Pediatric Hospitalists Collaborate to Improve Timeliness of Discharge Communication

abstract

OBJECTIVES: The transition of care from hospital to primary care provider (PCP) at discharge carries the potential for significant information loss. There is evidence that the timeliness and content of discharge communication are often unreliable during this handoff. Suboptimal transitions of care at discharge have been associated with adverse outcomes, and efficient solutions are required to transform the current state. Our specific aim was the achievement of 90% documentation of hospitalist-PCP communication within 2 days of hospital discharge.<12 months.

METHODS: As part of a grassroots collaborative improvement organization, pediatric hospitalist groups engaged in parallel quality improvement projects to improve the timeliness and reliability of discharge communication at their local institutions. After an initial face-to-face meeting, e-mail and regular conference calls were used to promote shared effort and learning. The study period lasted 12 months, with >16 weeks of continuous data required for inclusion.

RESULTS: The mean rate of documentation of timely discharge communication across the collaborative increased from 57% to 85% over the study period. For the 7 hospitals that were able to collect >16 weeks of data before July 2010, the mean rate of communication was >90%. Participants reported that the context of the collaborative contributed to their success.

CONCLUSIONS: Timely hospitalist-PCP communication was inconsistent at the beginning of the study. This low-resource quality improvement collaborative was able to achieve rapid improvement and resulted in improved perceptions of quality improvement knowledge among participants.

Increasingly, care of pediatric patients in the inpatient setting is being managed by pediatric hospitalists.1 Although studies have shown benefits of hospitalist care, including decreased length of stay, decreased cost of care, and potential improvement in quality, few studies have evaluated the communication between hospitalists and primary care providers (PCPs), which is critical to continuity of care.1–4 Transitions of care between providers (also termed “handoffs” or “handovers”) have been identified as potentially hazardous times for patients.5–8 Specifically, the final handoff from hospitalist to PCP at the time of hospital discharge is crucial, and inadequate communication at this time puts patients at risk for poor outcomes.7–9 The American Academy of Pediatrics recently highlighted this concern in the clinical report titled “Physician’s Roles in Coordinating Care of Hospitalized Children,” stating that a “legible summary...must be available to all personnel and institutions involved in the subsequent care of the child” and that “the provider responsible for ongoing care should be contacted directly by the inpatient team to

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KEY WORDS
care coordination, collaborative, discharge communication, handoffs, pediatric hospitalist, primary care provider, quality improvement, transitions of care

ABBREVIATIONS
EMR: electronic medical record
PCP: primary care provider
PHM: Pediatric Hospital Medicine
QI: quality improvement
VIP: Value in Inpatient Pediatrics

Drs Shen and Cooperberg conceptualized and designed the quality improvement project, designed and coordinated data collection, carried out the initial analyses, drafted the initial manuscript, reviewed and revised the manuscript, and approved the final manuscript as submitted; and Drs Hershey, Bergert, Mallory, and Stucky Fisher conceptualized and designed the quality improvement project, participated in data collection, drafted the initial manuscript, reviewed and revised the manuscript, and approved the final manuscript as submitted.

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ensure prompt initiation of outpatient care.” With respect to timeliness, a recent consensus paper on transitions of care states that discharge “information should be available at the time of the patient encounter.” Despite agreement on these principles, barriers to reliable communication remain.

In 2009, the Pediatric Hospital Medicine (PHM) Roundtable, a strategic planning retreat of PHM leadership, identified the need for action in hospital-focused quality improvement (QI) and commissioned creation of a national multicenter collaborative to effect rapid and measurable improvements in care for hospitalized children. The Value in Inpatient Pediatrics (VIP) Network, an inclusive and grassroots QI organization within PHM, houses the Transitions of Care Collaborative. This collaborative is focused on achieving measurable improvement in the communication of patient information from hospitalist to PCP at the time of discharge. A shared experience within a collaborative increases the pace of improvement through shared protocols, identification of barriers and abatement strategies across centers with differing structures, comparisons of data and tracking methods, and a unified voice that can aid in local culture change or adoption of new processes. Our specific aim was to achieve documentation of hospitalist-PCP communication within 2 calendar days of discharge in 90% of discharged patients from the hospitalist service within a 12-month time period. During our initial collection of baseline data, we found no evidence that communication was regularly occurring in the absence of documentation. Thus, we felt documentation to be a suitable measure for hospitalist-initiated communication. Patients without a PCP or medical home were excluded.

A secondary objective of the collaborative was participant education in QI methods through both didactic methods and facilitated experiential learning. Conference calls and shared resources helped participants establish procedures to gather data, review current communication procedures, identify problems, and devise solutions to those problems, which all varied by institution. In addition, site training in basic QI, the use of QI tools such as process mapping, and data collection was provided through conference calls.

**METHODS**

**Setting**

This study was a voluntary collaborative with interest solicited through a pediatric hospitalist listserv and at the 2009 PHM national meeting. Hospitalists representing 15 unique hospitalist groups initially joined this effort. The study was conducted from November 2009 to June 2010 (July 2009–October 2009 involved planning the improvement). Ten groups contributed data and 7 completed participation, defined as 16 weeks of consecutive data collection. Self-reported hospital characteristics are shown in Table 1.

**Improvement Teams**

Two hospitalists (Dr Shen and Julia Shelburne, MD) co-chaired the collaborative, leading the conference calls and facilitating sharing of resources. A pediatric hospitalist from each site led the improvement team locally. Composition of the teams varied, ranging from the hospitalist group alone, to multidisciplinary efforts involving staff from health information, information technology, nursing, and administration. Of the 7 sites with complete participation, 6 had residents and 2 had nurse practitioners or physician assistants who shared responsibility for the communication process.

**Planning the Interventions**

Through a series of monthly conference calls and a survey of participating hospitalist groups before the interventions, we established a unifying and measurable goal. The global aim of the study was to improve the timeliness of pediatric hospitalist-PCP communication at hospital discharge. The specific aim was to achieve documentation of hospitalist-PCP communication within 2 calendar days of discharge in 90% of discharged patients from the hospitalist service within a 12-month time period. During our initial collection of baseline data, we found no evidence that communication was regularly occurring in the absence of documentation. Thus, we felt documentation to be a suitable measure for hospitalist-initiated communication. Patients without a PCP or medical home were excluded.

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**TABLE 1 Demographics of Participating Hospitalist Program Sites**

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Description</th>
<th>Setting</th>
<th>Teaching</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Children’s hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents</td>
</tr>
<tr>
<td>2</td>
<td>Children’s hospital within a hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents</td>
</tr>
<tr>
<td>3</td>
<td>Children’s hospital within a hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents, midlevel providers</td>
</tr>
<tr>
<td>4</td>
<td>Community hospital</td>
<td>Suburban</td>
<td>No</td>
<td>Attending hospitalists only</td>
</tr>
<tr>
<td>5</td>
<td>Medium-size children’s hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents</td>
</tr>
<tr>
<td>6</td>
<td>Large children’s hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents, fellows, midlevel providers</td>
</tr>
<tr>
<td>7</td>
<td>Children’s hospital within a hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents</td>
</tr>
<tr>
<td>8</td>
<td>Medium-size children’s hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents</td>
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<tr>
<td>9</td>
<td>Large children’s hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents, fellows</td>
</tr>
<tr>
<td>10</td>
<td>Children’s hospital within a hospital</td>
<td>Urban</td>
<td>Yes</td>
<td>Residents</td>
</tr>
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</table>

* Sites unable to obtain 16 weeks of continuous data.
Each site developed a parallel QI initiative, using a site-specific key driver diagram and/or process map to understand the local process and target specific interventions. A sample key driver diagram was provided to each site (Appendix 1), which each local improvement team modified and individualized as needed to adapt to the local context. Process maps were also created locally at each site and shared between groups. Resources for communication varied across sites, including degree of administrative support and medical record format (electronic medical record [EMR], paper only, or mixed). In addition, the communication methods varied across and within sites to include telephone calls, e-mail, and/or fax. Based on this baseline information, specific interventions included obtaining conceptual support from hospital administration, collaborating with a multidisciplinary team to standardize and streamline the process, creating or accessing a documentation log of completed hospitalist-PCP communications, and using EMRs to standardize and facilitate discharge communication.

Planning the Study of the Interventions

The collaborative team agreed to perform a retrospective review of a random sample of 12 charts weekly from each site (4 each on Sunday, Monday, and Thursday). The sampling scheme was chosen based on consensus agreement of the participants to target days more likely to represent a stressed system and/or higher volume, attend to weekday variability in discharge volumes, and reflect a feasible sampling size with an ability to detect improvements of moderate to large scale.¹³

Methods of Evaluation

The primary outcome was rate of documentation of communication (whether through e-mail, fax, or telephone call) to the PCP within 2 calendar days of discharge. Chart review was performed at each site on a weekly basis. Three groups transitioned early to monthly tracking of all discharge communication rather than sampling as this method was easier to implement at their institutions. Site-specific run charts were used to demonstrate improvement. The study population consisted of patients discharged from the hospitalist service. Patients discharged by another service or discharged during days of the week without chart review were excluded. A postimplementation, open-ended participant survey on barriers and lessons learned was completed.

Analysis

Site-specific run charts were used to demonstrate the impact of this QI initiative and provide feedback to the teams. For each site, the weekly percentage of charts that documented communication with the PCP within 2 calendar days of discharge was plotted over time. Because each site’s start-up period progressed at a different pace, we defined “time zero” as the week that each site started their data collection. All sites began data collection within 12 weeks of the initial site. Only data from those centers that were able to sample for 16 consecutive weeks were included. Statistical Process Control p charts were used to aid in displaying and analyzing variation over time for sites with enough data points (Fig 1). The center line (mean) and upper and lower control limits were calculated by using QI-Charts (Scoville Associates, Austin, TX). Associates for Process Improvement Rules for Detecting Special Cause¹⁴ were used to differentiate special cause variation from common cause variation (Appendix 2).

Collaborative Learning

Lessons learned by individual sites were discussed and tracked during monthly conference calls to facilitate shared learning across sites. After the completion of the collaborative, the 10 primary group leaders completed a barrier analysis to delineate factors affecting success rates. Factors or interventions mentioned or used by ≥2 groups were recorded.

Human Subject Protection/Ethical Issues

No conflicts of interest were identified. No patient-specific information was collected or shared. Each group was required to receive site-specific approval (through institutional review board or local quality office) to participate.

RESULTS

All 7 pediatric hospitalist groups that completed participation demonstrated improvement in monthly rates of documentation of timeliness of discharge communication over a minimum 16-week period. Five of the 7 groups achieved the specific aim of the collaborative of communication rates of at least 90% after a minimum of 16 weeks of participation (Fig 2). The composite rates across the collaborative of PCP communication within 2 days of discharge increased from a mean of 57% to 85% by the fourth month. For 5 groups that participated for 5 months and 4 groups that participated for at least 6 months, the composite rates increased to 92% and 95%, respectively.
The remaining 3 groups that initially submitted data but then dropped out had considerable difficulty with continuous data collection, attributed to limited resources and infrastructure. For these sites, the mean rates of PCP communication within 2 days of discharge ranged from 25% to 98%, and length of participation ranged from 4 to 8 weeks. The characteristics of these 3 sites were similar to those of the remaining 7 sites (Table 1).

Table 2 lists challenges, interventions, and factors contributing to success reported by multiple participants during the collaborative and afterward in the postimplementation survey. Interventions and contextual factors that were felt to affect improvement were regularly discussed and recorded in an effort to facilitate shared learning. Groups shared a variety of local drivers that contributed to their success: timely and individualized feedback for providers, financial incentives, support from hospital medicine group, a multidisciplinary team and leadership, process automation, and integration into EMR when possible. The sequential timing of 2 interventions (financial incentives and provider feedback) that were shared and explicitly implemented is shown in Fig 1. In the postimplementation, open-ended survey of site leaders, participants reported several aspects related to the collaborative that were helpful: education about QI, feedback, support, motivation, and accountability. Several groups mentioned that as a result of participating in this project, they feel better equipped and motivated to take on other unrelated QI projects.

Sites providing limited data reported similar issues noted by successful participants. In other words, lack of support and infrastructure were common issues. The groups that were unable to collect 16 full weeks of data had significant difficulties in obtaining regular...
measurements of documentation of discharge communication despite, in 1 instance, communication rates as high as 98% for a 4-week period. The 4 sites with the highest rates of discharge communication were the groups with the longest periods of sustained data collection before the end of the study period. They were also the sites that implemented financial incentives or targeted individual feedback.

DISCUSSION

This QI report revealed that timely discharge communication from hospitalist groups to PCPs was inconsistent at the beginning of this collaborative effort, occurring slightly more than one-half of the time, but improved across groups that maintained participation throughout a 4- to 6-month time frame. Groups that participated for >4 months had rates of communication with PCPs within 2 days of discharge >90% of the time.

The mean rate of 57% timely discharge communication at the beginning of this effort is consistent with findings in the literature that reveal substantial gaps in the quality of hospitalist-PCP handovers. Communication was measured only from the standpoint of documentation by the hospitalist group, consistent with scope planned by the group. However, the complexity of communication and transitions of care clearly extend beyond hospitalist practices. The variability in communication methods arose not only from individual or group-specific hospitalist preferences but was also driven by institutional requirements as well as PCP preferences. Parents and family members played a role in communication as their knowledge of accurate PCP information was noted to be a consistent barrier at multiple sites. Several participants who had previously explored assessment of PCP receipt of communication had encountered administrative barriers such as an inability to assess whether PCP fax machines were always “on” to receive faxes. Thus, the decision to focus on hospitalist-initiated communication was made early on in the planning to conform to the resource constraints of this grassroots initiative. Despite these challenges, the collaborative was successful not only in sharing assessments of specific interventions that worked and failed but also in offering the perceived value of education in basic QI lessons and tools.

There was clear evidence of shared learning regarding culture change within our collaborative. For example, both the idea of financial incentives as well as timely individualized provider feedback were originally presented in conference calls by a single site and then later applied, with success, by other groups (Fig 1). These were shared as concepts rather than specific, well-characterized interventions; groups were free to modify or adjust the idea to fit their specific context.

<table>
<thead>
<tr>
<th>TABLE 2 Themes Reported by Multiple Participants</th>
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<td>Challenges</td>
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<td>Local drivers of success</td>
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<td>Collaborative drivers of success</td>
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<td>Lessons learned</td>
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and details were not further elaborated on in calls. These 2 themes, in addition to other site-reported factors such as practice standardization, automation (when feasible), and institutional or group support, are elements of an improvement bundle that could be tested at future sites.

Learning collaboratives are a relatively new and promising tool for potentially accelerating the pace at which change occurs. Impressive results have been demonstrated within health care, although many questions remain regarding both the mechanisms of change and the universal effectiveness of these collaboratives. Similarly, although we found that increasing participation in our collaborative resulted in higher rates of communication, we did not rigorously examine contextual factors that may have led to this success. Nonetheless, participants did identify several consistent themes related to the collaborative that they felt were instrumental in their efforts. The self-reported qualities of support, feedback, motivation, and accountability merit further exploration and suggest that a sense of community may have contributed to the improvement efforts. Specifically, multiple participants felt that this group of hospitalists supported each other on calls, provided peer feedback, motivated each other, and were accountable for their individual program’s results. These themes should also be considered in the specific context of this collaborative: a voluntary, self-identified group of peers sharing information via e-mails and regular conference calls. These methods represent a particularly low-resource approach compared with the most widely cited model, the Institute for Healthcare Improvement’s Breakthrough Series.

Several limitations of this work exist. As with many QI projects, this initiative was not designed to study factors that led to its success. Our goal was improvement. Although we queried and reported potential keys to this success, these factors were not systematically investigated in the process of the QI work. For example, the index site that implemented financial incentives was unable to actually pay out the incentives during the study period due to administrative barriers to pulling comprehensive provider-specific data. Thus, the mere proposal of this plan may have been associated with improved communication during the study period, but the administrative complexity of the incentive plan precluded further short-term evaluation. Similarly, the reasons for failure of the 3 groups unable to sustain data collection for >2 months are not clear. The accelerated timeline for improvement may have been a limitation. In addition, it should be noted that participation in this effort was voluntary and initiated by individual hospitalists, rather than hospitalist groups or institutions. Hospitalists may have agreed to participate but underestimated the degree of local administrative support necessary to regularly collect data, which is more likely to occur in this type of grassroots effort as opposed to a well-funded project initiated by hospital administration. Unmeasured individual, group, and contextual factors likely contributed to both successes and dropouts.

An additional limitation of this project is that PCP receipt of information and patient outcomes were not evaluated. It is difficult to know whether an improvement in timeliness ultimately resulted in outcomes beneficial to the patient or PCP. Effective handoffs require 2-way communication, with clear assignment of responsibility for certain components of the communication. This topic has been incompletely explored within pediatrics although the evidence suggests that expectations differ between hospitalists and PCPs with regard to certain aspects of this communication. Patient- and family-centered outcomes were similarly not included and represent a more global gap in care coordination research, particularly for families that are unable to identify a medical home. Exploring PCP expectations and family-centered outcomes for improving hospital-based discharge transitions of care is a planned next phase of this work.

Our primary goal was hospitalist-led, rapid-cycle improvement across multiple sites within a 12-month period. Recently, the successes of 2 other parallel PHM-VIP collaboratives with similar low-resource constructs have been published. Collectively, these works support the notion that efficient approaches may exist to effect change across multiple sites. Evaluating the components of the collaborative “community” that are effective in facilitating change, as well as the specific aspects of interventions that are generalizable across contexts, remains a primary challenge in implementation science.

**CONCLUSIONS**

This QI report suggests that there continue to be deficits in timeliness of discharge communication for hospitalized pediatric patients and that these may be improved in the context of a low-resource, pediatric hospitalist QI collaborative. Future efforts will be directed at improving the content of communication as well as examining the impact on patient outcomes.
ACKNOWLEDGMENTS
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REFERENCES

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**APPENDIX 1** A sample key driver diagram. H&P, history and physical.

**APPENDIX 2** Special cause variation identified in Statistical Process Control p charts for individual sites: rates of timely communication. Note: control chart phases were adjusted based on special cause variation.
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