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Building the Case for Quality Improvement in the Health Care Industry: A Focus on Goals and Training

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Health care organizations are under intense pressure to improve the efficiency and effectiveness of care delivery and, increasingly, they are using quality improvement teams to identify and target projects to improve performance outcomes. This raises the question of what factors actually drive the performance of these projects in a health care environment. Using data from a survey of health care professionals acting as informants for 244 patient care, clinical-administrative, and nonclinical administrative quality improvement project types in 93 health care organizations, we focus on 2 factors—goal setting and quality training—as potential drivers of quality improvement project performance. We find that project-level goals and quality training have positive associations with process quality, while organizational-level goals have no impact. In addition, the relationship between project-level goals and process quality is stronger for patient care projects than for administrative projects. This indicates that the motivational and cognitive effects of goal setting are greater for projects that involve interactions with clinicians than for ones that involve interactions with other staff. Although project-level goal setting is beneficial for improving process quality overall, our findings suggest the importance of being especially attentive to goal setting for projects that impact direct patient care.

Key words: *goals, health care, performance, quality improvement*

There is unquestionably a need for a systematic approach to improving health care delivery processes. The 2000 Committee on Quality of Health Care in America Institute of Medicine (IOM) Report, *To Err is Human*, reports that "as many as 98,000 Americans die in hospitals each year as a result of medical errors."[1] It further asserts that "the problem is not bad people; the problem is that the system needs to be made safer."[1] Even more than a decade after the Institute of Medicine report, the consensus among people who study health care is that clinical and patient processes have not improved enough and that increasing demands on the health care system (eg, an aging population, the passage of the 2010 Affordable Care Act) require redoubled efforts to improve quality, reduce costs, increase access to health care services, and more efficiently and effectively use health care resources.[2]

The National Institutes of Health, the Institute of Medicine, and the Centers for Medicare & Medicaid Services recognize that quality improvement efforts are necessary to improve health care processes

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and reduce costs. As a result, health care reform policies reward hospitals that have better quality and lower costs with higher reimbursement, while hospitals with poorer quality, such as preventable readmissions or iatrogenic infections, are reimbursed less.[3] These changes should motivate providers and organizations to monitor and improve their processes and performance.

The problems of cost and quality are far from unique to the United States. In many countries, access to health care is limited or the costs of health care are prohibitive. In countries where health services have been accessible, the rising costs of addressing their populations' health needs are increasingly challenging. The World Health Organization 2012 report estimated that 20% to 40% of expenditure on health care is wasted through inefficiency.[4]

Health care organizations are increasingly using quality improvement teams to identify and implement projects targeted at improving performance outcomes. Improvement programs such as Six Sigma and Lean are being applied more frequently in health care systems, but there has been little study of what factors make the use of these and other methodologies most effective in the health care environment. A theoretical lens that has been used extensively to understand performance outcomes for other types of tasks and projects is goal setting.[5] We apply this lens to health care improvement projects and extend goal theory by exploring how organizational and project goals affect project performance outcomes, and whether the effect of goal setting on project performance differs by project type. While goals focus attention and direct action toward desired performance outcomes, teams also require approaches and tools for enabling task performance. Thus, we simultaneously examine whether organizational and project-level goals and quality improvement training impact project performance outcomes.

LITERATURE REVIEW AND HYPOTHESES

We next present the rationale for our conceptual model of the relationships of goal setting and quality training with process quality, our measure of project performance, along with the development of the associated hypotheses. The Figure illustrates the conceptual model for this study and the hypothesized relationships.

Goals and performance

People's conscious ideas affect and regulate their actions and their performance.[6] In particular, Locke found that people perform at a higher level when they have harder rather than easier goals; that specific goals result in higher levels of performance; and that monetary incentives, time limits, and knowledge independent of goals and intentions do not affect performance.[6]

Others, however, warn of some pitfalls of goal setting. Ordóñez et al[7] caution that when goals are overly narrow, people can be too focused and unable to see important aspects of a problem; when individuals are not involved in goal setting, it can reduce their commitment; and when focusing on performance goals, people may not recognize better alternatives and fail to learn. Some quality management leaders, such as W. Edwards Deming,[8] have criticized the use of specific numerical goals as counterproductive, focusing the workforce more on volume than on quality.

Since Locke's early work, many studies have tested the relationship between goals and performance.[9-11] The vast majority have supported the basic premises of goal theory. Some have identified mediating and moderating variables, including goal choice, learning goals, framing, affect, and shared vision.[10] In group situations, scholars have generally found a positive relationship between group goals and group performance.[12,13]

In this study, quality improvement goals are considered at 2 levels: the organizational (individual hospital or unit) level and the project level. At the organizational level, goals are linked to organization-wide strategic issues such as reducing costs or improving patient satisfaction. At the project level, management and the project teams can set very specific outcome goals that support the overall

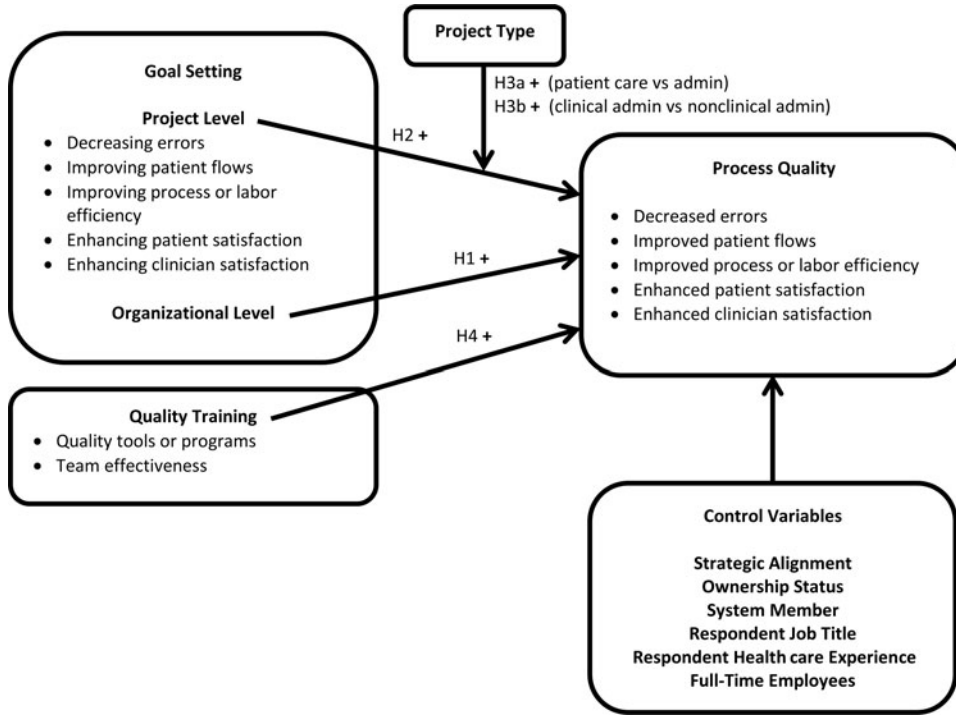

Figure. Conceptual model and hypotheses (construct items are bulleted).

organizational goals. Within health care systems, some goals are also set at the system level. However, we focus on organizational- and project-level goals because system-level goals are often broad and not very specific. It tends to be at the organizational and departmental levels that broad system goals are translated into a specific improvement projects and where improvement methodologies are applied.

Organizational-level goals

The vast majority of hospital strategic and/or business plans include quality improvement as a priority.[14] In particular, organizations that develop a business case or specific justification for why projects are selected not only provide the rationale for focusing on quality improvement projects and setting performance improvement goals but also include explicit or inferred task strategies that form the basis of project-level goal setting.

However, the relationship between organizational-level goals and outcomes can be complicated. While both Blumenthal and Ferris[15] and Reiter et al[16] advocate creating business cases for health care quality improvement, Blumenthal and Ferris discuss why it is difficult to compute return on investments on quality improvement efforts and what can be done to address those difficulties. Lurie et al[17] found that although it is useful to make both the social and the business cases when undertaking projects to reduce disparities in the delivery of health care, it can be particularly challenging to do so as a practical matter, because it is often nearly impossible to measure the effects of individual interventions in such a complex system. Leatherman et al[18] found in their comparative study of 7 health care improvement interventions that while the social case for improving quality was clear, the financial benefit to the part of the health care system that was implementing the improvement was not always evident—not so much because financial benefit did not occur but because that benefit accrued elsewhere in the system. Song et al[19] found that health care systems that invested in

high-performance work systems did not tend to have explicit financial return expectations for investments but rather viewed the investment as important to the realization of the organization's strategic priorities. Overall, these studies suggest that measurement issues, rather than the actual efficacy of organizational-level goals, account for much of the ambiguity in understanding their performance impact.

Boehler et al[20] presented a strong argument for collaboration among clinicians and managers to make the business case for quality improvement. They found that not only were they able to substantially improve care for their patients but they were also able to reduce costs—all while developing trust between the financial and clinical professionals.

Thus, we propose the following hypothesis, which extends goal theory broadly to the health care environment:

H1: Organizational-level goal setting will be positively associated with project performance.

Project-level goals

Shah et al[21] posit that work is coordinated through networks of communication and relationships. This relational coordination is based on shared goals between the network of participants in the process improvement efforts, shared knowledge between the individuals and relationships that exist (organizational and interpersonal), and mutual respect for work.[22] According to Shah et al[21]:

> Shared goals motivate participants to act with greater regard for the overall work process, while shared knowledge informs participants how their tasks and those of others contribute to the overall work process. Mutual respect for others' work further reinforces the inclination to act in line with the goals of the overall work process. As a set, the three mechanisms reinforce frequency, timeliness, and problem solving in communication to improve coordination. Coordination under this theory is defined as the conscious activity of assembling and synchronizing differentiated work efforts so that they function harmoniously in attaining organizational goals.[21,23]

This work suggests the importance of both organizational-level and project-level goals and supports the linkages between them.

As previously discussed, setting goals focuses the organization and its employees on relevant problems, regulates efforts to improve performance, and encourages the development of strategies and action plans to improve performance. More than 400 studies have found a relationship between challenging, specific goals with measurable standards and improved performance.[5] In a study linking goal theory and quality improvement teams, albeit in a manufacturing context, Linderman[24] found that goals were effective in driving performance for Six Sigma projects. Despite the evidence of the benefits of goal setting for project performance, relatively few health care organizations specify goals prior to the initiation of quality improvement projects, primarily because it is assumed that team members are doing their best to deliver results and, therefore, no explicit goal is required.[25] Thus, to test whether the impact of project-level goal setting on project performance in a health care setting is consistent with the findings in the goal setting body of literature, we hypothesize that the following:

H2: Project-level goal setting will be positively associated with project performance.

Goals serve to focus attention and effort on the desired performance outcome and motivate people to work toward that outcome. However, setting project-level goals in health care can be challenging from a motivational perspective, because of what can appear to be the tradeoff between patient-centered outcomes and cost. Allen[26] notes that physicians and nurses are not comfortable focusing on cost for its own sake but rather as a byproduct of more patient-focused improvement efforts. Because they view themselves as highly trained professionals, physicians and nurses often reject imposed standardization of processes that limit decision-making discretion.[27] Physicians, in particular, are more likely to embrace clinical process or outcome improvement efforts rather than ones focused on efficiency gains only.[25] In addition, Weiner et al[28] note clinicians' lack of involvement where "quality" is not the main focus; they suggest

that administrators tend to narrow the projects selected for quality improvement down to only specific projects "... to avoid the appearance of management encroachment on physician autonomy in clinical decision making." Thus, for quality improvement teams in health care settings, goals related to patient-centered projects and outcomes may be more motivating to team members.

Furthermore, while we expect project-level goals to be beneficial overall for improving performance (as in H2), the actual opportunities to impact performance outcomes are not equal across project types.[25] For example, projects vary in terms of length and scope as well as the amount of effort required. In this study, we look at 3 types of improvement projects: patient care (such as improving operating room flow or reducing medication errors), clinical administrative (such as admissions or managing clinical supplies), and nonclinical administrative (such as billing or accounts payable). Overall, because goals drive both motivation and effort to improve, and these factors can vary by project type, we further explore whether and how the effect of project-level goal setting on performance improvement differs by project type.

In previous studies of health care quality improvement programs, performance outcomes have been divided into clinical and process-level performance.[27,29] Clinical performance refers to the patient medical outcomes, such as mortality, readmission rates, and receipt of recommended treatment protocols.[14,27,29-31] Process-level performance relates to how health care services are delivered and includes, for example, the level and quality of patient-provider interaction, waiting times and total process flow time, the efficiency of check-in, and the accuracy of hospital bills.[29,32-35] Quality improvement efforts frequently emphasize reducing errors.[32,33,36] Error reduction affects not only clinical performance, especially for patient care projects, but also process-level outcomes in both patient-facing and back office activities. In addition, health care providers are increasingly focusing on patient satisfaction as a key performance metric that captures perceptions of the patient experience.[14,29,33,35,37] Overall, Green[2] states that the necessary focus of health care performance improvement efforts going forward is "optimizing clinical and service outcomes at minimum cost."

In this study, we focus on process-level performance outcomes linked to quality management practices such as quality improvement teams.[30] More specifically, we define "process quality" as attributes related to the execution and perceptions of the process.[38] Based on the key process-level performance dimensions just identified from the health care quality improvement literature, this includes decreased errors, improved patient flows, improved process or labor efficiency, and enhanced patient satisfaction. We also include improved clinician satisfaction as a process quality dimension to capture the benefits for team participants. This definition of process quality is consistent with a focus on improving clinical and service outcomes through better process quality, with decreased cost as a separate performance outcome.[2] Thus, project performance, defined as process quality, consists of 5 dimensions in total.

To further explore alignment between project type and performance outcomes in the context of project-level goal setting, we draw on insights from the customer contact model.[39-42] According to the customer contact model, the predominant orientation of back office processes is on cost and efficiency, while the orientation of front office processes is on enhancing the customer (or more broadly, the stakeholder) experience. In the continuum from front office to back office, direct patient care processes are primarily front office processes; clinical administrative processes are a mix of back office (e.g., managing clinical supplies, determining test results, using electronic medical records) and front office (e.g., admissions) processes; and nonclinical administrative processes are primarily back office processes.

We contend that the conceptual alignment of the process quality construct dimensions is greater for front office than for back office processes. This is because 4 of the 5 dimensions of process quality (i.e., decreased errors, improved patient flows, enhanced patient satisfaction, and improved clinician satisfaction) are closely tied to managing and evaluating the patient-provider interactions in front office

processes, where "providers" include both clinicians and staff with direct patient contact.

However, while a focus on efficiency is typically associated with back office processes, process or labor efficiency, clinical, and other process outcomes can be mutually supportive if team members recognize that pursuing goals to improve efficiency may help not only eliminate wasted administrative time and effort for both patients and providers but also translate into more clinician time for meaningful patient care and indirectly lead to better patient outcomes.[43] In particular, many quality improvement projects are now focusing on shortening treatment times and are evolving from clinical needs. For example, some quality improvement efforts that focus on reducing systemic delays (such as reducing door-to-balloon times) may increase efficiency, but the primary objective is clinical improvement.[44] These time-to-treat projects should also have cost savings, but rarely do quality improvement teams consider cost or describe the project in terms of efficiency. Thus, when setting efficiency goals for patient care projects, quality improvement teams demonstrate an understanding that increased efficiency is important for improving quality of care. In effect, setting efficiency goals for patient care projects is done not only to improve efficiency (or even primarily to improve efficiency) but because of the clear implications for quality of care.

While much of the goal setting literature has focused on the motivational effects of goals, some researchers have argued that goal setting has cognitive benefits as well.[5] Campbell et al[45] suggest that goals will help employees recognize what tasks to perform if the goals give employees clear information about where to direct their efforts. We argue that this cognitive benefit is more manifest when the project type is conceptually aligned with its performance goals. This alignment makes it easier to identify opportunities to improve, because employees better understand where to direct their efforts and what tasks to perform. For projects and performance goals without this conceptual alignment (e.g., patient care projects and cost), we expect it to be more difficult to determine what improvement strategies to employ, because the connection between the project type and the improvement in the performance dimension is less evident.

In summary, we expect the effect of project-level goal setting on process quality to be greater for front office (i.e., involving the interactions between patients and providers) than for back office project types for the following reasons. First, providers, especially clinicians, are primarily focused on improving the patient experience and only secondarily on issues such as cost. Second, front office projects are more conceptually aligned with our process quality dimensions and, therefore, afford greater opportunities to improve along these dimensions. Taken together, this suggests that because the theoretical basis for setting goals is to motivate and encourage quality improvement efforts, project outcomes that are priority for providers (i.e., improved patient experience) and goals that are directly aligned with these types of projects will enhance the motivational and cognitive effects of goal setting. While we expect goal setting to be associated with improved performance regardless of the project type, front office project types should see an even greater positive effect of goal setting on process quality because of the more compelling link between patient-centered projects and desired outcomes from the perspective of the quality improvement team members. Thus, based on the front office to back office ordering of patient care, clinical administrative, and nonclinical administrative projects, we hypothesize the following:

H3: Project type moderates the relationship between project-level goal setting and process quality. Specifically:

H3a: The relationship between project-level goal setting and process quality will be stronger for patient care projects than for administrative project types.

H3b: The relationship between project-level goal setting and process quality will be stronger for clinical-administrative projects than for nonclinical administrative projects.

Quality improvement in health care

More than 2 decades ago, Laffel and Blumenthal[46] made the argument that the application of

"industrial" quality improvement methodologies such as Six Sigma and Lean could help move quality improvement in health care from a static model of conformance to a continuous improvement model. Boyer et al[47] found that health care–specific quality practices are associated with process quality as measured by the adherence to the Centers for Medicare & Medicaid Services quality of care measures across medical conditions including myocardial infarction, heart failure, pneumonia, and surgery-related infection. Lloyd and Holsenbach described positive results of a Six Sigma application in a radiology process and in medication administration in a hospital setting but warned that management commitment must be demonstrated through investment in data collection, analysis capability, and time away from the clinical environment to collect and analyze data.[48] Tsasis and Bruce-Barrett[49] described the implementation of Lean in a children's hospital in Toronto, Canada, and the resulting shift in organizational culture to be more collaborative and data-driven.

The recognition of the simultaneous need for more efficient processes, faster patient flow times, and better clinical outcomes has led to the increasing use of Six Sigma and Lean approaches to quality improvement in health care settings.[32,50,51] But while Six Sigma, Lean, and other quality improvement approaches are gaining traction in health care systems, there is evidence that such quality improvement programs are more effective when they are clearly linked to organizational strategy via explicit goals, when projects are chosen to align with strategic organizational objectives, and when they incorporate cross-functional teams.[25] In particular, the quality context (i.e., market-based quality pressures, manager's knowledge, top management support, and a strong quality department) provides a necessary framework in which hospital quality management efforts affect performance.[52]

Previous research has shown that health care quality improvement programs have the potential to improve performance, but that the overall impact of these programs on patient outcomes remains questionable.[32,50,51,53-55] However, quality improvement programs were found to be an especially effective tool for clinicians when specific training and support were provided.[14,33,54-56]

In general, for quality programs to be successful, participants require approaches and tools to apply to improvement projects.[57-60] Shah et al[21] refer to this as shared knowledge that not only supports shared goals but enables problem solving. Given that the teams in our study are all engaging in quality improvement initiatives such as Six Sigma, Lean or others, we focus on the more fundamental question of the impact of team member quality training and knowledge on the effectiveness of quality improvement efforts. Because quality improvement training is likely to influence the way team members formulate and execute task strategies, we hypothesize the following:

H4: Training on quality methods will be positively associated with project performance.

METHODOLOGY

Data collection

We designed a survey instrument to explore the factors associated with health care quality improvement project performance comprising 36 questions organized around these factors and performance outcomes. The survey used a combination of yes-no, Likert scales and open-ended formats. Before administering the survey electronically using Qualtrics, we assessed face validity by relying on a pilot test group of executives at 5 different hospitals, all of whom were representative of the sample selected. Minor changes were made to the survey on the basis of their feedback.

The target respondents were managers and higher in health care organizations in the United States who had responsibilities over both clinical and nonclinical quality improvement projects. We identified a professional society that focuses on quality improvement in health care, the Healthcare Information and Management Systems Society and the Management Engineering and Process Improvement (MEPI) committee, which is a large Healthcare Information and Management Systems Society committee. The

committee represents a subset of approximately 500 professionals involved in quality management and improvement. An e-mail was sent with a link to the survey in the first week of March 2010. Ninety of the e-mails were immediately returned as undeliverable, yielding an effective sampling frame of 410. We received 62 survey responses within the first 3 weeks. A second reminder e-mail was distributed in early May, which yielded 13 additional responses.

To increase the survey sample size, we identified a second very similar professional society that focuses on quality improvement in health care: the Society for Health Systems (a division of the Institute for Industrial Engineering). This organization has approximately 450 members. A second wave of e-mails was distributed in the first week of August 2010 to Society for Health Systems, from which we received an additional 47 responses.

From the 2 societies together, we received 122 responses out of 860 members, for a response rate of 14%. Of the 122 respondents, 18 indicated that their health care organization had not worked on any quality improvement projects in the last year, leaving 104 respondents whose organization worked on at least 1 type of project in the previous year. Each respondent completed the survey for up to 3 project types (patient care, clinical administrative, nonclinical administrative), as applicable within their organization, with an average of 2.7 project types per organization.

The MEPI surveys its members each year to profile its membership in terms of demographic and organizational characteristics (the Society for Health Systems has a similar profile). On the basis of the results of the 2010 survey (http://www.himss.org/content/files/MEPI_2010_Survey.pdf), we compared our study sample with the MEPI profile on 3 questions to assess potential sample biases. For the first question about the respondent's position held in the organization, a χ^2 test comparing the observed frequency of 9 categories of positions in the study sample with the expected frequencies from the MEPI profile showed no significant differences between the sample and the MEPI profile ($\chi^2 = 7.34$; $P = .50$). Similarly, no differences were found between the study sample and the MEPI profile in terms of 7 categories of whom the respondent reports to ($\chi^2 = 5.91$; $P = .43$). When comparing the study sample with the MEPI profile on the type of organization (hospital/multihospital health system or other type of organization), the study sample has a higher proportion of hospitals than the MEPI profile ($\chi^2 = 23.33$; $P = .00$). However, the high proportion of hospitals in the sample is not surprising since hospitals are the front line for health care quality improvement efforts.

Measurement of variables

Each respondent in the study answered questions about quality improvement projects in their health care organizations. The questions focused on either the use of projects at the organizational level or a specific type of project (patient care, clinical-administrative, and nonclinical-administrative).

Dependent variable

To measure process quality, the respondents answered the question, "How would you evaluate project performance in each category?," for the 5 process quality construct items (i.e., decreased errors, improved patient flows, improved process or labor efficiency, enhanced patient satisfaction, and enhanced clinician satisfaction) for each project type (i.e., patient care, clinical administrative, and nonclinical administrative) using a 7-point Likert scale. The possible responses ranged from 1 = no improvement to 7 = very significant improvement.

Independent variables

To measure project-level goal setting, we asked respondents to assess how often specific, measurable goals are set for each process quality measure and project type at the onset of the project[49] using a scale that ranged from 1 = never to 4 = sometimes to 7 = always.

To test whether project type moderates the relationship between project-level goal setting and process quality, we constructed 2 orthogonal Helmert contrasts for project type.[61] If we had instead included 2 simple indicator variables for the project

type, the omitted project type would have served as the baseline intercept for the model. However, with Helmert contrasts, the overall intercept can be interpreted as the performance level for an average project type. In addition, the Helmert contrasts chosen were of theoretical interest in this study. Helmert1 is the difference between clinical-administrative projects and nonclinical-administrative projects. Helmert2 is the difference between patient care projects and the average of the 2 administrative project types. We then constructed interaction terms between the project type contrasts and goal setting for quality performance. The terms Helmert1 × Project-level goal setting and Helmert2 × Project-level goal setting are used to test H3b and H3a, respectively.

Organizational-level goal setting was measured by asking respondents how often their organization develops a "business case" or specific justification for why projects are selected.[8,61] Responses include 1 = never, 2 = very rarely, 3 = sometimes, 4 = fairly regularly, and 5 = always. Quality training was measured with 2 items asking respondents about the extent to which team members are provided training on quality tools and programs and training on team effectiveness.[14,33,54,55]

Control variables

We included an organizational-level Likert scale control variable—the extent to which quality improvement projects are chosen on the basis of alignment with organizational strategy or larger initiatives—because quality improvement activities that are aligned with the overall goals of the organization tend to be more successful.[14,25,57,62]

Prior research on health care performance typically includes control variables for ownership status and size of the organization.[30,35,63,64] In our study, respondents indicated the ownership status of their organization as for-profit, nonprofit, or government. In addition, because goal setting can occur at multiple levels of the organization, we controlled for whether the organization is a system member.[14] Finally, we included control variables related to the respondents themselves. Respondent job title was based on responses to the question, "What is your job title?" The text responses were then coded as hospital/corporate executive, department head/director, and project manager/consultant/team leader within or across departments. The last control variable is the number of years of respondent health care experience, which was input directly by the respondent (i.e., no scale was provided) and ranged from 1 to 42 years.

Confirmatory factor analysis

We conducted a confirmatory factor analysis (CFA) in Stata version 13.0 with the latent variables: process quality, project-level goal setting, and quality training. Respondents acted as informants for their organizations and because they reported on up to 3 project types within the organization, project types are nested within organizations. Thus, we used robust standard errors clustered by organization in the CFA.[65] With robust standard errors, the only fit statistic Stata calculates for the measurement model is the standardized root mean square residual (SRMR). The SRMR of 0.05 satisfies the Hu and Bentler criteria of less than 0.08.[66] For both the CFA and the subsequent structural equation model, missing data were deleted listwise, which resulted in a final sample size of 244 project types from 93 organizations (out of the original 104 organizations).

Because respondents answered questions about both the independent and dependent variables, common method variance (CMV) is a potential concern. To test for CMV, we conducted a Wald test during the CFA that compares a 1-factor model with the factor structure used in this study. The use of robust standard errors required us to conduct a Wald test rather than the usual CFA likelihood ratio test. The hypothesis that a single factor accounts for all the variance in the data is not supported ($\chi^2(21) = 17894.39$; $P < .001$), thus allaying concerns about the single method of collecting data. This test is analogous to the Harman's single-factor test, but the use of CFA is considered to be a more sophisticated test for CMV.[67] In addition, while the base question for the process quality and project-level goal setting questions differed, we allowed the responses between pairs of performance

measures in the 2 questions to covary to address CMV associated with the structure of the questions.

For each multi-item construct, the values of Cronbach α and composite reliability (Table 1) all exceed 0.7, which indicates that the constructs are internally consistent.[68] As evidence of convergent validity, all items load significantly on their constructs (Table 1), with most items having a factor loading above 0.70.[68]

To establish discriminant validity, we used a CFA approach for each pair of latent variables in Table 1 by estimating 2 models.[69] The first model constrains the correlation between the pair to 1, whereas in the second model, the correlation is unconstrained. With these nested set of models that each differ by 1 *df*, we conducted a series of $\chi^2(1)$ tests to determine whether the unconstrained model is a better fit to the data. For all pairs of variables in Table 1, the χ^2 test results are significant at the 0.01 level. The significant differences between the constrained and unconstrained models indicate that the correlation between each pair of variables is different from 1 and support discriminant validity.

Structural equation model

Because of the inclusion of latent variables, we estimated a moderated structural equation model (SEM) on the basis of the conceptual model in the Figure. The model includes estimates of the structural relationships between process quality and each of the following variables: organizational-level goal setting (H1), project-level goal setting (H2), the interaction between the Helmert2 contrast and project-level goal setting (H3a), the interaction between the Helmert1 contrast and project-level goal setting (H3b), and quality training (H4). In addition to the control variables, the Helmert contrasts themselves are included for completeness. To estimate the moderating effect

Table 1

CONFIRMATORY FACTOR ANALYSIS

Constructs and Scale Items	Standard Factor Loadings[a]
Process quality (Cronbach $\alpha = .89$; CR = 0.90; AVE = 0.63)	
How would you evaluate project performance in each category?	
Decreased errors	0.72
Improved patient flows	0.84
Improved process or labor efficiency	0.70
Enhanced patient satisfaction	0.90
Improved clinician satisfaction	0.80
Project-level goal setting (Cronbach $\alpha = .88$; CR = 0.88; AVE = 0.60)	
How often do you set specific, measurable goals at the onset of the project related to the following?	
Decreasing errors	0.67
Improving patient flows	0.81
Improving process or labor efficiency	0.77
Enhancing patient satisfaction	0.84
Improving clinician satisfaction	0.77
Quality training (Cronbach $\alpha = .84$; CR = 0.84; AVE = 0.72)	
What preparation/training is provided for quality improvement team members?	
Training on quality tools or programs	0.82
Training on team effectiveness	0.88

Abbreviations: AVE, average variance extracted; CR, composite reliability.
[a]All factor loadings are significant at $P < .01$.

of project type on the relationship between project-level goal setting and process quality in the SEM, product indicators of the interaction between project type and the latent variable project-level goal setting were formed and specified following the procedure recommended by Marsh et al.[70]

As with the CFA, we used Stata 13.0 with robust standard errors clustered by organization to account for the nested structure of our data (i.e., project types within organizations). Because of this structure, the only fit statistic Stata calculates for the SEM is the SRMR. The SRMR = 0.05, which again satisfies the Hu and Bentler[66] criteria of less than 0.08.

RESULTS

Table 2 shows the descriptive statistics for the variables (means, standard deviations, and correlations), and Table 3 displays the results for the SEM. The sample size, n, at the project type level is 244, clustered within 93 organizations.

In H1, we hypothesized a positive association between organizational-level goal setting and project performance. With process quality as the dependent variable, the estimated coefficient for organizational-level goal setting is not significant (coefficient = −0.025; $P > .10$). Therefore, H1 is not supported. However, the coefficient estimates for project-level goal setting (coefficient = 0.677; $P < .01$) and quality training (coefficient = 0.196; $P < .05$) are both positive and significant. These provide support for both a positive association between project-level goal setting and process quality (H2) and a positive association between quality training and process quality (H4). In addition, the interaction between Helmert1 and project-level goal setting is not significant (coefficient = −0.011; $P > .10$), but the interaction between Helmert2 and project-level goal setting is positive and significant (coefficient = 0.126; $P < .05$). Thus, the positive moderating effect of patient care projects (vs administrative project types) on the relationship between project-level goal setting and process quality (H3a) is supported, while the moderating effect of clinical administrative projects (vs nonclinical administrative projects) on the relationship between project-level goal setting and process quality (H3b) is not supported.

Three control variables and the 2 Helmert contrasts are significant. The indicator variables for both for-profit (coefficient = 0.679; $P < .05$) and nonprofit (coefficient = 0.296; $P < .10$) ownership status (vs government ownership) are positive and significantly associated with process quality, as is being a member of a system (coefficient = 0.197; $P < .10$). The structural equation estimates for the Helmert contrasts are both positive and significant, with Helmert1 (coefficient = 0.107; $P < .05$) indicating a higher level of process quality for clinical administrative projects (vs nonclinical administrative projects) and Helmert2 (coefficient = 0.096; $P < .10$) indicating a higher level of process quality for patient care projects (vs the average of the 2 administrative project types).

DISCUSSION

In this study, we explored how the setting of organizational-level and project-level goals and quality training affects the performance of health care quality improvement projects. Our conceptual model in the Figure is based on the following premises: goal setting focuses attention and directs action toward desired performance outcomes, with organizational-level goals providing the context in which project-level goals are set; opportunities for improvement and motivation for pursuing process quality can differ by project type, with project-level goal setting having a greater impact on performance when the project type and desired performance outcomes are aligned with these opportunities and motivations; in addition to goals, teams also require training to acquire approaches and tools for enabling task performance. Thus, by testing this model, we simultaneously examine the roles of organization-level and project-level goals and team quality training for enhancing health care quality improvement project performance.

Table 2

DESCRIPTIVE STATISTICS[a]

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Process quality	4.94	1.28	1											
2. Project-level goal setting	5.12	1.28	0.79[b]	1										
3. Quality training	4.47	1.54	0.61[b]	0.60[b]	1									
4. Organizational-level goal setting	3.65	0.90	0.46[b]	0.54[b]	0.53[b]	1								
5. Strategic alignment	5.51	1.25	0.33[b]	0.33[b]	0.53[b]	0.43[b]	1							
6. Ownership status: for-profit	0.09	0.28	−0.04	−0.12	−0.23[c]	−0.04	−0.20	1						
7. Ownership status: not for-profit	0.77	0.42	0.08	0.03	0.10	−0.01	0.20	−0.56[b]	1					
8. System member: yes	0.49	0.50	0.13	0.05	0.03	0.01	−0.05	−0.16	0.03	1				
9. Respondent job title: hospital/corporate executive	0.27	0.45	0.00	0.04	−0.02	0.05	0.09	−0.09	0.00	0.08	1			
10. Respondent job title: department head/director	0.34	0.48	−0.19	−0.14	−0.02	−0.20	0.08	−0.07	0.05	−0.11	−0.01	1		
11. Respondent health care experience	18.43	10.73	0.01	0.03	0.13	0.01	0.21[c]	−0.09	−0.04	−0.08	0.19	0.06	1	
12. Full-time employees	4.43	1.16	0.06	−0.01	0.10	0.00	−0.06	−0.41[b]	0.36[b]	0.29[b]	−0.08	−0.08	−0.05	1

[a] $n = 244$ project types from 93 organizations (respondents).
[b] $P < .01$.
[c] $P < .05$.

Table 3

STRUCTURAL EQUATION MODEL RESULTS FOR PROCESS QUALITY

Variable	Coefficient Estimate
Helmert1[a]	0.107[b]
Helmert2[c]	0.096[d]
Project-level goal setting	0.677[e]
Helmert1 × Project-level goal setting	−0.011
Helmert2 × Project-level goal setting	0.126[b]
Organizational-level goal setting	−0.025
Quality training	0.196[b]
Strategic alignment	0.005
Organizational status: For-profit	0.679[b]
Organizational status: Non-profit	0.296[d]
System member: yes	0.197[d]
Respondent job title: Hospital/corporate executive	−0.023
Respondent job title: Department head/director	−0.180
Respondent health care experience	−0.000
Full-time employees	0.019
N	244
Standardized root mean squared residual	0.050

[a]Helmert1 is the difference between clinical-administrative and nonclinical administrative projects.
[b]$P < .05$.
[c]Helmert2 is the difference between patient care projects and the average of the 2 administrative project types.
[d]$P < .10$.
[e]$P < .01$.

The hypothesis that organizational-level goal setting is positively associated with project performance was not supported. This is consistent with Goldstein and Naor[71] who found no relationship between hospital goal setting and the quality management practices put in place to improve performance. One explanation for this finding may be related to how process quality is measured. Process quality includes metrics focused on and transparent to patients that are the "default" orientation for health care quality improvement projects.[25,26] Thus, a business case or specific justification for why projects are selected would not necessarily be essential for improving patient-centered performance. In addition, quality improvement teams may feel more removed from the business or financial aspects of quality improvement, whereas they are keenly familiar with how processes of care impact performance outcomes without the need for a business case. This suggests that further research is needed on if and when organizational-level goal setting impacts other project performance dimensions.

As expected, we found support for the association between project-level goal setting and project performance. This finding is consistent with other literature that demonstrates a strong association between setting specific goals and better performance.[5] On the basis of goal setting theory and the customer contact model, we expected a stronger relationship between project-level goal setting and process quality for patient care projects versus the administrative projects. In addition, we expected project-level goal setting to have a stronger relationship with process quality for clinical administrative projects versus nonclinical administrative projects. However, we found only a moderating effect for patient care projects. This implies that the motivational and cognitive effects of goal setting are greater for projects that involve interactions with clinicians than for ones that involve interactions with other staff (e.g., registration) and is suggestive of the particular benefit of goal setting to focus patient care projects on improving the actual and perceived quality of the underlying processes that impact direct patient care.

As predicted, training on quality tools is positively and significantly associated with process quality. This finding makes sense, since many quality improvement tools focus on defining problems, measuring outcomes, and benchmarking performance. Quality improvement tools may also provide a clear "how to" for improvement projects, thereby clarifying task strategies to implement change and achieve performance goals.

Academic and managerial implications

This study provides an example of the type of rich research environment that operations management researchers can find in the health care industry, an industry that has been slow to adopt quality improvement tools and practices. However, the academic

literature in operations management in the health care industry is growing as more health care organizations embrace quality improvement approaches and the need to evaluate what is and is not effective becomes more critical.[29,36,72-74] Our study adds to this growing stream of research by focusing on how goal setting and quality training impact health care quality improvement project performance.

In terms of academic contributions, the results of this study support previous research that shows that specific, measurable goals increase overall performance. However, this study also shows that goals do not uniformly increase performance. For project-level goals that focus attention and efforts on performance dimensions that are naturally aligned with the project type, we found that goal setting can be even more important for improving performance, in particular for patient care projects. Although we also expected this result for clinical administrative projects versus nonclinical administrative projects, our findings did not support the added importance of goals for improving process quality. These results indicate that more research is needed on understanding the role of goal setting in driving performance improvements for different types of patient-provider interactions.

In addition, quality training was associated with better performance outcomes in this study. Although self-efficacy may influence goal setting, this study suggests that goal theory could be expanded to emphasize the importance of task strategies enabled through quality training in goal attainment.[75]

This research also has several managerial implications. First, our results suggest that organizational-level goal setting may not be critical to project performance, especially for patient-centered performance metrics that are typically the default orientation for hospitals. However, setting goals at the organizational-level conveys an organizational emphasis on improving performance metrics that may be important for organizational success even if they are not transparent to the patients. Thus, business cases may still be important for focusing attention and driving improvement on these other performance dimensions. Second, while setting project-level goals for performance improvement is beneficial overall, project-level goals for improving process quality generate an added benefit for patient care projects. As a result, managers should set specific, measurable goals for all project types, while being especially attentive to goal setting for improving process quality for patient care projects. Third, because quality training was significantly associated with process quality, managers should make sure that quality improvement teams have adequate training in quality improvement tools and techniques. These tools help teams set clearer task strategies for goal attainment.

LIMITATIONS AND CONCLUSIONS

Our findings are subject to certain limitations. As with all single respondent survey-based studies, CMV is a concern. While CMV can never be ruled out completely, the Wald test during the CFA provides evidence suggesting that CMV is not a problem in our study. Furthermore, there are other factors that might also be responsible for the success of quality improvement projects, including trust in leadership, commitment to leadership, and job autonomy.[76] Although we did control for the alignment of projects with the organization's strategy and a number of organizational and respondent characteristics, future research could more explicitly account for these and other factors. In addition, there are a number of clinical outcomes in addition to decreased errors, improved patient flows, increased efficiency, and "satisfaction" on the part of either the physician or the patient. Although we focused on process quality as the performance outcome in this study, other outcomes that measure patient health would be of interest as well.

Health care managers are not always flush with data on performance, nor are they always certain on which data to focus. Since goal setting requires some degree of knowledge of current performance levels, the health care industry has been slower than other industries to adopt quality improvement initiatives. However, health care managers are now

getting key information systems in place—such as electronic medical records, physician order entry, monitoring and tracking systems—to extract performance and outcome data and better understand baseline trends and patterns. This new focus on benchmarking and quality improvement in health care suggests that health care managers have increasing opportunities to set actionable goals on the basis of relevant data to improve clinical outcomes, project performance, and, ultimately, organizational performance. In addition, many are also investing in human resources to drive such improvement, which is important in promoting the collaboration between clinicians and managers. Our study contributes to furthering this agenda by moving toward a better understanding of health care quality improvement project performance and, in particular, the roles of goal setting, at both organizational and project levels, and quality training for improving process quality.

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