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All teach, all learn, all improve?: The role of interorganizational learning in quality improvement collaboratives

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Abstract

Background—Quality improvement collaboratives are an increasingly common strategy for implementing evidence-based practices in health care. However, research shows that many participating organizations do not achieve the level of performance improvement desired.

Purpose—This study examined the use of interorganizational learning activities (inter-OLAs) as an explanation for mixed performance improvement among collaborative participants. We tested the hypotheses that inter-OLA use is positively associated with participants' performance improvement and that this relationship is moderated by the use of intraorganizational learning activities (intra-OLAs) and quality-focused human resource (Q-HR) practices.

Methodology—We conducted a survey of organizational teams participating in 4 Institute for Healthcare Improvement Breakthrough Series collaboratives. Survey responses from 52 teams, regarding the use of inter-OLAs, intra-OLAs and Q-HR practices, were linked to performance improvement data obtained from the Institute for Healthcare Improvement and demographic data obtained from secondary sources.

Findings—The more collaborative teams used inter-OLAs, the more their organizations' performance improved. Contrary to our hypothesis, the use of intra-OLAs did not moderate this relationship; teams' use of intra-OLAs added to, but did not multiply, the effect of inter-OLA use. In contrast, an organization's use of Q-HR practices multiplied the performance benefit of inter-OLA use.

Practice Implications—Our findings suggest that organizations that participate in collaboratives are more likely to improve their performance if they use the inter-OLAs offered by the collaborative. Our results also suggest that complementing high use of inter-OLAs with intra-OLA use and Q-HR practices enhances performance improvement. For collaborative sponsors, our findings imply that including activities that facilitate interorganizational and intraorganizational learning are worthwhile.

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Keywords

human resources practices; organizational learning; performance; quality improvement collaboratives

Quality improvement collaboratives have been described as “arguably the health care delivery industry's most important response to quality and safety gaps” (Mittman, 2004, p. 897). Since 1995, thousands of organizations and health systems in at least a dozen countries (e.g., Australia, Peru, Russia, Sweden, Tanzania, the United Kingdom, and the United States) have participated in collaboratives in an effort to close the substantial and troublesome gap between current practice and evidence-based practice and to improve quality of care (Heiby, 2004; Wilson, Berwick, & Cleary, 2003). Collaboratives are structured programs in which multidisciplinary teams from different organizations work to improve care in one area of their operations (e.g., infection control). As part of a collaborative, teams attend a series of meetings where they learn about best practices in their target area, quality improvement techniques, and the experiences of others that have implemented new practices. Between meetings, teams are expected to implement changes in their own organization and to share their implementation experiences with each other for collective learning via several activities (e.g., monthly conference calls and listserv discussions). After the collaborative ends, teams summarize their results and lessons learned and present them to non-participating organizations at conferences so that others may learn from their experiences (Kilo, 1999).

Despite the popularity of collaboratives, evidence regarding their effectiveness is mixed (Mittman, 2004; Schouten, Hulscher, Everdingen, Huijsman, & Grol, 2008). Whereas some studies find that participating organizations experience significant improvement relative to nonparticipants (e.g., Baier et al., 2004), others find no significant improvement (e.g., Landon et al., 2004) or find improvement on some measures, but not on others, relative to nonparticipants (e.g., Horbar et al., 2004). Studies that examine performance improvement across participants within collaboratives find similar variation, with some participants showing substantial improvement, whereas others in the same collaborative experience limited to no improvement (Lindenauer, 2008). A review of 40 collaboratives found that approximately half of participating organizations were able to implement the prescribed changes in a pilot unit and begin spread to other units; the remaining organizations were less successful (Massoud, Provost, & Nicholas, 2004). The mixed results raise an important theoretical and practical question: Under what conditions do health care organizations benefit from participation in collaboratives and other interorganizational networks? More specifically, under what conditions does participants' performance improve?

This article examines the variance in participants' use of interorganizational learning activities (inter-OLAs) as a predictor of performance improvement for collaborative participants. In addition, it investigates whether the effect of using inter-OLAs depends on other participant behaviors and organizational practices. Specifically, it investigates the potential moderating effect of participants' use of intraorganizational learning activities (intra-OLAs) and the use of quality-focused human resource (Q-HR) practices. Figure 1

shows the relationships that we investigate. *Interorganizational learning activities* refer to external activities that enable organizations to acquire, share, and combine knowledge with other organizations (e.g., exchanging monthly reports), whereas *intraorganizational learning activities* refer to internal activities that enable the acquisition, sharing, and combining of knowledge among individuals within the organization (e.g., soliciting ideas from staff).

In the next section, we review the literature related to interorganizational relationships and organizational learning as they inform our hypotheses on the roles of inter-OLA, intra-OLA, and Q-HR practices in performance improvement in collaboratives. We then report results from tests of our hypotheses in a sample of 52 teams that participated in four collaboratives sponsored by the Institute for Healthcare Improvement (IHI), the organization credited with formalizing and popularizing the collaborative model. Our results inform discussions about effective activities for promoting quality improvement and when and how collaboratives, which are frequently described as “black boxes” (Duckers, Spreeuwenberg, Wagner, & Groenewegen, 2009; Wilson et al., 2003), contribute to quality improvement. In addition, our results advance research on interorganizational learning in health care, a subject that has received relatively little empirical attention since Schermerhorn's 1970s and 1980s studies of information sharing and interorganizational cooperation among hospital administrators (e.g., Schermerhorn, 1977). Given the difficulty that organizations have experienced in their independent efforts to improve quality of care, a better understanding of how collective efforts may help is critical.

Theory and Hypotheses

Inter-OLAs and Performance

Inter-OLAs are a fundamental component of the collaborative model. The model includes activities such as monthly conference calls, face-to-face meetings (called “Learning Sessions”), exchange of monthly reports, and listserv discussions. We contend that collaborative teams’ use of these external activities facilitates their performance improvement because these activities enable the acquisition of new knowledge relevant to improvement efforts. Qualitative research on teams in the aerospace and pharmaceutical industries suggests that teams use external activities to locate experienced others with whom they can discuss ways to improve work processes and from whose experiences they can extract lessons (Ancona & Bresman, 2005).

In sum, teams use these activities for vicarious learning (Bresman, 2010). Through inter-OLAs, teams and their organizations have the opportunity to learn of the successes and failures of their peers in the improvement area. Success stories reveal possible practices worth adopting, whereas failure stories save teams from implementing practices that would stall or reverse their improvement efforts. Organizational learning research suggests that both types of knowledge—knowledge of do's and don'ts—are valuable for teams and organizations striving to implement new and better processes in a timely manner (Kim, Kim, & Miner, 2009). Hansen (1999) found that new-product development teams that leveraged their external ties performed better on their projects. He observed that teams’ external ties provided them with access to information not only about beneficial strategies but also about

strategies that would be a wasteful expenditure of time, effort, and resources, saving them from reinventing the wheel and shortening their time to complete their projects. Furthermore, he observed that teams advanced several steps in their own projects because they capitalized on the lessons learned by others. Similarly, in a study of cardiac surgery teams implementing a new technology, Edmondson, Winslow, Bohmer, and Pisano (2003) found that late-adopting teams implemented the technology faster because they drew upon the lessons learned from early adopters. We expect that teams participating in collaborative-related inter-OLAs experience similar performance gains as a result of vicarious learning from other teams.

In addition to vicarious learning, inter-OLAs may provide the opportunity for performance-enhancing, exploration-inspired learning that stimulates innovation in the organization (Ingram, 2002). External activities provide access to external parties, who tend to possess non-redundant knowledge and offer different perspectives (Ancona & Caldwell, 1992; Hansen, 1999). Prior work shows that exposure to novel and contrasting viewpoints has the advantages of broadening the recipients' knowledge base, compelling consideration of alternative approaches, and prompting novel combination of ideas, resulting in the development of innovative practices that can ultimately result in better outcomes (Powell, 1998; Sutton & Hargadon, 1996). Several studies outside health care have found a positive relationship between use of external activities and performance (Ancona & Caldwell, 1992; Choi, 2002; Wong, 2004). Given the effect that external activities can have, we propose that collaborative participants that leverage the inter-OLAs offered by collaboratives are likely to experience greater performance improvement.

Recent evidence from studies of collaborative teams appears to support our proposition that the use of inter-OLAs is positively related to performance improvement. A descriptive study by Nembhard (2009) found that the teams that made the most improvement rated collaborative features that provided opportunities to learn from other teams as a great help to their improvement efforts, with interviewed team leaders citing the benefits of gaining implementation knowledge, motivation, and social support from their interactions with other teams. A study by Marsteller et al. (2007) also documented that collaborative teams leveraged their interactions with other teams to gain knowledge; 77% of teams in their study reported at least one tie to another team that involved sharing howto advice. Furthermore, for 86% of ties, teams stated that they had made a change as a direct result of interaction with another team. Although no relationship was found between number of ties and improvement, based on both studies' suggestion of knowledge and other benefits gained via collaborative-related inter-OLAs and based on organizational learning theory, we hypothesize the following:

Hypothesis 1: The use of inter-OLAs is positively associated with performance improvement for collaborative participants.

The Moderating Role of Intra-OLAs

Some of the experience-based knowledge that is gained from external activities such as inter-OLAs is likely to be complex (Bresman, 2010). This has implications for the implementation of this knowledge in recipient organizations. A substantial body of research

on the implementation of new practices in health care has found that organizations often struggle to implement new practices that have demonstrated their effectiveness in other organizations (Nembhard, Alexander, Hoff, & Ramanujam, 2009). Two explanations have been offered for this phenomenon. First, scholars have observed that many effective practices in health care contain tacit knowledge; that is, practices require capabilities and routines that have not been or are difficult to articulate, making them challenging to transfer to other organizations (Berta & Baker, 2004). Second, differences in organizational contexts (e.g., staffing, facilities, and technology) have made it difficult to exactly replicate practices in new settings.

Both of these challenges—tacit knowledge and differences in organizational context—suggest a benefit of teams undertaking additional activities to help them develop a better understanding of imported practices and how to adapt them to their setting.

Intraorganizational learning activities may help teams achieve these goals. Tucker, Nembhard, and Edmondson (2007) found that improvement teams' use of activities that helped them learn how to operationalize new practices in their setting contributed to the successful implementation of those practices in 23 neonatal intensive care units. In addition, a case study by Sutton and Hargadon (1996) showed that when teams brainstormed (a form of intra-OLA) on how to apply knowledge they acquired from outside the organization, they created more performance-enhancing solutions for the organization. Given the ways in which intra-OLAs may help teams address the challenges of integrating complex knowledge and practices acquired from inter-OLAs, we propose that greater use of intra-OLAs by collaborative teams, in combination with inter-OLA use, enhances performance improvement, a relationship also suggested by work on team learning in pharmaceutical firms (Bresman, 2010). Thus, we hypothesize the following:

Hypothesis 2: There is an interaction between the use of inter-OLAs and the use of intra-OLAs such that when teams use more intra-OLAs, inter-OLA use is more positively associated with performance improvement.

The Moderating Role of Q-HR Practices

Performance improvement depends not only on the identification of improved practices and strategies for their effective implementation, both of which collaborative teams may identify via inter-OLAs and intra-OLAs, but also on all relevant staff's committed use of the practices derived from the team's learning experiences. Prior research theorizes that individuals work toward the implementation of new knowledge when the environment fosters their ability, motivation, and opportunity to learn new practices (Argote, McEvily, & Reagans, 2003). An organization's HR practices can be a determinant of staff ability, motivation, and opportunity (Huselid, 1995). Human resource practices are programmed efforts to align staff and organizational interests and to prepare staff to perform their tasks. Typical HR practices include staff training and performance-based rewards. Training provides the ability and opportunity to learn new practices, whereas rewards may provide the motivation to perform the practices reliably. Both these HR practices implicitly signal organizational priorities via their content. For example, training in patient scheduling and rewards for seeing a high number of patients each day signal an organizational commitment to high productivity. Likewise, training in quality improvement techniques and rewards for

participating in improvement efforts signal an organizational commitment to quality improvement. Studies suggest that staff are responsive to such signals. For example, Rundall et al. (2002) found that staff in health care organizations that emphasized quality were more likely to implement new practices. Thus, we expect that the use of Q-HR practices complements the use of inter-OLAs by collaborative teams. Intraorganizational learning activities help teams to identify better practices for their organizations, and Q-HR practices help teams elicit the necessary staff commitment to broadly implement the practices. Without staff commitment and effort, performance improvement is less likely to occur. Thus, we hypothesize the following:

Hypothesis 3: There is an interaction between the use of inter-OLAs and the use of Q-HR practices such that when the use of Q-HR practices is greater, inter-OLA use is more positively associated with performance improvement.

Methods

Study Design and Sample

We tested our hypotheses in a cross-sectional study of collaborative participants using survey and archival data. The participants were teams and their organizations located in the United States and Canada who had participated in one of four collaboratives sponsored by the IHI. The topics of the collaboratives were the following: Improving Access and Efficiency in Primary Care (ACCESS; 16 teams), Reducing Complications From Ventilators and Central Lines in the ICU (ICU; 25 teams), Reducing High-Hazard Adverse Drug Events (ADE; 14 teams), and Reducing Surgical Site Infections (SSI; 23 teams). We invited members of the 78 teams participating in these four collaboratives to complete a survey about their teams' experiences in the collaborative.

For 67 of the 78 teams (86%), we received a completed survey from at least one team member. As is a norm in teams research, we retained only data from teams with three or more team members' responses to increase the reliability of our estimates (cf. Van der Vegt & Bunderson, 2005). Therefore, our study sample was reduced to 53 teams (68% of teams) whose collaborative experience was reported by 217 team members. We excluded one of these teams because of incomplete data, resulting in a final sample of 52 teams. These teams represented 48 organizations, as four organizations participated in more than one collaborative, having distinct teams represent them in each of two collaboratives. On average, there were 13 teams per collaborative and four respondents per team. We found no statistically significant differences between the 52 teams in our final sample and the 26 nonstudy teams in terms of geographic location, setting (urban vs. rural), teaching status, health system membership, ownership status, and organizational size (p values $> .05$).

Data Collection

We invited team members to participate in our survey via a letter distributed through the collaborative listserv. The letter explained that a survey would be distributed to all team members present at the final Learning Session of the collaborative and offered the opportunity for online or paper completion of the survey to those unable to attend the meeting. After the Learning Session, five surveys with self-addressed stamped envelopes

were mailed to the key contact for each team that did not attend. A reminder e-mail to complete the survey, with “thank you” to those who had participated, was then sent to all team members within 2 weeks of the Learning Session. The survey inquired about the use of inter-OLAs, intra-OLAs and Q-HR practices. We linked the survey data to performance improvement and demographic data for each team's home organization. We obtained the performance improvement data from IHI records and demographic data from the American Hospital Association, *Profiles of U.S. Hospitals* (2006), and organizations' Web sites.

Measures

Use of inter-OLAs—Use of inter-OLAs was assessed using team member responses to a survey question asking respondents to report “the extent to which your team used the following during the course of the 10-month collaborative period”: (a) Learning Sessions interactions, (b) monthly conference calls arranged by the collaborative, (c) team-initiated telephone calls to other teams in the collaborative, (d) collaborative e-mail/listserv communications, (e) monthly report exchange, and (f) collaborative extranet (a Web site where teams could post their performance data and information; viewable only by participants). Respondents used a 5-point Likert scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *regularly*, 5 = *a lot*) to report their team's usage of each activity. However, for data analysis, we recalibrated the scale to range more intuitively, from 0 = *never* to 4 = *a lot*, and summed responses across activities. Thus, the possible range for this variable was 0 to 24. There was a high level of agreement among the responses of members of the same team (mean $r_{Wg} = .96$); therefore, we aggregated responses to the team level by calculating the arithmetic mean of team members' responses. Significant differences in responses between teams also supported aggregation, analysis of variance (ANOVA) $F = 2.84$, $p < .01$; intraclass correlation coefficient (ICC) (1) = .35).

Use of intra-OLAs—In addition to reporting their use of inter-OLAs, team members were asked to report the extent to which their team used two additional activities during the 10-month period: (1) solicitation of ideas and feedback from staff in their home organization and (2) plan–do–study–act cycles, which is an approach to improvement in which teams investigate quality problems, develop, and implement small-scale changes, measure the effects, and make changes for improvement. The reported use of these two activities served as our measure of intra-OLA use. We summed responses for both activities and aggregated individual responses to the team level because there were high agreement within teams (mean $r_{Wg} = .91$) and differences between teams, ANOVA $F = 1.36$, $p < .10$; ICC(1) = .10.

Use of Q-HR practices—We assessed the use of Q-HR practices by asking survey respondents to indicate their organization's use of two HR practices that prior research has identified as key components of quality management programs in health care: (1) training of staff (administrative and clinical staff) in quality improvement principles and methods and (2) incorporation of quality measures into the reward and performance appraisal system (Westphal, Gulati, & Shortell, 1997). We used the same response scale that we used for inter-OLA and intra-OLA use, as well as the same summing and aggregation procedures because a high level of agreement among team members (mean $r_{Wg} = .87$) and differences

between teams existed about these practices as well (ANOVA $F = 2.12$, $p < .01$; ICC(1) = .25).

Performance improvement—Each organization's improvement was assessed by the IHI director who was assigned to the collaborative using organization-submitted data for specified metrics (e.g., for the SSI collaborative, the number of surgical cases between surgical site infections). Directors of the IHI classified the level of improvement as no improvement, modest improvement, improvement, or significant improvement using defined criteria. For example, to be classified as “significant improvement,” an organization had to have implemented the majority of the recommended practices, demonstrated evidence of breakthrough improvement in specified outcome measures (e.g., SSI breakthrough goal: double the number of surgical cases between surgical site infections), been at least 50% toward accomplishing its goals, and established plans for spreading improved practices throughout the organization. We created an indicator variable to denote significant (performance) improvement because the IHI promoted this goal and about half of the organizations in our sample achieved this goal. Organizations received a 1 for performance improvement if they made significant improvement, and a 0 otherwise.

Control variables—We included four control variables in our analytic models. First, because prior research suggests that performance improvement varies by collaborative topic and our preliminary data analysis showed significant differences in performance improvement for those in the ADE collaborative relative to those in the other three collaboratives, we included an indicator variable for membership in the ADE collaborative. We also included an indicator variable for membership in the ACCESS collaborative because this collaborative's focus on an operational issue was qualitatively different from the other collaboratives' focus on clinical issues. Second, because team composition has been shown to affect team effectiveness in collaboratives (Shortell et al., 2004), we included a measure—the number of departments or functions represented on the team—that simultaneously captured two influential properties of the teams: their size and diversity. Third, due to our interest in performance improvement, it was important to control for prior performance (West, Guthrie, Dawson, Borrill, & Carter, 2006), which we assessed using teams' assessment that poor performance had motivated participation in the collaborative (1 = *strongly disagree*, 5 = *strongly agree*). Finally, we included two indicator variables for geographic location because being located in two U.S. regions (south and west) was associated with performance improvement in our models. Other demographic characteristics—teaching status, health system membership, prior collaborative membership, and ownership status—were considered as control variables but ultimately excluded because our analyses showed that they reduced the degrees of freedom for testing our hypotheses yet had no significant effect on our outcome variable, performance improvement ($p > .10$).

Analytic Approach

We tested our hypotheses using logistic regression models, appropriate for our binary dependent variable (i.e., performance improvement). In all models, we included our control variables and used clustered robust standard errors to account for possible correlation among the few teams in different collaboratives originating from the same organization (i.e., four

organizations with two teams in different collaboratives). We evaluated support for our first hypothesis by including inter-OLA use in our regression model and examining the statistical significance of its odds ratio (OR). In a further test of this hypothesis, we then added our other focal variables—use of intra-OLAs and Q-HR practices—to the model and reexamined the OR for inter-OLAs. In this study, the OR indicates the odds of an organization making “significant improvement” (vs. not) as a result of a one-unit increase in the predictor (e.g., an increase from sometimes to regular use of an inter-OLA).

To test our two moderating hypotheses, we added the requisite interaction terms to our model. To reduce multicollinearity between the interaction terms and their individual components, the individual measures were mean-centered prior to conducting the analyses (Aiken & West, 1991). Given the relatively small sample size, we considered significance levels of 1%, 5%, and 10%.

Findings

Table 1 shows the means, standard deviations, and inter-correlations for the variables in our study. The mean reported use of collaborative-related inter-OLAs was 15.32 of a possible 24, which indicates that the average collaborative team regularly used these activities. The standard deviation of 2.72 (and range of use = 6.50–19.92), however, indicates substantial variation in the overall use of collaborative-related inter-OLAs. Figure 2 shows that there was also considerable variation in the use of specific inter-OLAs, ranging from a high of 85% of teams regularly participating in the monthly conference calls to a low of 8% of teams regularly participating in telephone calls with other collaborative teams. The variation in use of inter-OLAs was positively correlated with the use of intra-OLAs ($r = .53$; $p < .05$; Table 1).

The results of the regression models used to test our first hypothesis are shown in Table 2. Model 1 shows support for Hypothesis 1, which proposed that greater use of inter-OLAs is associated with a higher level of performance improvement ($OR = 1.66$, $p < .01$). As shown in Model 2, this positive relationship remained ($OR = 1.53$, $p < .05$) after adjusting for the other key variables in our study, use of intra-OLAs and Q-HR practices. Post hoc analysis of the six inter-OLAs studied showed that interacting with other teams at Learning Sessions and exchanging monthly reports were the activities most significantly correlated with performance improvement ($r = .29$ and $r = .28$, respectively, $p < .05$).

Model 3 in Table 2 shows the results from our examination of the interactions between use of inter-OLAs and use of intra-OLAs and between use of inter-OLAs and Q-HR practices. The model shows that we found no support for our hypothesis that the interaction of inter-OLAs and intra-OLAs is associated with greater improvement (Hypothesis 2). Although both inter-OLA use ($OR = 1.66$, $p < .01$) and intra-OLA use ($OR = 3.19$, $p < .10$) were associated with higher odds of significant improvement, their interaction did not significantly affect performance ($OR = .70$, $p > .10$). In contrast, the model shows that the interaction of inter-OLA and Q-HR practices had a positive and significant association with performance improvement ($OR = 1.28$, $p < .10$), as predicted by Hypothesis 3. Figure 3 shows the nature of the interaction between these two factors (± 1 SD). It indicates that when

the use of Q-HR practices targeting all staff is high, increased use of inter-OLAs is associated with greater odds of performance improvement. For organizations that make little use of Q-HR practices, use of inter-OLAs has a relatively limited effect on performance improvement.

In summary, we found that the use of collaborative-related inter-OLAs was positively associated with performance improvement for participants. Contrary to expectation, the use of intra-OLAs, in combination with inter-OLAs, did not multiply the improvement associated with the use of inter-OLAs, even though intra-OLA use was also associated with greater improvement. In contrast, an organization's use of Q-HR practices multiplied the odds of improvement related to inter-OLA use. The benefit of using inter-OLAs was greater for those organizations with greater use of HR practices that encouraged all staff (not just those in the collaborative team) to focus on quality.

Discussion

The primary goal of our study was to develop and test a model of performance improvement for organizations in collaboratives, in order to add to the understanding of the mixed performance results of collaborative participants. Our model focused on the behavior of participants, specifically their use of inter-OLAs and intra-OLAs, and the context in which participants sought to implement what they learned (specifically, the extent to which Q-HR practices were also used in their organization). Our findings about how these factors influence the performance improvement of collaborative participants have implications for both research and practice.

Research Implications

Our findings suggest that much may be learned by expanding research on collaboratives to include the study of how participants' behaviors—their actions and interactions—within them impacts performance improvement. To date, research on collaboratives has focused largely on whether membership in a collaborative affects performance improvement. Few studies have looked inside the “black box of collaboratives” to examine how participants' attributes alter their ability to benefit from collaborative membership (Duckers et al., 2009; Wilson et al., 2003). The studies that have looked inside focused primarily on identifying the structural and cultural attributes of participants (e.g., the presence of a champion and climate of openness, [Deo et al., 2009; Shortell et al., 2004]), not the more proximate behavioral attributes that may influence their performance. An exception is the aforementioned study by Marsteller et al. (2007), which documented the forming of ties between participants. Our results support that study's focus on participants' actions and interactions and suggest that a promising avenue of research for understanding performance in collaboratives is the study of participant behavior. This line of inquiry may provide new insight on the conditions under which collaborative membership translates into performance improvement. Our study implies that one facilitating condition is participants' use of inter-OLAs.

Our findings also have implications for research on organizational learning in health care. Much of the research in this area has focused on intraorganizational learning. This research has provided great insights about the benefits (e.g., innovation implementation) and

antecedents (e.g., participative leadership) of such learning (Chuang, Ginsburg, & Berta, 2007; Tucker et al., 2007). By comparison, little research has been conducted on interorganizational learning, despite the international growth of health-care-related learning networks that are premised on the idea that interorganizational learning is needed to facilitate quality improvement in health care (e.g., IHI's 5 Million Lives Campaign in the United States and the United Kingdom's Patient Safety First Campaign, [McCannon & Perla, 2009]). Our research empirically validates the benefit of using inter-OLAs and thus suggests the importance of studying interorganizational, in addition to intraorganizational, learning to better understand performance improvement in health care. In follow-up to this study, future research should investigate the antecedents of inter-OLA use, for example. Insights about antecedents would not only advance organizational theory but also may help managers, collaborative sponsors, and policy makers interested in facilitating the use of inter-OLAs for performance improvement. Several of the structural and cultural variables highlighted in previous research (e.g., leadership support) are likely to be antecedents to inter-OLA use, given their influence on intra-OLA use. However, some antecedents are likely to differ, given the difference in activities.

Our findings also indicate that future learning studies in health care should examine contingent relationships, as we found that the relationship between inter-OLA use and performance improvement was moderated by organizations' use of Q-HR practices (i.e., training and rewards). More research is needed to identify other moderators of this relationship and to examine whether the moderators are the same across different types of learning networks (e.g., closed networks such as collaboratives vs. open networks such as national improvement campaigns). Although intra-OLA use did not significantly moderate the relationship between inter-OLAs and performance in the collaboratives we studied, the interaction of intra-OLA use and inter-OLA use deserves further study. Our descriptive statistics showed that use of one correlates with use of the other; thus, they may motivate each other. Longitudinal research is needed to investigate the evolution of these learning processes, whether there is an optimal sequence of these activities (e.g., intra-OLAs should precede inter-OLAs), and whether the optimal use of each depends on where the organization is in its improvement journey. Action research studies, in which researchers and organizations collaborate to implement problem-solving interventions (Reason & Bradbury, 2004), may be a particularly helpful strategy for advancing our understanding of how organizational learning occurs through these activities.

Practical Implications

Our findings have implications for improvement-focused organizations, collaborative sponsors, policy makers, and health care purchasers. For improvement-focused organizations, particularly those interested in collaboratives, our findings offer three lessons. First, they imply that organizations that join collaboratives with a goal of making significant improvement should actively use the inter-OLAs presented by the collaborative; collaborative membership alone is unlikely to result in such improvement. To improve, collaborative participants must be willing to share their knowledge and experiences and to learn from others. Historically, such sharing has been rare in health care due to competition, productivity pressures, lack of time, and few opportunities for sharing (Kilo, 1999).

The second lesson implied by our findings is that the use of inter-OLAs is beneficial for organizations in collaboratives regardless of whether they are high or low users of intra-OLAs. Practitioners may question, as scholars have, whether organizations can spend too much time on external learning activities (Bresman, 2010) and face a tradeoff in benefit from external versus internal learning activities (Choi, 2002; Wong, 2004). Our study suggests that the risks of engaging in inter-OLAs to facilitate the implementation of evidence-based practices are small relative to the benefits in health care as organizations continue to struggle to accomplish this goal independently. Despite their various efforts to deliver evidence-based care during the last decade, only a median of 59% of patients receive the recommended care for their condition in the United States (Agency for Healthcare Research and Quality, 2009). Nevertheless, future research should examine whether there is a point at which a tradeoff occurs between inter-OLAs and intra-OLAs.

The third lesson for organizations participating in collaboratives is that they should encourage and support their representative teams. They should encourage their participating teams to use the inter-OLAs presented by the collaborative as well as intra-OLAs. Ways in which they may support their teams' use of these activities are by providing resources, time, and information. Without such support, teams may limit their use of these activities, hindering the organization's ability to capitalize on the improvement opportunity. Finally, organizations must ensure that their HR practices, and more broadly the organizational context, complement learning efforts. Our data showed that without this complement, the odds of significant improvement are lower.

For sponsors of collaboratives and other improvement initiatives (e.g., improvement campaigns), our results affirm the importance of including activities that facilitate inter-organizational learning and exchange in programmatic design. Interacting with teams at Learning Sessions and exchanging monthly reports were both found to be significantly correlated with performance improvement. The former likely provides a rich connection because it allows for breadth and depth of information sharing about improvement strategies due to two-way communication. These interactions, along with the exchanging of monthly reports, are also rich in the sense that they enable benchmarking, which can be a powerful motivator to improve (Nembhard, 2009). Realizing that a peer has improved performance significantly can prompt an institution to set higher performance goals for itself and to persist in its improvement efforts when obstacles are encountered, knowing that the goal can be achieved. Thus, collaborative sponsors are encouraged to pursue opportunities that allow the development of rich connections between program participants. The most effective of these connections appear to hinge on two-way communication and transparency.

Finally, this research offers guidance for policy makers and health care purchasers. Both groups strive to identify strategies for improving quality of care and to facilitate the use of effective strategies. Much attention has been given to intraorganizational learning as an implementation strategy, and our results support this focus. However, our results also point to the importance of complementing the use of intra-OLAs with inter-OLAs. Both policy makers and purchasers are well positioned to use their influence to promote inter-OLAs. Policy makers, for example, might revise licensing standards to encourage

interorganizational learning. Likewise, purchasers might require or reward participation in inter-OLAs that facilitate the implementation of evidence-based practices.

Limitations of the Research

Although our study's findings are informative, they should be considered in light of its limitations. First, our effective response rate of 68% is less than ideal; however, it is comparable with that of other studies of collaboratives (e.g., Landon et al., 2004). Furthermore, differences between those in our final sample and the remaining collaborative participants in terms of performance improvement and other characteristics were not statistically significant. Second, although our qualitative measure of performance improvement enabled us to combine data from collaboratives with different outcome measures, ideally, we would have an objective, quantitative measure. Similarly, objective measures of participants' use of activities, rather than their reported use, would be preferred. Lastly, we studied only participants in IHI's collaboratives. Although many collaboratives are modeled after IHI's, there are also several variants of this model. Additional studies are needed to assess whether our results extend to participants in other models.

Conclusion

Collaboratives have been increasingly used as a performance improvement strategy in health care. However, studies show that not all participating organizations experience performance improvement. In this article, we theoretically developed then empirically tested a model of performance improvement in collaboratives. We found that differences in the use of collaborative-related inter-OLAs partly explain the variability in organizations' performance improvement. The more participants used inter-OLAs, the greater their performance improvement. This was true regardless of their level of intra-OLA use. However, the positive effect of inter-OLAs was enhanced for organizations that were high users of HR practices that encourage quality-oriented behaviors by all staff. Thus, our findings suggest that, to understand performance improvement in collaboratives, it is helpful to investigate participant behavior within them, in addition to the context in which knowledge acquired during them must be implemented.

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Figure 1.
Hypothesized model of performance improvement in collaboratives

Figure 2.

Percentage of organizations reporting regular use of collaborative-related interorganizational learning activities

Note. Regular use was defined as a score of 2.5 or greater for teams' reported use of an activity on a response scale in which 0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *regularly*, and 4 = *a lot*.

Figure 3.

Effect of using interorganizational learning activities (inter-OLAs) and quality-focused human resources (Q-HR) practices on performance improvement

Note. High use refers to a +1 SD in use above the mean, whereas low use refers to -1 SD in use below the mean. The figure is based on the results of the logit model, which allows us to show the impact of our variables on a linear scale, per the STATA command: `vibl` (visualizing interactions for binary logit models). The coefficients of the logit model indicate the degree of change in the logit of the outcome for a one-unit increase in the predictor (i.e., inter-OLAs). —▲— Low use of Q-HR practices; ----●---- Mean use of Q-HR practices; —■— High use of Q-HR practices.

Table 1

Descriptive statistics and intercorrelations for study variables

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. Significant performance improvement	0.51	0.50									
2. Collaborative topic: ADE	0.19	0.39	-.30*								
3. Collaborative topic: ACCESS	0.25	0.43	.03	-.27*							
4. Geographic location: South	0.28	0.45	.20	-.09	-.07						
5. Geographic location: West	0.10	0.30	.06	-.16	-.03	-.20					
6. Team composition: no. of departments	6.17	1.38	-.02	-.20	-.45*	.11	-.04				
7. Prior performance	3.73	1.23	.23	-.21	.17	-.03	.28*	<-.01			
8. Use of inter-OLAs	15.32	2.72	.37*	-.01	-.18	.03	.09	.23	-.05		
9. Use of intra-OLAs	6.60	0.75	.19	.30*	-.04	.03	-.07	.11	-.17	.53*	
10. Use of Q-HR practices	5.13	1.31	.02	-.10	-.14	-.16	.13	.08	.03	-.01	.21

Note. ADE = Reducing High-Hazard Adverse Drug Events; ACCESS = Improving Access and Efficiency in Primary Care.

* $p < .05$.

Table 2

Logistic regression models of performance improvement

	Model 1	Model 2	Model 3
	OR (RSE)	OR (RSE)	OR (RSE)
Control variables			
Collaborative topic	Included	Included	Included
Geographic location	Included	Included	Included
Team composition: no. of departments	0.56 (0.19) *	0.47 (.017) **	0.45 (0.18) **
Prior performance	1.85 (.63) *	2.05 (0.65) **	2.63 (0.99) ***
Independent variables			
Use of Inter-OLAs	1.66 (0.29) ***	1.53 (0.33) **	1.66 (0.34) ***
Use of Intra-OLAs		3.21 (2.04) *	3.19 (2.06) *
Use of Q-HR practices		0.99 (0.27)	0.90 (0.29)
Interactions for moderating effects			
Use of Inter-OLAs × Intra-OLAs			0.70 (0.16)
Use of Inter-OLAs × Q-HR practices			1.28 (0.19) *
Wald χ^2	14.19 **	19.43 **	25.91 ***
Pseudo- R^2	.31	.36	.39

Note. OR = odds ratio; RSE = robust standard error; inter-OLAs = interorganizational learning activities; intra-OLAs = intraorganizational learning activities; Q-HR = quality-focused human resource practices.

*
 $p < .10$.

**
 $p < .05$.

 $p < .01$.