resources that the patients acknowledge.[24] Surgical patients might be nervous and in need of extra assurance before surgery, then once in recovery, they can benefit from proper nurse assistance, and when discharged, proper instructions for recovery and billing assistance.[25] To meet these needs, Houston Methodist applies frequent rounding, including BCCR, in perioperative areas to answer patients and family questions. Then post-discharge, patients were followed up with the CONNECT Transitions program to assess their recovery.

Oncology patients expressed high levels of satisfaction. Cancer places considerable stress on patients and requires them to make major life adjustments. To address these needs, health care providers need to go beyond their clinical duties and provide emotional support, information to family members, care coordination among specialists, lifestyle explanation, and practical issues such as parking for medical appointments and treatment costs. Oncologic patients greatly value the information provided by medical staff about their illness and treatment, the time spent with the physician and the interpersonal skills of the physician. Given the importance of patient satisfaction to treatment compliance, it is recommended that oncologists consider evaluating patient expectations for support, issues concerning treatment planning (including side effects and fatigue), and involving the family in medical decisions.

4.4. Limitations

First, a limitation of this study is that we only analyzed data from our 8-hospital system whose patient mix may differ from other hospitals. However, it is noteworthy that Houston Methodist Hospital is set in one of the largest medical centers in the World and within one of the most ethnically and racially diverse cities in the United States. Second, we only used the HCAHPS results as an indicator of patient satisfaction. One of the criticisms of HCAHPS score is its evaluation of hospital care in terms of its ability to offer a positive experience, which puts pressure on hospitals to do things to improve satisfaction that might compromise clinical protocols.[26] Third, patient outcomes were not analyzed, though they could provide additional information helpful to determine the effectiveness of care delivery. Lastly, the study was a non-randomized study that strived to control the cohorts' differences with a multivariable regression analysis. There may be unmeasured differences that we were unable to control. Deeper analysis on the post-implementation satisfaction scores was also beyond the scope of this study. A more comprehensive study addressing these limitations is being planned.

5. Conclusion

This study has helped us obtain useful information for healthcare workers, health managers, and executives to devise policies and measures for addressing patients satisfaction.[27] Equally impor-

tant is the need to address patients perception and expectations of medical service.[28] Treating patients with high levels of respect and dignity and getting them involved in their treatment decisions are aspects that patients value highly.[29] The aforementioned factors informed the design and introduction of several measures and new interventions by Houston Methodist Hospital since 2016 for addressing coordination of care, improving patient safety, reducing the length of stay, and ultimately improving patient satisfaction. These approaches have been translated into improved patient services and appreciable enhancement of our patient satisfaction ratings.

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