

REVIEWS

An environmental analysis of the evolution of readmission reduction strategies: A study of United States hospitals

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ABSTRACT

Objective: Environmental factors have changed the manner in which issues in the U.S. healthcare industry are addressed. One of these changes is in the area of quality improvement, specifically readmission reduction. The purpose of this paper is two-fold: (1) analyze macro-environmental segments (political, technological, economic, and socio-demographic); and (2) trace the historic evolution of readmission reduction programs to understand how macro-environmental factors have shaped the development of readmission reduction strategies.

Methods: Scopus, PubMed, and ABI/Inform electronic databases were searched for articles on readmission reduction programs from 2000 to 2014. In addition, literature on macro-environment was retrieved from these sources for the same time period. Studies were identified using specific search terms and inclusion criteria. A total of 24 articles were selected for review. Data on the following variables were extracted: type of organization studied, type of quality improvement strategy used, type of patients studied, and results of the strategy. In addition, an examination of macro-environmental factors that may have affected the above variables was done. Finally, results were integrated and presented in a chronological order.

Results: Findings suggest that macro-environmental factors have influenced the development of readmission reduction strategies over time. This paper informs healthcare managers about being cognizant of environmental trends when devising readmission reduction strategies within hospitals.

Conclusions: Insights from this paper urge hospital administrators to forge collaborations with key stakeholders while developing new quality improvement strategies when facing an unstable and complex environment.

Key Words: Environmental analysis, Readmission reduction, External environment

1. INTRODUCTION

The external environment has shaped the quality improvement journey in healthcare. During the last decade of the 20th century, macro-environmental forces contributed to significant changes in the healthcare environment. One of these

significant changes- the quality improvement movement- happened after the generation of the first Institute of Medicine (IOM) report, "To Err is Human", in 1999. The report emphasized prevention of medical errors, complications, and adverse medication events for a better quality

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healthcare.^[1] Improper medical management that leads to medical errors, complications, and adverse medication events costs hospitals nationwide up to \$17-\$29 billion per year.^[1,2] Hospital readmissions are an outcome of expensive medical errors and complications and are considered an important quality indicator in healthcare.

Hospital readmission is defined as an “occurrence when a patient is admitted to a hospital within a specific time period after being discharged from an earlier hospitalization”.^[3] Hospital readmissions warrant attention as a quality improvement concern - re-hospitalization is stressful for patients - and reimbursement has been tied to readmission rates in recent years. Under the Hospital Readmission Reduction Program, the Centers for Medicare and Medicaid Services (CMS) penalize hospitals with relatively higher rates of Medicare readmissions. The CMS estimate of total penalties is \$290 million in FY 2013, \$227 million in FY 2014 and \$428 million in FY 2015.^[3,4]

The data cited above drives the need to reduce wasteful expenditure on unnecessary readmissions. Extant literature lacks studies that describe the environmental forces impacting readmission reduction strategies within healthcare organizations. This study fills this gap by examining both the evolution of readmission reduction programs under the large umbrella of quality improvement and the macro-environmental factors that have shaped those strategies. From the practice perspective, this research will inform hospital managers about trends in quality improvement programs. An external environment analysis will assist managers in strategically positioning their organizations in terms of quality improvement programs in a dynamic healthcare industry. Against the backdrop of rapidly changing economic, technological and regulatory aspects of the U.S. healthcare setting in which organizations have adopted quality improvement strategies over the last decade, this paper examines the macro-environmental factors that may have led to those strategies. Our research question is as follows:

How have United States hospitals adapted readmission reduction strategies in responding to the rapidly changing external environment during the first decade of the 21st century?

2. METHOD

We performed a comprehensive literature review of readmissions programs in the quality improvement area of healthcare (see Figure 1). Literature pertinent to environmental analysis was also searched, but for this section we will focus on the literature review on readmission reduction strategies only.

2.1 Inclusion/exclusion criteria

Step 1: Bibliographic search

We conducted a bibliographic search using Scopus, PubMed, and ABI/Inform electronic databases to include both healthcare and business/management journals. We searched keywords to identify healthcare studies that discussed quality improvement strategies with a focus on readmissions. In addition to “healthcare”/“health care”, we searched for any of the following combinations: “quality improvement”, “quality” and “improvement”, “readmission reduction” or “readmissions”. Only those articles that appeared in peer-reviewed journals, were written in English language, and were published between 2000 and 2014 were considered. We found 21 articles in Scopus, 18 articles in PubMed and 8 articles in ABI/Inform in Step 1 (n = 47).

Step 2: Hand search

We recognized that relevant studies that did not appear in the above databases might have been referenced in the bibliography section of selected articles. The next step was to perform a hand search of the reference lists of selected articles. Studies were included in the review if they met the following criteria: (1) described a new quality improvement strategy resulting in reduction of readmissions and (2) discussed a different setting or organization than those selected in Step 1.

Step 3: Applying exclusion criteria

Of the 47 articles that were found in Step 1, three were excluded because they were not in the English language. Nine were excluded because they were not relevant to U.S. healthcare, and one was excluded because it did not appear in a peer-reviewed journal. After filtering for the above criteria, a total of 34 articles were left. We read through each article to eliminate duplicates. If more than one article discussed the same readmission reduction strategy within a single organization, only one of the articles was used. After applying these exclusion criteria, 13 articles were eliminated, leaving a total of 21 articles. In Step 2, an additional three articles were included in the original list as they were identified in the hand search of reference lists. A total of 24 articles were selected for review of the readmission reduction programs.

2.2 Variables examined

Five variables were extracted from each of these articles: year of publication; type of organization studied; type of strategy used; type of patients examined; results of the strategy. There were some articles that were missing one or more of these variables or did not explicitly mention each one of them. In addition to examining the general characteristics of each study, we also examined the macro-environmental

factors that may have affected those general characteristics. To do so, we looked at political and regulatory, technological, economic, and social factors during the time of the study. These factors have been identified in the strategic management literature as relevant to managerial decision-making. Trends in each of these areas (e.g., aging of the population, development of new technology) have significant impacts on organizational operations, “regardless of the industry”.^[5] Given the impact of the 1999 IOM’s report on quality improvement activities, we considered 2000 as the first year of literature review in our study to allow some time lag between when the report was published to appearance of literature on

quality improvement.

2.3 Analysis

Information related to the variables of interest was tabulated as part of the analysis of readmission reduction programs in the United States. Findings were organized in tables in chronological order to present information from each article that was reviewed. In addition to information from the literature on readmissions, Table 1 also contains relevant external environment factors over the 14-year time period. A macro- environmental analysis is presented in subsequent paragraphs.

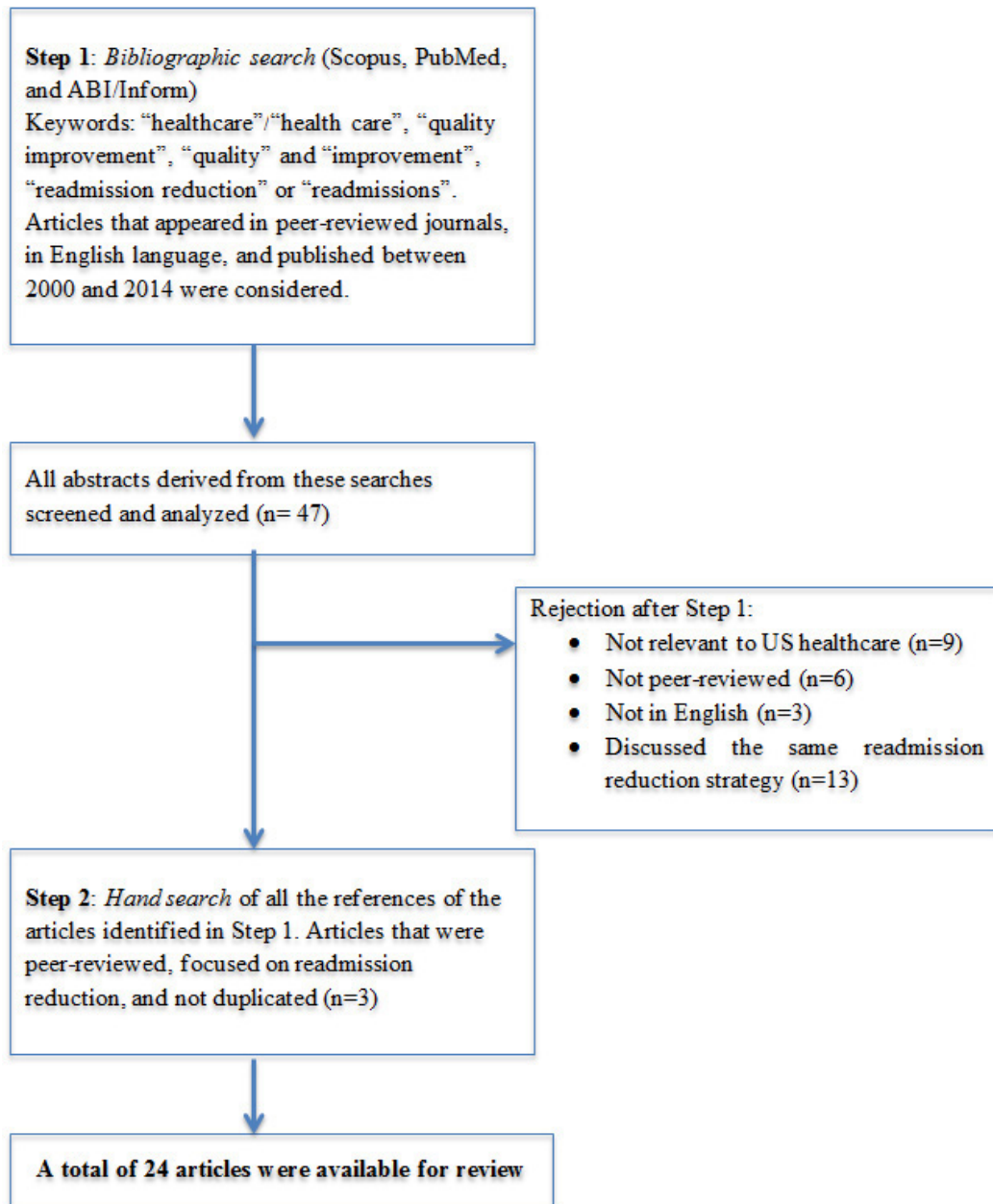


Figure 1. A visual representation of the steps followed in review

Table 1. Healthcare studies that address the interventions used to lower readmission rates, their efficacy and macro environmental factors during 2000-2014

Year	Author(s) of study	Type of organization studied	Type of Quality Improvement (QI) strategy used	Type of patients studied	Results achieved by Quality Improvement strategy	Macro-environmental factors
2000	Hughes et al.	Veteran Affairs (VA) medical centers across United States (16)	Team managed home based primary care		Improved Quality of Life (QoL), satisfaction with care, reduced readmissions at 6 months.	The Institute of Medicine report "To err is human" was published in 1999. President Clinton's Healthcare Reform in 1993, "Quality is something we can't leave for chance".
2001	Barth		Nurse managed telephone calls post discharge	Heart Failure (HF)	QoL improved	The IOM report "Crossing the Quality Chasm" was published
2004	Naylor et al.	Philadelphia academic and community hospitals (6)	Transitional care intervention by nurses	HF	Reduced total no of readmissions, and healthcare costs.	Hospital discharges for heart failure increased by 155% during the last 20 years, and heart failure is the most frequent cause of hospitalization in persons aged 65 years or older
2006	Kay et al.	Carolinas Medical Center	Integrated care management system model	All causes	30-day readmission rate decreased	
2008	Hallerbach et al.	Large community teaching hospital	Retrospective chart review to determine specific characteristics common to patients readmitted within 30 days	HF	Focusing on renal failure led to major improvements in early readmission rates	
2008	Woodend et al.		3 months of telehome monitoring	HF	Number of hospital readmissions and days spent in the hospital reduced, improved quality of life and functional status	
2009	Berry et al.	Geisinger health system	Integrated delivery system with process redesign: evidence based practices, multidisciplinary approach, real time data collection	HF	Frequency and length of readmissions decreased. Mean hospital charges also decreased	H.R. 3200- 111 th congress (2009): Proposal to reduce payments to hospitals to account for excess readmissions. The HITECH act is signed into law. Beginning in 2012, CMS will rank hospitals based on 30-day readmission rate for heart attack, failure and pneumonia. Those in bottom quartile nationally from the prior year will have a percent of total Medicare payments withheld up to 1% in 2013, up to 2% in 2014, and up to 3% in 2015.
2010	Ballard et al.	8 acute care hospitals and 2 specialty heart hospitals	Standardized heart failure set	HF	Reductions in 30-day mortalities and readmissions.	Patient protection And Affordable Care Act of 2010.
2010	Amarasingham et al.		Real time electronic predictive model that identifies HF patients that are at risk for readmissions or death	HF	Improved readmission prediction	
2011	White N.W.		Home to Health (H2H) national QI initiative by Institute of Healthcare Improvement (IHI)			
2011	Vaughan-Sarrazin et al.		VA surgical QI program	General surgery patients	Incidence of surgical complications decreased and reduced healthcare costs.	Joint Commission article on standardized hospital discharge planning at Mayo clinic.
2012	Kaboli et al.	129 acute care VA hospitals	Reducing Length of Stay (LOS) can help reduce readmission rates	HF, Chronic Obstructive Pulmonary Disease, Acute Myocardial Infarction, Pneumonia	By reducing LOS, readmission rates improved to some extent.	Readmission reduction program established by Centers for Medicare and Medicaid Services. Hospitals with excessive readmissions to be penalized.
2012	Golden and Shier; Markley et al.		Community based care transition program			
2012	Lago et al.; Goldfield et al.		Potentially preventable readmission software		Developing definition of readmission, quantitative analysis helps in reducing readmission rates.	AHRQ- tools for clinicians to avoid preventable readmissions.
2012	Claffey et al.		Robust data sharing, information systems sharing, analytical support, care management, joint strategic planning		56% fewer readmissions and other patient centered outcomes improved.	
2012	Neuwirth et al.	Kaiser Permanente hospitals in Southern California, Hawaii and Colorado	Video ethnography		Readmissions reduced from 13.6%-9% in 6 months	
2013	Bradley et al.	Web based survey of 599 hospitals enrolled in these campaigns	State Action on Avoidable Rehospitalization (STAAR) and H2H (hospital to Home)		Opportunities for improvement exist for hospitals adopting these initiatives.	4 year STAAR initiative by Institute for Healthcare Improvement started in May 2009 and ended in June 2013. Development of Readmissions Diagnostic worksheet tool by IHI.
2013	Basoor et al.	48 patients in randomly selected group	Quality Improvement Heart Failure checklist	HF	Use of a HF checklist is associated with lower readmission rates.	

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Table 1. (continued.)

Year	Author(s) of study	Type of organization studied	Type of Quality Improvement (QI) strategy used	Type of patients studied	Results achieved by Quality Improvement strategy	Macro-environmental factors
2014	Burke et al.	Literature review to identify interventions that work	Ideal Transition care (ITC) framework to develop interventions		Monitoring symptoms after discharge, social and community support, and educating patients to promote self-management helps reduce readmissions	
2014	Jackson et al.	18 Kaiser Permanente northern California hospitals	Chart reviews, interviews with patients and families, nurse and physician evaluation. Reassessed with Potentially Preventable Readmission software (PPR) Reduce Acute Care Transfers (INTERACT) quality improvement program for identification, evaluation, and management of acute changes in condition of nursing home residents		Manual review better than automated classification.	
2014	Ouslander et al.	Nursing home residents	Heart Failure Quality Improvement program		To be rolled out by federal government. Expected to improve readmission rates.	Hospital Value Based Purchasing and Medicare Spending Per Beneficiary measure to incentives high quality hospitals
2014	Ryan et al.	University of Connecticut Health Center	Community Health Workers (CHW) Intervention		Readmissions can be prevented with this Quality Improvement program	
2014	Burns et al.	Academic medical center and 10 affiliated adult primary care practices in Boston area			Lower readmission rates among CHW patients	

3. RESULTS

This section discusses the evolution of readmission reduction strategies and external environment analysis.

3.1 Evolution of readmission reduction strategies

We reviewed a total of 24 studies that were published from 2000 to 2014. Studies from the early 2000s show hands-on efforts by nurses (e.g. manual chart reviews and making phone calls to patients). Team-managed, home-based primary care could improve quality of life, satisfaction with care and reduce readmissions at six months.^[6] A quality improvement strategy in which nurses made telephone calls post-discharge improved quality of life for heart failure patients.^[7] A similar intervention involves transitional care by nurses, which helped in reducing the total number of readmissions as well as healthcare costs at six academic and community hospitals for patients with heart failure.^[8] An integrated care management system model was developed at Carolinas Medical Center that helped in reducing 30-day readmission rates for all-cause patients.^[9] Subsequently, a retrospective manual chart review at a large community teaching hospital found that focusing on renal failure alone could lead to major improvements in readmission rates.^[10] Telehome monitoring was also found to reduce the number of readmissions and to improve functional status, leading to better quality of life.^[11]

In the mid-2000’s, readmission reduction strategies gained a process improvement perspective, which involved an integrated delivery system model, process redesign, evidence-based practices, a multidisciplinary approach, and real time data collection.^[12] A process improvement approach led to a decrease in average hospital charges and lower readmission rates. In the latter part of the 2000’s, interventions became more inclusive of technology. In addition, studies found that an electronic predictive model had the potential to identify

heart failure patients at risk for readmissions or death and demonstrated the use of a heart failure order-set that helps in reducing readmissions.^[13,14] In 2011, we found a few publications on hospital to home (H2H) quality improvement initiatives and surgical quality improvement programs.^[15] The Veteran Affairs surgical quality improvement program assisted in decreasing surgical complications and readmission rates.^[16]

In 2012, there was a dramatic rise in studies on readmissions. Health care reform proposals from 2009 suggested the use of financial penalties for high readmission rates; it is plausible that changes in hospital reimbursement contributed to increased interest.^[17] One study found that readmission rates can be reduced to some extent by reducing the length of stay for patients.^[18] Community care transition programs have also demonstrated effectiveness in reducing readmissions.^[19,20] Several studies in 2012 and 2013 discuss the efficacy of potentially preventable readmission software that performs quantitative analysis to lower readmission rates.^[21–23] Other researchers discuss robust data sharing, information systems sharing, analytical support, care management and joint strategic planning to improve outcomes.^[24] Video ethnography, an intervention developed at the Care Management Institute at Kaiser Permanente, focused on patients, their family caregivers and on pivotal transition points in healthcare delivery.^[25]

In 2013, a study surveyed patients enrolled in the State Action on Avoidable Readmission (STAAR) and Home to health (H2H) campaigns and uncovered opportunities for improvement in these campaigns.^[26] Two studies found that a quality improvement heart failure checklist tool was effective in lowering readmission rates.^[27,28] A 2014 study reviewed literature on successful readmission reduction strategies. This

study found that monitoring symptoms after discharge, providing social and community support, and educating patients to promote self-management helps reduce readmissions.^[29] A study at Kaiser Permanente hospitals demonstrated that manual chart reviews were more effective at reducing readmissions than automated classifications done by technical software programs.^[30] Researchers studied nursing home residents and found that the Interventions to Reduce Acute Care Transfers (INTERACT) quality improvement program for identification, evaluation, and management of acute changes in the condition of nursing home residents can be expected to reduce readmission rates.^[31] Another study found that outreach telephone calls to recently discharged patients facilitated appropriate post-discharge care and lowered readmission rates.^[32] To summarize, we found a gradual shift

of focus from manual efforts to process improvement approaches, and later, to technological interventions within readmission reduction programs.

3.2 External environment analysis

Readmission reduction programs evolved over a period of several years. Certain macro-environmental factors significantly contributed to the development of these programs. The IOM has identified forces in the external environment that drive quality improvement. These forces have been grouped into two headings - (1) regulatory/legislative activities and (2) economic and other incentives.^[1] Table 2 summarizes discusses regulatory, economic and technological forces in the form of opportunities and threats posed by the external environment.

Table 2. Opportunities and threats in the external environment

EXTERNAL ENVIRONMENT ANALYSIS (OPPORTUNITIES AND THREATS)	
External environment opportunities	External environment threats
<ul style="list-style-type: none"> • Tools and initiatives developed by leading quality institutes like Agency for Healthcare Research and Quality, Institute for Healthcare Improvement • Financial incentives to use Health Information Technology for Quality Improvement purposes 	<ul style="list-style-type: none"> • Increase in incidence of Heart Failure in the 21st century • Increasing medical costs • Expense of technology • Medicare and private payers reduced reimbursements • Regulations

3.2.1 Political and regulatory environment

An early development was President Clinton’s healthcare reform of 1993 with “Quality” as its 5th principle that said “Quality is something we cannot leave to chance”.^[33] Although this reform was not passed, it raised awareness of quality as a healthcare issue and spurred managers to initiate various quality improvement efforts. Before the release of the first IOM report in 1999, stories on healthcare quality often did not make it to the headline news except for occasional scandals. Given the overall lack of attention, quality improvement efforts failed even as if they were initiated.^[34] With this report, the media, the public, and to a large extent, healthcare professionals became aware all at once that loopholes in patient safety are not acceptable.^[35] In 2001, the second IOM report, “Crossing the Quality Chasm” was released. This report outlines efficiency, efficacy and patient-centeredness among aims of healthcare quality.^[36] It created further pressure on professionals to innovate efficient quality improvement strategies. Lowering readmission rates achieves efficiency by reducing waste while increasing patient-centeredness. Around this time, the healthcare

industry became more aware of quality issues. This heightened awareness was a driving force behind Affordable Care Act (ACA) regulations under the Obama administration.^[37] Several provisions of the ACA aim to improve healthcare quality by abandoning the traditional fee-for-service model and linking reimbursement for services to hospital performance.^[38] Bundled payments, Medicare readmission reduction programs, and pay-for-value programs are examples of such measures.^[39]

3.2.2 Technological environment

The Health Information Technology for Economic and Clinical Health (HITECH) Act, which was part of the American Recovery and Reinvestment Act of 2009, stimulated hospitals and healthcare professionals to advance the health of Americans by meaningful use of information technology. Under this act, hospitals would obtain financial incentives if they used information technology (e.g., electronic health records) to improve quality, safety and efficiency of healthcare while engaging patients and their families in care.^[40-42] The HITECH Act worked as a regulatory, technological and

economic force for hospitals to lower readmission rates by making hospitals dependent on resources in the external environment.^[43] It provided financial incentives for organizations to adopt information technology to improve healthcare quality.^[44] However, the expense involved in adopting technology was a threat to achieving goals of quality improvement.^[45]

3.2.3 Economic environment

Hospitals depend on scarce resources from the CMS and private payers. Reporting quality outcomes (including readmission rates) to CMS is mandatory; hospitals are penalized if they fail to meet quality targets. A bill that was introduced in the 111th Congress session in July 2009, proposed to reduce payments to hospitals to account for readmissions. In 2012, penalties for hospitals that had excessive readmission rates became mandatory, resulting in a spike in publications related to readmissions.

In the same year, CMS began to rank hospitals based on 30-day readmission rates for heart attack, heart failure and pneumonia. Those in the bottom quartile nationally from the prior year would have up to 1% of total Medicare payments withheld in 2013, up to 2% in 2014, and up to 3% in 2015.^[46] In 2015, the Medicare Spending per Beneficiary (MSPB) measure was introduced as part of the Hospital Value Based Purchasing (HVBP) program. CMS measures cost of care through this measure and provides financial incentives to those hospitals that provide high quality care at lower cost.^[47-49] Limited discretionary funding, rising medical costs, high performance standards, and a general uncertainty about connecting hospital reimbursement to quality became the norm, and the external environment became stringent for hospitals experiencing excess readmissions.

3.2.4 Socio-demographic trends and stakeholders

The incidence of heart failure was ascending at the beginning of the 21st century.^[50] Hospital discharges for heart failure increased by 155% during the first couple decades of the 21st century, and heart failure was determined to be the most frequent cause of hospitalization in persons aged 65 years or older.^[51] In addition, the readmission rates within 30 days of discharge with heart failure were very high, which imposed a burden on population greater than 65 years of age.^[50,51] This environmental factor increased the population of people both with index admissions and readmissions for heart failure. However, on the positive side, leading quality institutes, such as the Institute for Healthcare Improvement (IHI) and the Agency for Healthcare Research and Quality (AHRQ), were developing quality improvement tools, which became valuable resources to achieve desired readmission rates.^[52]

Understanding the influence of key stakeholders is important to understand their contributions to quality improve-

ment. The principal stakeholders in readmission reduction programs are the U.S. Congress, President, CMS, hospitals, health professionals, patients, competitors and leading quality institutes. Each of these entities is invested in the success of these programs.^[4] The Congress, President and CMS may affect the political environment, while CMS and competitors may play an economic role. Patients determine the social and demographic environment, while health professionals influence the regulatory side. Quality institutes provide a consultative and interactive role. These stakeholders contributed to the development of readmission reduction programs over 14 years and the trend needs to continue.

4. DISCUSSION

We found that readmission reduction programs as part of quality improvement strategies have evolved with the changing demands of the industry's external environment. During our study period, readmission reduction strategies evolved from manual efforts (e.g., follow-up using telephone calls after discharge) to process improvement efforts, and gradually to technological interventions. In addition, we found that readmission initiatives have to be patient-centered for optimal results. During our study period, resources in the external environment were constrained. Organizations strived to fit themselves with changes in the environment thus leading to a generation of strategies to reduce excess readmissions. Political, technological, economic, and social forces have played an instrumental role in readmission reduction program development and expansion.

This study has some limitations. We may have inadvertently missed those quality improvement studies that include readmission reduction strategies, but were not published in academic journals. Future studies should include articles that were presented at professional associations and conferences and focused on readmission reduction. Furthermore, our study period may be short and may have not captured recent readmission reduction strategies. Studies in the future should include a longer study period.

Our study has important implications. Hospital managers learn that it is imperative to collaborate with quality improvements and external stakeholders to improve the quality of healthcare delivery at their organizations. Despite the progress in readmission reduction programs that was achieved in the first part of the 21st century, readmission rates are still high.^[3,53] Given the continued changes in the external environment, our study shows that there is a need to devise new readmission reduction strategies within the context of current macro-environmental changes. To succeed, healthcare managers can draw upon findings from this study to better understand how macro-environmental forces would

shape their readmission reduction strategies.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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