

ORIGINAL RESEARCH

Quality Collaboratives and Campaigns to Reduce Readmissions: What Strategies Are Hospitals Using?

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BACKGROUND: Reducing hospital readmissions is a national priority, and many hospitals are participating in quality collaboratives or campaigns.

OBJECTIVE: To describe and compare the current use of hospital strategies to reduce readmissions in 2 prominent quality initiatives—STAAR (State Action on Avoidable Rehospitalization) and H2H (Hospital-to-Home Campaign).

DESIGN: Cross-sectional.

METHODS: Web-based survey of hospitals that had enrolled in H2H or STAAR from May 2009 through June 2010, conducted from November 1, 2010 through June 30, 2011 (n = 599, response rate of 91%). We used standard frequency analysis and multivariable logistic regression to describe differences between STAAR and H2H hospitals.

RESULTS: Many hospitals were not implementing several of the recommended strategies. Although STAAR hospitals

tended to be more likely to implement several strategies, differences were attenuated when we adjusted for region and ownership type. In multivariable models, STAAR hospitals compared with H2H hospitals were more likely to ensure outpatient physicians were alerted within 48 hours of patient discharge (63% vs 38%, $P < 0.001$), and more likely to provide skilled nursing facilities the direct contact number of the inpatient treating physician for patients transferred (53% vs 34%, $P = 0.001$). H2H hospitals were more likely to assign responsibility for medication reconciliation to nurses usually or always (80% vs 54%, $P = 0.001$) and more likely to give most or all discharged patients referrals to cardiac rehabilitation services (59% vs 41%, $P = 0.001$).

CONCLUSIONS: Substantial opportunity for improvement exists for hospitals engaged in STAAR or H2H quality initiatives. *Journal of Hospital Medicine* 2013;8:601–608. © 2013 Society of Hospital Medicine

With US hospital readmission rates within 30 days of discharge approaching 20%,¹ reducing readmissions has become a national priority. Hospitalists are frequently involved in quality improvement efforts to improve transitions from hospital to home,^{2,3} and they play critical roles in implementing recommended strategies to support effective discharge transitions.^{4,5} Initiatives such as Better Outcomes for Older Adults through Safe Transitions⁶ and the adaptable Transitions Tool⁷ from the Society of Hospital Medicine provide important approaches and checklists for helping hospitals improve strategies.⁸

In addition to these initiatives, multiple quality collaboratives and campaigns are underway to help hospitals reduce their readmission rates. Two of the more prominent efforts are the STAAR (State Action on Avoidable Rehospitalization) initiative,⁹ a learning collaborative launched in the fall of 2009 and led by the

Institute for Healthcare Improvement (IHI) and funded in part by The Commonwealth Fund, and H2H (Hospital-to-Home), a national quality campaign led by the American College of Cardiology and IHI with support from several professional associations and partners. Together, these serve more than 1000 hospitals nationally. The STAAR initiative is a state-based collaborative that partnered with more than 500 community groups across 4 states selected for their diverse readmissions performance and support for improvement efforts, including Massachusetts, Michigan, and Washington. After July 2011, efforts expanded to include Ohio. STAAR was designed to work with leadership at the state level including representatives from hospital associations, government payers, private payers, state governments, provider organizations, employers, and business groups. H2H, in contrast, employs a national quality campaign model and focuses on the care of patients with heart failure or acute myocardial infarction. H2H hospitals are encouraged to participate in a set of H2H Challenges, which provide hospitals with recommended strategies and tools for reducing unnecessary readmission and improve transitions of care. Each Challenge project is 6 to 8 months and consists of success metrics, 3 webinars, and 1 tool kit.

Although previous research has examined strategies used by hospitals enrolled in H2H,¹⁰ we know little

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about strategies used by STAAR hospitals within 1 year of enrollment. Such data across these 2 prominent initiatives at baseline can provide a snapshot of strategies used prior to the major efforts to reduce readmission rates nationally and identify gaps in practice to target for improvement. Furthermore, given the distinct designs of STAAR (a state-based learning collaborative in selected regions) and H2H (an open, national campaign), future evaluations will likely compare the effectiveness of these alternative approaches for reducing readmissions.

Accordingly, we sought to describe and compare the reported use of recommended strategies to reduce readmission strategies among STAAR and H2H hospitals. Our findings provide a contemporary view of a large set of hospitals working to reduce readmissions. Findings from this study can provide insight into the strategies used by hospitals that enrolled in a state-based learning collaborative versus a national campaign as well as document a baseline against which future improvements can be measured and evaluated.

METHODS

Study Design and Sample

We conducted a national Web-based survey of all hospitals that had enrolled in H2H and/or STAAR from May 2009 through June 2010 ($n = 658$ hospitals); the survey was conducted from November 1, 2010 through June 30, 2011 and completed by 599 hospitals (response rate of 91%) (see the survey tool in the Supporting Information, Appendix, in the online version of this article). To initiate contact with each hospital, we emailed the primary liaison person for the initiative at the hospital ($n = 594$ hospitals enrolled in the H2H campaign and $n = 64$ hospitals from Massachusetts, Michigan, and Washington enrolled in STAAR). Respondents were instructed to coordinate with other relevant staff to complete a single survey reflecting the hospital's response. Of the total 658 hospitals, 599 completed the survey, for a response rate of 91%. A total of 532 of these 599 hospitals were enrolled in H2H, 55 hospitals were enrolled in STAAR, and 12 hospitals were enrolled in both STAAR and H2H. We excluded the 12 hospitals that were enrolled in both campaigns from our analysis. All research procedures were approved by the institutional review board at the Yale School of Medicine.

Measures

We examined hospital strategies in 3 areas: quality improvement resources and performance monitoring, medication management, and discharge and follow-up procedures. In addition, consistent with our earlier work,¹⁰ we summarized strategies using an index of 10 specific strategies across the 3 domains. The first domain (quality improvement resources and performance monitoring) includes having a quality improvement team for reducing readmissions for heart failure,

or for acute myocardial infarction, or for both; monitoring the percent of patients with follow-up appointments within 7 days of discharge; and monitoring 30-day readmission rates. The second domain (medication management) includes providing patient education about the purpose of each medication and any alterations to the medication list, having a pharmacist primarily responsible for conducting medication reconciliation at discharge, and having a pharmacy technician primarily responsible for obtaining medication history as part of medication reconciliation process. The third domain (discharge and follow-up procedures) includes discharge processes in which patients or their caregivers receive an emergency plan, patients usually or always leave the hospital with an outpatient follow-up appointment already arranged, a process is in place to ensure the outpatient physicians are alerted to the patient's discharge status within 48 hours of discharge, and patients are called after discharge to follow up on postdischarge needs or to provide additional patient education. The summary score ranged from 0 to 10, and its items are supported by a number of studies,^{3,11-28} although definitive evidence on their effectiveness is lacking.

We also examined hospital characteristics including the number of staffed hospital beds, teaching status (hospital that is a member of Council of Teaching Hospitals [COTH], non-COTH teaching hospital with residency approved by the Accreditation Council for Graduate Medical Education, or nonteaching hospital), multihospital affiliation (yes or no), and ownership (for profit, nonprofit, or government) using data from the Annual Survey of the American Hospital Association from 2009. We determined census regions from the US Census Bureau and urban/suburban/rural location from the 2003 Urban Influence Codes. Hospital 30-day risk-standardized readmission rates (RSRRs) were derived from the most recent year of data (July 2010 to June 2011) collected by the Centers for Medicare and Medicaid Services (CMS). RSRRs were calculated using the statistical model as specified by the CMS for public reporting of 30-day RSRRs.^{29,30}

Data Analysis

We used standard frequency analysis to describe the sample of hospitals, the prevalence of each hospital strategy, and the distribution of summary variables, for both H2H and the STAAR hospitals. We examined the statistical significance of differences between the reported use of strategies to reduce readmissions in H2H versus STARR hospitals using logistic and linear regression, adjusted for hospital characteristics that differed significantly between the 2 groups in the bivariate analyses (ownership type and census region). We adjusted for hospital characteristics to isolate the independent association between the initiative (H2H or STAAR) and hospital strategies being employed.

This was important given the significant differences in types of hospitals (by ownership and census region) in the H2H versus STAAR initiatives and reported variation of strategies used by hospital characteristics. Because hospitals completed the questionnaire at different times during the survey period, we adjusted for month of survey completion, but this variable was nonsignificant and therefore eliminated from the final model. We employed $P < 0.01$ as our significance level to adjust for multiple comparisons conducted. This research was funded by the Commonwealth Fund, which had no influence on the methodology, findings, or interpretation. All analyses were conducted in SAS version 9.3 (SAS Institute Inc., Cary, NC).

RESULTS

Characteristics of Hospital Sample

Of the 587 hospitals in our sample, 55 hospitals (9%) were enrolled in STAAR and 532 hospitals (91%) were enrolled in H2H. The roles reported by respondents varied, and many respondents reported having more than 1 role; nearly 60% were from quality management departments, 24% were from cardiology departments, 24% had other clinical roles, 17% were from case management or care coordination, and 7% reported working in nonclinical roles. Hospital characteristics are reported in Table 1.

Hospital Strategies to Reduce Readmission Rates

Many hospitals were not implementing recommended strategies at the time of enrollment. Only 52.7% of STAAR hospitals and 53.4% of H2H hospitals had a quality improvement team devoted to reducing readmissions for patients with AMI (Table 2). Half or fewer hospitals in either initiative reported that they monitored the proportion of discharge summaries sent to the primary care physician or the percent of patients with follow-up appointments within 7 days. Less than 20% of hospitals in either initiative were monitoring readmissions to another hospital (Table 2). Most hospitals in STAAR and in H2H did not have the pharmacists responsible for medication reconciliation, with most assigning nurses this task, and few employed a third-party database regularly for checking historical fill and current refill information (Table 3). In both initiatives, a small minority of hospitals reported that patients were always discharged with a follow-up appointment already made, and less than half of hospitals had assigned someone to follow up on test results that return after the patient was discharged (Table 4).

Differences in the use of strategies by STAAR versus H2H hospitals were significant ($P < 0.01$) in unadjusted analysis for several strategies that were attenuated and nonsignificant after adjustment for census region and ownership type (Tables 2–4). STAAR compared with H2H hospitals were more likely to have: (1) used a multidisciplinary team to care for patients

TABLE 1. Descriptive Characteristics of Surveyed Hospitals

Characteristic	H2H, N = 532	STAAR, N = 55	χ^2 P Value
Teaching status, N (%)			0.185
COTH teaching	70 (13.2)	12 (22.2)	
Non-COTH teaching	105 (19.7)	9 (16.7)	
Nonteaching	357 (67.1)	33 (61.1)	
Number of staffed beds, N (%)			0.598
<200 beds	180 (34.2)	22 (42.3)	
200–399 beds	199 (37.8)	19 (36.5)	
400–599 beds	90 (17.1)	6 (11.5)	
600+ beds	58 (11.0)	5 (9.6)	
Mean (SD)	315 (218)	254 (206)	0.056*
Census region, N (%)			<0.001
New England	21 (4.0)	14 (26.4)	
Middle Atlantic	58 (10.9)	0	
East North Central	95 (17.9)	27 (50.9)	
West North Central	45 (8.5)	0	
South Atlantic	122 (23.0)	0	
East South Central	52 (9.8)	0	
West South Central	54 (10.2)	0	
Mountain	33 (6.2)	0	
Pacific	50 (9.4)	12 (22.6)	
Puerto Rico	1 (0.2)	0	
Geographic location, N (%)			0.184
Urban	451 (85.1)	40 (75.5)	
Suburban	53 (10.0)	9 (17.0)	
Rural	26 (4.9)	4 (7.6)	
Ownership type, N (%)			<0.001
For profit	129 (24.3)	1 (1.9)	
Nonprofit	355 (66.9)	44 (83.0)	
Government	47 (8.9)	8 (15.1)	
Multihospital affiliation, N (%)			0.032
Yes	385 (72.5)	31 (58.5)	
No	146 (27.5)	22 (41.5)	
Risk-standardized readmission rate (per 100 patients) [†]			
For patients with HF, Mean (SD)	24.7 (0.06)	25.1 (0.06)	0.088*
For patients with AMI, Mean (SD)	19.5 (0.06)	19.6 (0.07)	0.722*

NOTE: Abbreviations: AMI, acute myocardial infarction; COTH, Council of Teaching Hospitals; H2H, Hospital-to-Home Campaign; HF, heart failure; SD, standard deviation; STAAR, State Action on Avoidable Rehospitalization. Percentages computed excluding missing values, ranging from 0 to 9 missing values by item.

*P values derived from *t* tests.

[†]Risk-standardized readmission rates (RSRRs) are weighted by hospital volume; 14 RSRRs are missing for HF, and 25 are missing for AMI.

at high risk of readmission, (2) partnered with community homecare agencies and/or skilled nursing facilities, (3) partnered with community physicians or physician groups, (4) partnered with other local hospitals to reduce preventable readmissions, (5) estimated risk of readmission in a formal way and used it in clinical care, (6) used teach-back techniques, and (7) used telemonitoring. In contrast, H2H hospitals were more likely than STAAR hospitals to have monitored 7-day readmission rates and to have conducted nurse-to-nurse report usually or always prior to discharge to nursing home facilities.

In multivariable analysis, STAAR and H2H hospitals differed significantly ($P < 0.01$) for 4 additional strategies. STAAR hospitals were more likely to have (1) ensured outpatient physicians were alerted within 48 hours of patient discharge, and (2) provided skilled

TABLE 2. Quality Improvement Resources and Performance Monitoring

	H2H, N = 532	STAAR, N = 55
Hospital has reducing preventable readmissions as a written objective		
Strongly agree/agree	478 (89.9%)	53 (96.4%)
Not sure/disagree/strongly disagree	54 (10.2%)	2 (3.6%)
Hospital has a reliable process in place to identify patients with HF at the time they are admitted	438 (82.6%)	50 (90.9%)
Hospital has quality improvement teams devoted to reducing preventable readmissions for patients with HF	462 (86.8%)	49 (89.1%)
Hospital has quality improvement teams devoted to reducing preventable readmissions for patients with AMI	284 (53.4%)	29 (52.7%)
Hospital has a multidisciplinary team to manage the care of patients who are at high risk of readmission	299 (56.4%)	42 (76.4%)*
Hospital has partnered with the following to reduce readmission rates		
Community homecare agencies and/or skilled nursing facilities	358 (67.6%)	48 (87.3%)*
Community physicians or physician groups	262 (49.6%)	42 (76.4%)*
Other local hospitals	123 (23.3%)	23 (41.8%)*
Hospital tracks the following for quality improvement efforts:		
Timeliness of discharge summary	373 (70.6%)	40 (72.7%)
Proportion of discharge summaries sent to primary physician	121 (23.0%)	17 (31.5%)
Percent of patients discharged with follow-up appointment ≤ 7 days	168 (31.9%)	27 (50.0%)
Accuracy of medication reconciliation	385 (72.9%)	36 (66.7%)
30-day readmission rate	499 (94.5%)	54 (98.2%)
Early (<7 day) readmission rate	293 (55.5%)	26 (48.2%)*
Proportion of patients readmitted to another hospital	61 (11.6%)	9 (16.7%)
Has a designated person or group to review unplanned readmissions that occur within 30 days of the original discharge	338 (63.9%)	43 (78.2%)
Estimates risk of readmission in a formal way and uses it in clinical care during patient hospitalization	118 (22.3%)	22 (40.0%)*

NOTE: Abbreviations: AMI, acute myocardial infarction; H2H, Hospital-to-Home Campaign; HF, heart failure; STAAR, State Action on Avoidable Rehospitalization. Numbers of missing (overall) ranged by item from 0 to 6.

*P value <0.01 in unadjusted analysis; none of these were significant in analysis adjusted for census region and hospital ownership type.

nursing facilities the direct contact number of the inpatient treating physician for patients transferred. H2H hospitals were more likely to have (1) assigned responsibility for medication reconciliation to nurses, and (2) referred discharged patients to cardiac rehabilitation services.

DISCUSSION

We found that many hospitals enrolled in the STAAR or the H2H initiative were not implementing strategies commonly recommended to reduce readmission in 2010 to 2011, indicating substantial opportunities for improvement. The gaps were apparent among both the STAAR and the H2H hospitals. Previous literature has shown that discharged patients often do not have timely posthospitalization follow-up visits, and that discharge summaries are infrequently completed prior to the follow-up visit.^{4,19,31} Studies have also demonstrated weaknesses in the medication reconciliation process³² and overall communication between hospital-based and primary care physicians.^{33,34} Our survey adds to this existing literature by employing a more comprehensive survey of hospital strategies and reporting results for a larger, national sample of hospitals.

Encouraging the use of strategies recommended by quality initiatives is difficult for several reasons. First, the evidence base for their effectiveness is not yet solid, making it difficult for institutions to prioritize and select interventions and to foster enthusiasm for change. Second, the organizational challenges of these

interventions are often substantial, requiring coordination across disciplines, departments, and settings (hospital, home, nursing facility). Third, some literature suggests³ that multipronged strategies may be most effective, increasing the complexity of readmission reduction activities. Last, important financial barriers must be overcome, including the cost of interventions as well as lost revenue from reduced readmissions. Input from hospitalists who are often critical links among inpatient and outpatient care and between patients and their families is strongly needed to ensure hospitals focus on what strategies are most effective for successful transitions from hospital to home.

The prevalence of several strategies differed between STAAR and H2H hospitals; however, these differences were largely attenuated by geographic region. The finding that significant differences among hospitals in strategies was explained in large part by geographical region is consistent with previous research that has documented substantial regional differences in many kinds of practice patterns^{35–37} as well as geographic differences in readmission rates.^{38–40} The results suggest regionally focused initiatives may be most effective in tailoring interventions to practice needs and norms within specific areas.

Among the strategies that differed significantly between the hospitals in STAAR compared with H2H, the variation may be attributable in part to the focus of the initiatives themselves. For instance, 1 strategy that was significantly more prevalent among H2H compared with STAAR hospitals is central to the quality of care for patients with heart failure and

TABLE 3. Medication Management Strategies

	H2H, N = 532	STAAR, N = 55
Who is responsible for medication reconciliation at discharge?		
Nurse		
Never	53 (10.0%)	12 (22.2%) [†]
Sometimes	51 (9.6%)	13 (24.1%)
Usually	49 (9.3%)	5 (9.3%)
Always	376 (71.1%)	24 (44.4%)
Pharmacist		
Never	309 (58.5%)	30 (55.6%)
Sometimes	163 (30.9%)	21 (38.9%)
Usually	21 (4.0%)	1 (1.9%)
Always	35 (6.6%)	2 (3.7%)
Responsibility is not formally assigned		
Never	453 (86.1%)	41 (77.4%)
Sometimes	23 (4.4%)	6 (11.3%)
Usually	21 (4.0%)	4 (7.6%)
Always	29 (5.5%)	2 (3.8%)
Tools in place to facilitate medication reconciliation [‡]		
Paper-based standardization form	290 (54.5%)	31 (56.4%)
Electronic medical record/Web-based form	392 (73.7%)	38 (69.1%)
How often does each of the following occur as part of the medication reconciliation process at your hospital?		
Emergency medicine staff obtains medication history		
Never	3 (0.6%)	0
Sometimes	39 (7.4%)	5 (9.1%)
Usually	152 (28.7%)	20 (36.4%)
Always	336 (63.4%)	30 (54.6%)
Admitting medical team obtains medication history		
Never	8 (1.5%)	1 (1.8%)
Sometimes	33 (6.2%)	6 (10.9%)
Usually	97 (18.3%)	15 (27.3%)
Always	392 (74.0%)	33 (60.0%)
Pharmacist or pharmacy technician obtains medication history		
Never	244 (46.1%)	19 (34.6%)
Sometimes	160 (30.3%)	16 (29.1%)
Usually	47 (8.9%)	10 (18.2%)
Always	78 (14.7%)	10 (18.2%)
Contact is made with outside pharmacies		
Never	76 (14.4%)	3 (5.5%)
Sometimes	366 (69.3%)	42 (76.4%)
Usually	69 (13.1%)	6 (10.9%)
Always	17 (3.2%)	4 (7.3%)
Contact is made with primary physician		
Never	27 (5.1%)	2 (3.6%)
Sometimes	280 (52.9%)	30 (54.6%)
Usually	148 (28.0%)	18 (32.7%)
Always	74 (14.0%)	5 (9.1%)
Outpatient and inpatient prescription records are linked electronically		
Never	324 (61.4%)	28 (50.9%)
Sometimes	91 (17.2%)	14 (25.5%)
Usually	61 (11.6%)	8 (14.6%)
Always	52 (9.9%)	5 (9.1%)
Third-party prescription database that provides historical fill and refill information (eg, Health Care Systems)		
Never	441 (83.5%)	37 (67.3%)
Sometimes	54 (10.2%)	10 (18.2%)
Usually	14 (2.7%)	4 (7.3%)
Always	19 (3.6%)	4 (7.3%)
All patients (or their caregivers) receive at the time of discharge information about the purpose of each medication, which medications are new, which medications have changed in dose or frequency, and/or which medications are to be stopped	407 (76.9%)	35 (63.6%)
Hospital promotes use of teach-back techniques (having the patient "teach" new information back to educator)	371 (69.9%)	48 (87.3%)*

NOTE: Abbreviations: H2H, Hospital-to-Home Campaign; STAAR, State Action on Avoidable Rehospitalization. Numbers of missing ranged by item from 0 to 5; 1 item is missing 8.

*P value <0.01 in unadjusted analysis; association not significant in analysis adjusted for census region and hospital ownership type.

[†]P value <0.01 in analysis adjusted for census region and hospital ownership type.

[‡]Select all that apply.

TABLE 4. Discharge and Follow-up Procedures

	H2H, N = 532	STAAR, N = 55
For all patients		
All patients (or their caregivers) receive the following in written form at the time of discharge:		
Discharge instructions	485 (91.3%)	45 (81.8%)
Names, doses, and frequency of all discharge medications	463 (87.4%)	42 (76.4%)
Educational information about heart failure, when relevant	385 (72.5%)	37 (67.3%)
Symptoms that prompt an immediate call to a physician or return to hospital	352 (66.4%)	33 (60.0%)
Educational information about AMI	348 (65.5%)	36 (66.7%)
Any type of emergency plan*	312 (58.8%)	26 (47.3%)
Action plan for heart failure patients for managing changes in condition	282 (53.1%)	28 (50.9%)
Personal health record	139 (26.3%)	23 (41.8%)
Discharge summary	104 (19.6%)	12 (21.8%)
Patients are discharged from the hospital with an outpatient follow-up appointment already arranged		
Never	20 (3.8%)	1 (1.8%)
Sometimes	222 (41.9%)	26 (47.3%)
Usually	233 (44.0%)	26 (47.3%)
Always	55 (10.4%)	2 (3.6%)
Patients with home health services are provided direct contact information for a specific inpatient physician in case of questions	249 (47.1%)	35 (63.6%)
Process is in place to ensure outpatient physicians are alerted to the patient's discharge within 48 hours of discharge	199 (37.6%)	37 (67.3%) [†]
Proportion of patients for whom a paper or electronic discharge summary is sent directly to the patient's primary physician		
None	43 (8.1%)	3 (5.5%)
Some	153 (28.9%)	14 (25.5%)
Most	200 (37.8%)	18 (32.7%)
All	133 (25.1%)	20 (36.4%)
Patient's discharge summary typically completed and available for viewing		
Upon discharge	42 (8.0%)	5 (9.1%)
Within 48 hours of discharge	222 (42.1%)	33 (60.0%)
Within 7 days	94 (17.8%)	10 (18.2%)
Within 30 days	157 (29.7%)	7 (12.7%)
There are no explicit goals or policies defining a time-frame for completing the discharge summary	13 (2.5%)	0
Someone in the hospital is assigned to follow up on test results that return after the patient is discharged	191 (36.2%)	27 (49.1%)
Patients are regularly called after discharge to either follow up on postdischarge needs or to provide additional education	334 (63.0%)	38 (69.1%)
Home visits are arranged for all or most patients after discharge	114 (21.5%)	9 (16.4%)
After discharge, patients:		
Receive telemonitoring		
None	241 (45.5%)	12 (21.8%)*
Some	265 (50.0%)	41 (74.6%)
Most	23 (4.3%)	1 (1.8%)
All	1 (0.2%)	1 (1.8%)
Receive referrals to cardiac rehabilitation		
None	27 (5.1%)	4 (7.4%) [‡]
Some	190 (36.0%)	28 (51.9%)
Most	203 (38.5%)	17 (31.5%)
All	108 (20.5%)	5 (9.3%)
Are enrolled in chronic disease management programs		
None	161 (30.4%)	13 (23.6%)
Some	321 (60.7%)	34 (61.8%)
Most	41 (7.8%)	7 (12.7%)
All	6 (1.1%)	1 (1.8%)
For patients transferred to skilled nursing facilities		
Nurse-to-nurse report is always conducted prior to transfer	326 (61.5%)	22 (40.0%)*
Information always provided to the facility upon discharge		
Completed discharge summary	252 (47.6%)	27 (49.1%)
Reconciled medication list	436 (82.3%)	46 (83.6%)
Medication administration record	352 (66.4%)	38 (69.1%)
Direct contact number of inpatient treating physician	180 (34.0%)	29 (52.7%) [‡]

NOTE: Abbreviations: AMI, acute myocardial infarction; H2H, Hospital-to-Home Campaign; STAAR, State Action on Avoidable Rehospitalization. Numbers of missing ranged by item from 1 to 4.

*P value <0.01 in unadjusted analysis; neither association was significant in analysis adjusted for census region and hospital ownership type.

[†]P value <0.01 in analysis adjusted for census region and ownership type.

[‡]Indicates hospitals that provide direct contact information for a specific physician in case of emergency and/or any other type of emergency plan.

acute myocardial infarction, the focus of H2H: referral patterns to cardiac rehabilitation services after discharge. H2H hospitals may have been particularly

attuned to this practice, as H2H focused on cardiovascular-related readmissions, whereas STAAR focused on all readmissions.

The study has several limitations. First, data were self-reported, and we did not have the resources to verify these reports with onsite evaluations. Nevertheless, the methods for obtaining the data were the same for H2H and STAAR hospitals, and therefore measurement errors are unlikely to have varied systematically between the 2 groups of hospitals. Second, a single respondent at each hospital completed the survey; however, we did instruct respondents to attain information from a broad range of relevant staff to reflect a more comprehensive perspective in the survey. Third, the sample size of STAAR hospitals was modest and therefore may have lacked statistical power to detect important differences; however, we did include all hospitals that had enrolled in STAAR by the study date. Fourth, hospitals that enrolled in STAAR and H2H initiatives represent a selected group, and results may differ among nonenrolled hospitals. Last, we have data on strategies used during the 2010 to 2011 time frame and therefore cannot evaluate the impact of the quality initiatives from these baseline data. Studies that examine the associations between changes in the use of strategies and subsequent changes in readmission rates would be valuable. Nevertheless, this study establishes a baseline against which future progress can be evaluated.

In sum, we found that many STAAR and H2H hospitals were not implementing many of the recommended strategies for reducing readmissions as of 2010 to 2011, suggesting continued opportunities for improvement. Hospitalists will have opportunities to play leadership roles as hospitals look for meaningful ways to reduce readmissions. At the same time, although hospitalists have a key role in implementing hospital-based programs, much of the care transitions work must also engage teams across the continuum of care. Furthermore, priority should be given to augmenting the evidence base about which strategies are most effective in reducing readmissions, as this evidence is currently underdeveloped.

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References

- Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med*. 2009; 360:1418–1428.
- Greysen SR, Schiliro D, Curry L, Bradley EH, Horwitz LI. “Learning by doing”—resident perspectives on developing competency in high-quality discharge care. *J Gen Intern Med*. 2012;27:1188–1194.
- Hansen LO, Young RS, Hinami K, Leung A, Williams MV. Interventions to reduce 30-day rehospitalization: a systematic review. *Ann Intern Med*. 2011;155:520–528.
- Kripalani S, Jackson AT, Schnipper JL, Coleman EA. Promoting effective transitions of care at hospital discharge: a review of key issues for hospitalists. *J Hosp Med*. 2007;2:314–323.
- Whelan CT. The role of the hospitalist in quality improvement: systems for improving the care of patients with acute coronary syndrome. *J Hosp Med*. 2010;5(suppl 4):S1–S7.
- Society of Hospital Medicine. Project BOOST: Better Outcomes by Optimizing Safe Transitions Available at: http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_CareTransitions/CT_Home.cfm. Accessed January 19, 2013.
- Society of Hospital Medicine. The BOOST Tools. Available at: http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_CareTransitions/html_CC/06Boost/07_Boost_Tools.cfm. Accessed January 19, 2013.
- Halasyamani L, Kripalani S, Coleman E, et al. Transition of care for hospitalized elderly patients—development of a discharge checklist for hospitalists. *J Hosp Med*. 2006;1:354–360.
- Institute for Healthcare Improvement. Overview: STate action on avoidable rehospitalizations (STAAR) initiative. Available at: <http://www.ihc.org/offerings/Initiatives/STAAR/Pages/default.aspx>. Accessed February 20, 2010.
- Bradley EH, Curry L, Horwitz LI, et al. Contemporary evidence about hospital strategies for reducing 30-day readmissions: a national study. *J Am Coll Cardiol*. 2012;60:607–614.
- Beckett RD, Crank CW, Wehmeyer A. Effectiveness and feasibility of pharmacist-led admission medication reconciliation for geriatric patients. *J Pharm Pract*. 2012;25:136–141.
- Boockvar KS, Blum S, Kugler A, et al. Effect of admission medication reconciliation on adverse drug events from admission medication changes. *Arch Intern Med*. 2011;171:860–861.
- Climente-Marti M, Garcia-Manon ER, Artero-Mora A, Jimenez-Torres NV. Potential risk of medication discrepancies and reconciliation errors at admission and discharge from an inpatient medical service. *Ann Pharmacother*. 2010;44:1747–1754.
- Ferraco K, Spath PL. Measuring patient safety performance. In: Spath PL, ed. *Error Reduction in Health Care: A Systems Approach to Improving Patient Safety*. 2nd ed. Hoboken, NJ: Jossey-Bass; 2010: 59–102.
- Ferraco K, Spath PL. Analyzing patient safety performance. In: Spath PL, ed. *Error Reduction in Health Care: A Systems Approach to Improving Patient Safety*. 2nd ed. Hoboken, NJ: Jossey-Bass; 2010: 103–118.
- Gardner B, Graner K. Pharmacists’ medication reconciliation-related clinical interventions in a children’s hospital. *Jt Comm J Qual Patient Saf*. 2009;35:278–282.
- Gleason KM, McDaniel MR, Feinglass J, et al. Results of the Medications at Transitions and Clinical Handoffs (MATCH) study: an analysis of medication reconciliation errors and risk factors at hospital admission. *J Gen Intern Med*. 2010;25:441–447.
- Hayes BD, Donovan JL, Smith BS, Hartman CA. Pharmacist-conducted medication reconciliation in an emergency department. *Am J Health Syst Pharm*. 2007;64:1720–1723.
- Hernandez AF, Greiner MA, Fonarow GC, et al. Relationship between early physician follow-up and 30-day readmission among Medicare beneficiaries hospitalized for heart failure. *JAMA*. 2010; 303:1716–1722.
- Jack BW, Chetty VK, Anthony D, et al. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. *Ann Intern Med*. 2009;150:178–187.
- Krumholz HM, Amatruda J, Smith GL, et al. Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. *J Am Coll Cardiol*. 2002;39:83–89.
- Latino R. Using performance data to prioritize safety improvements. In: Spath PL, ed. *Error Reduction in Health Care: A Systems Approach to Improving Patient Safety*. 2nd ed. Hoboken, NJ: Jossey-Bass; 2010:119–142.
- Mills PR, McGuffie. Medication reconciliation at an academic medical center: Implementation of a comprehensive program from admission to discharge. *Emer Med J*. 2010;27:911–915.
- Murphy EM, Oxencis CJ, Klauck JA, Meyer DA, Zimmerman JM. Medication reconciliation at an academic medical center: implementation of a comprehensive program from admission to discharge. *Am J Health Syst Pharm*. 2009;66:2126–2131.
- National Quality Forum (NQF). Safe practices for better healthcare—2010 update: A consensus report. 2010. Available at: http://www.qualityforum.org/Publications/2010/04/Safe_Practices_for_Better_Health_care_%Ed%80%93_2010_Update.aspx. Accessed September 28, 2012.
- Schnipper JL, Kirwin JL, Cotugno MC, et al. Role of pharmacist counseling in preventing adverse drug events after hospitalization. *Arch Intern Med*. 2006;166:565–571.
- Steurbaut S, Leemans L, Leysen T, et al. Medication history reconciliation by clinical pharmacists in elderly inpatients admitted from home or a nursing home. *Ann Pharmacother*. 2010;44:1596–1603.

28. Vreeland DG, Rea RE, Montgomery LL. A review of the literature on heart failure and discharge education. *Crit Care Nurs Q*. 2011;34:235–245.
29. Keenan PS, Normand SL, Lin Z, et al. An administrative claims measure suitable for profiling hospital performance on the basis of 30-day all-cause readmission rates among patients with heart failure. *Circ Cardiovasc Qual Outcomes*. 2008;1:29–37.
30. Krumholz HM, Lin Z, Drye EE, et al. An administrative claims measure suitable for profiling hospital performance based on 30-day all-cause readmission rates among patients with acute myocardial infarction. *Circ Cardiovasc Qual Outcomes*. 2011;4:243–252.
31. Horwitz LI, Jenq GY, Brewster UC, et al. Comprehensive quality of discharge summaries at an academic medical center [published online ahead of print [March 22, 2013]. *J Hosp Med*. doi: 10.1002/jhm.2021.
32. Horwitz LI, Moriarty JP, Chen C, et al. Quality of discharge practices and patient understanding at an academic medical center. *JAMA Intern Med*. In press.
33. Bell CM, Schnipper JL, Auerbach AD, et al. Association of communication between hospital-based physicians and primary care providers with patient outcomes. *J Gen Intern Med*. 2009;24:381–386.
34. Calkins DR, Davis RB, Reiley P, et al. Patient-physician communication at hospital discharge and patients' understanding of the postdischarge treatment plan. *Arch Intern Med*. 1997;157:1026–1030.
35. Baldwin LM, MacLehose RF, Hart LG, Beaver SK, Every N, Chan L. Quality of care for acute myocardial infarction in rural and urban US hospitals. *J Rural Health*. 2004;20:99–108.
36. Krumholz HM, Chen J, Rathore SS, Wang Y, Radford MJ. Regional variation in the treatment and outcomes of myocardial infarction: investigating New England's advantage. *Am Heart J*. 2003;146:242–249.
37. Wennberg DE, Lucas FL, Siewers AE, Kellett MA, Malenka DJ. Outcomes of percutaneous coronary interventions performed at centers without and with onsite coronary artery bypass graft surgery. *JAMA*. 2004;292:1961–1968.
38. Krumholz HM, Merrill AR, Schone EM, et al. Patterns of hospital performance in acute myocardial infarction and heart failure 30-day mortality and readmission. *Circ Cardiovasc Qual Outcomes*. 2009;2:407–413.
39. Ross JS, Chen J, Lin Z, et al. Recent national trends in readmission rates after heart failure hospitalization. *Circ Heart Fail*. 2010;3:97–103.
40. Bernheim SM, Grady JN, Lin Z, et al. National patterns of risk-standardized mortality and readmission for acute myocardial infarction and heart failure. Update on publicly reported outcomes measures based on the 2010 release. *Circ Cardiovasc Qual Outcomes*. 2010;3:459–467.