ORIGINAL RESEARCH

Improving the Reliability of Verbal Communication Between Primary Care Physicians and Pediatric Hospitalists at Hospital Discharge

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INTRODUCTION: Timely and reliable verbal communication between hospitalists and primary care physicians (PCPs) is critical for prevention of medical adverse events but difficult in practice. Our aim was to increase the proportion of completed verbal handoffs from on-call residents or attendings to PCPs within 24 hours of patient discharge from a hospital medicine service to ≥90% within 18 months.

METHODS: A multidisciplinary team collaborated to redesign the process by which PCPs were contacted following patient discharge. Interventions focused on the key drivers of obtaining stakeholder buy-in, standardization of the communication process, including assigning primary responsibility for discharge communication to a single resident on each team and batching calls during times of maximum resident availability, reliable automated process initiation through leveraging the electronic health record (EHR), and

transparency of data. A run chart assessed the impact of interventions over time.

RESULTS: The percentage of calls initiated within 24 hours of discharge improved from 52% to 97%, and the percentage of calls completed improved to 93%. Results were sustained for 18 months. Standardization of the communication process through hospital telephone operators, use of the discharge order to ensure initiation of discharge communication, and batching of phone calls were associated with improvements in our measures.

CONCLUSION: Reliable verbal discharge communication can be achieved through the use of a standardized discharge communication process coupled with the EHR. *Journal of Hospital Medicine* 2015;10:574–580. © 2015 Society of Hospital Medicine

Timely and reliable communication of important data between hospital-based physicians and primary care physicians is critical for prevention of medical adverse events.[1,2] Extrapolation from high-performance organizations outside of medicine suggests that verbal communication is an important component of patient handoffs.[3,4] Though the Joint Commission does not mandate verbal communication during handoffs per se, stipulating instead that handoff participants have "an opportunity to ask and respond to questions,"[5] there is some evidence that primary care providers prefer verbal handoffs at least for certain patients such as those with medical complexity.[6] Verbal communication offers the receiver the opportunity to ask questions, but in practice, 2-way verbal communication is often difficult to achieve at hospital discharge.

At our institution, hospital medicine (HM) physicians serve as the primary inpatient providers for nearly 90% of all general pediatric admissions. When

the HM service was established, primary care physicians (PCPs) and HM physicians together agreed upon an expectation for verbal, physician-to-physician communication at the time of discharge. Discharge communication is provided by either residents or attendings depending on the facility. A telephone operator service called Physician Priority Link (PPL) was made available to facilitate this communication. The PPL service is staffed 24/7 by operators whose only responsibilities are to connect providers inside and outside the institution. By utilizing this service, PCPs could respond in a nonemergent fashion to discharge phone calls.

Over the last several years, PCPs have observed high variation in the reliability of discharge communication phone calls. A review of PPL phone records in 2009 showed that only 52% of HM discharges had a record of a call initiated to the PCP on the day of discharge. The overall goal of this improvement project was to improve the completion of verbal handoffs from HM physicians (residents or attendings) to PCPs. The specific aim of the project was to increase the proportion of completed verbal handoffs from on-call residents or attendings to PCPs within 24 hours of discharge to more than 90% within 18 months.

METHODS

Human Subjects Protection

Our project was undertaken in accordance with institutional review board (IRB) policy on systems
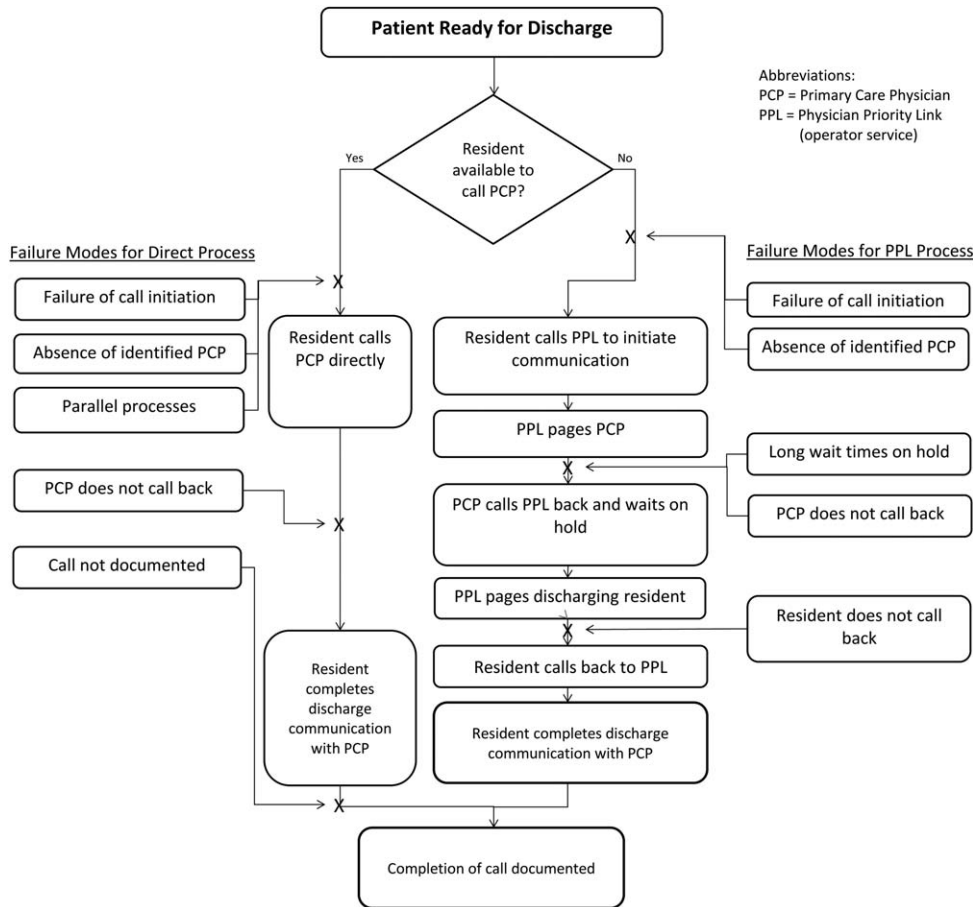
FIG. 1. Preintervention processes and failure modes for discharge communication with PCPs.

improvement work and did not require formal IRB review.

Setting

This study included all patients admitted to the HM service at an academic children's hospital and its satellite campus.

Planning the Intervention

The project was championed by physicians on the HM service and supported by a chief resident, PPL administrators, and 2 information technology analysts.

At the onset of the project, the team mapped the process for completing a discharge call to the PCPs, conducted a modified failure mode and effects analysis,[7,8] and examined the key drivers used to prioritize interventions (Figure 1). Through the modified failure modes effect analysis, the team was able to identify system issues that led to unsuccessful communication: failure of call initiation, absence of an identified PCP, long wait times on hold, failure of PCP to call back, and failure of the call to be documented. These failure modes informed the key drivers to achieving the study aim. Figure 2 depicts the final key drivers, which were revised through testing and learning.

Interventions Targeting Key Stakeholder Buy-in

To improve resident buy-in and participation, the purpose and goals of the projects were discussed at resident morning report and during monthly team meetings by the pediatric chief resident on our improvement team. Resident physicians were interested in participating to reduce interruptions during daily rounds and to improve interactions with PCPs. The PPL staff was interested in standardizing the discharge call process to reduce confusion in identifying the appropriate contact when PCPs called residents back to discuss discharges. PCPs were interested in ensuring good communication at discharge, and individual PCPs were engaged through person-to-person contact by 1 of the HM physician champions.

Interventions to Standardization the Communication Process

To facilitate initiation of calls to PCPs at hospital discharge, the improvement team created a standard process using the PPL service (Figure 3). All patients discharged from the HM service were included in the process. Discharging physicians (who were usually but not always residents, depending on the facility), were instructed to call the PPL operator at the time of
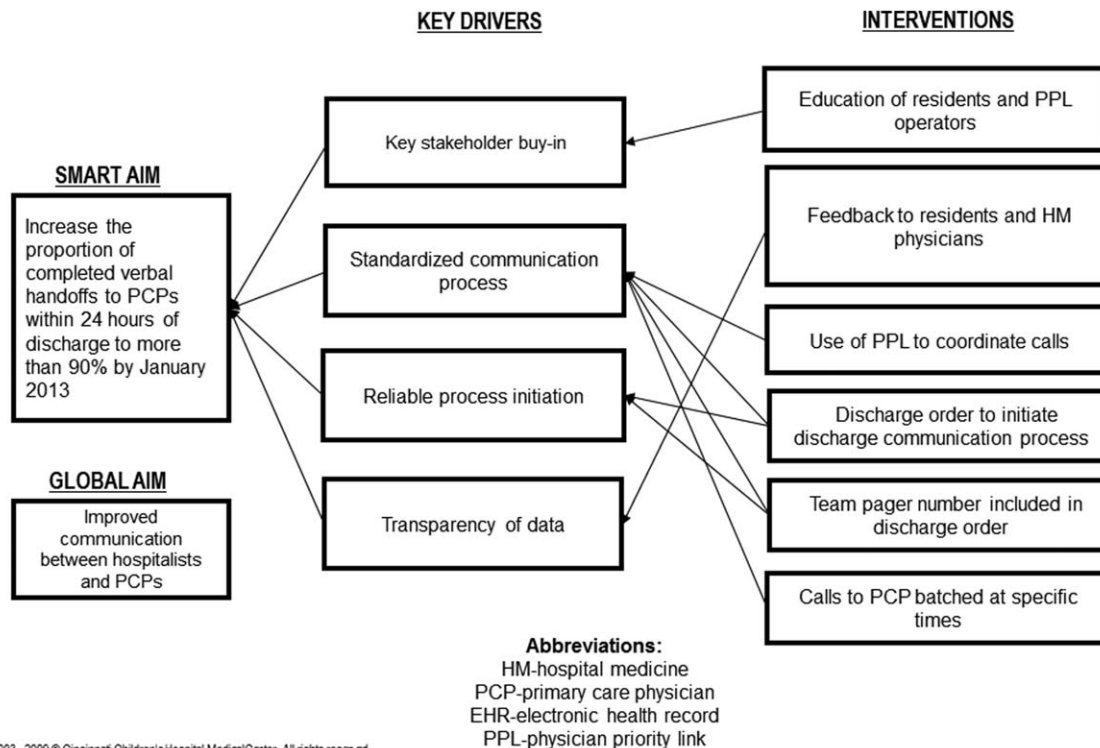
KEY DRIVERS

INTERVENTIONS

SMART AIM

Increase the proportion of completed verbal handoffs to PCPs within 24 hours of discharge to more than 90% by January 2013

GLOBAL AIM

Improved communication between hospitalists and PCPs

Key stakeholder buy-in

Standardized communication process

Reliable process initiation

Transparency of data

Education of residents and PPL operators

Feedback to residents and HM physicians

Use of PPL to coordinate calls

Discharge order to initiate discharge communication process

Team pager number included in discharge order

Calls to PCP batched at specific times

Abbreviations:
HM-hospital medicine
PCP-primary care physician
EHR-electronic health record
PPL-physician priority link

FIG. 2. Key driver diagram for verbal communication at hospital discharge.

discharge. The PPL operator would then page the patient's PCP. It was the responsibility of the discharging physician to identify a PCP prior to discharge. Instances where no PCP was identified were counted as process failures because no phone call could be made. The expectation for the PCPs was that they would return the page within 20 minutes. PPL operators would then page back to the discharging physician to connect the 2 parties with the expectation that the discharging physician respond within 2 to 4 minutes to the PPL operator's page. Standardization of all calls through PPL allowed efficient tracking of incomplete calls and operators to reattempt calls that were not completed. This process also shifted the burden of following up on incomplete calls to PPL. The use of PPL to make the connection also allowed the physician to complete other work while awaiting a call back from the PCP.

Leveraging the Electronic Health Record for Process Initiation

To ensure reliable initiation of the discharge communication pathway, the improvement team introduced changes to the electronic health record (HER) (EpicCare Inpatient; Epic Systems Corp., Verona, WI), which generated a message to PPL operators whenever a discharge order was entered for an HM patient. The message contained the patient's name, medical record number, discharge date, discharging physician, and PCP name and phone number. A checklist was implemented by PPL to ensure that duplicate phone calls were not made. To initiate communication, the operator contacted the resident via text page to ensure they were ready to initiate

the call. If the resident was ready to place a call, the operator then generated a phone call to the PCP. When the PCP returned the call, the operator connected the HM resident with the PCP for the handoff.

As the project progressed, several adaptations were made to address newly identified failure modes. To address confusion among PPL operators about which resident physicians should take discharge phone calls after the discharging resident was no longer available (for example, after a shift change), primary responsibility for discharge phone calls was reassigned to the daily on-call resident rather than the resident who wrote the discharge order. Because the on-call residents carry a single pager, the pager number listed on the automated discharge notification to PPL would never change and would always reach the appropriate team member. Second, to address the anticipated increase in interruption of resident workflow by calls back from PCPs, particularly during rounds, operators accessed information on pending discharge phone calls in batches at times of increased resident availability to minimize hold times for PCPs and work interruptions for the discharging physicians. Batch times were 1 PM and 4 PM to allow for completion of morning rounds, resident conference at noon, and patient-care activities during the afternoon. Calls initiated after 4 PM were dispatched at the time of the discharge, and calls initiated after 10 PM were deferred to the following day.

Transparency of Data

Throughout the study, weekly failure data were generated from the EHR and emailed to improvement team
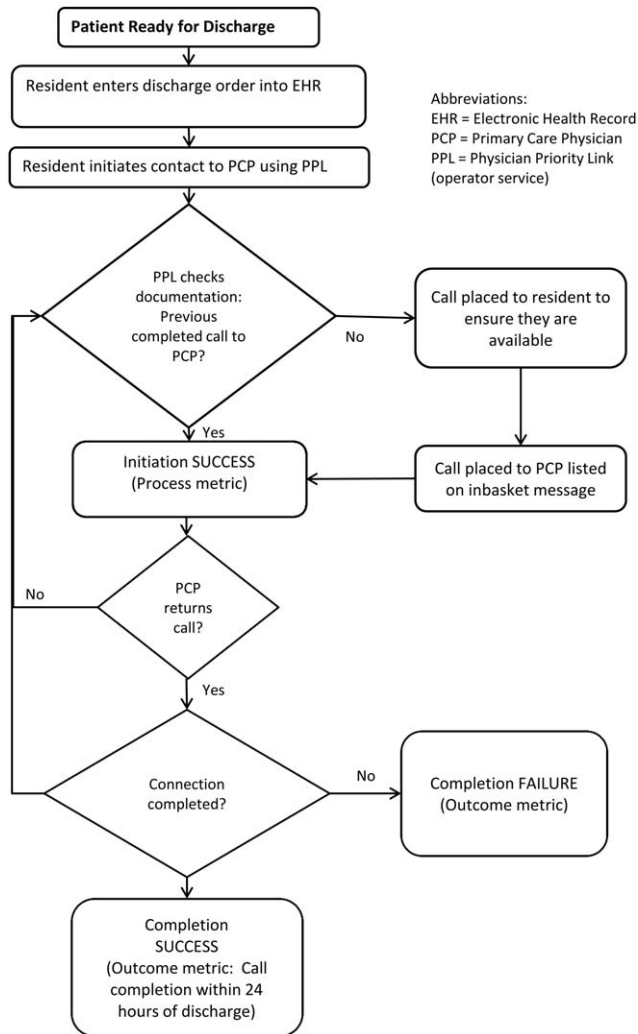
FIG. 3. Final process map for verbal communication at discharge.

members, enabling them to focus on near real-time feedback of data to create a visible and more reliable system. With the standardization of all discharge calls directed to the PPL operators, the team was able to create a call record linked to the patient's medical record number. Team-specific and overall results for the 5 HM resident teams were displayed weekly on a run chart in the resident conference room. As improvements in call initiation were demonstrated, completion rate data were also shared every several months with the attending hospitalists during a regularly scheduled divisional conference. This transparency of data gave the improvement team the opportunity to provide individual feedback to residents and attendings about failures. The weekly review of failure data allowed team leaders to learn from failures, identify knowledge gaps, and ensure accountability with the HM physicians.

Planning the Study of the Intervention
Data were collected prospectively from July 2011 to March 2014. A weekly list of patients discharged

from the HM service was extracted from the EHR and compared to electronic call logs collected by PPL on the day of discharge. A standard sample size of 30 calls was audited separately by PPL and 1 of the physician leads to verify that the patients were discharged from the HM service and validate the percentage of completed and initiated calls.

The percentage of calls initiated within 24 hours of discharge was tracked as a process measure and served as the initial focus of improvement efforts. Our primary outcome measure was the percentage of calls completed to the PCP by the HM physician within 24 hours of discharge.

Methods of Evaluation and Analysis
We used improvement science methods and run charts to determine the percentage of patients discharged from the HM service with a call initiated to the PCP and completed within 24 hours of discharge. Data on calls initiated within 24 hours of discharge were plotted on a run chart to examine the impact of interventions over time. Once interventions targeted at call initiation had been implemented, we began tracking our primary outcome measure. A new run chart was created documenting the percentage of calls completed. For both metrics, the centerline was adjusted using established rules for special cause variation in run charts.[9–13]

RESULTS
From July 2011 to March 2014, there were 6313 discharges from the HM service. The process measure (percentage of calls initiated) improved from 50% to 97% after 4 interventions (Figure 4). Data for the outcome measure (percentage of calls completed) were collected starting in August 2012, shortly after linking the EHR discharge order to the discharge call. Over the first 8 weeks, our median was 80%, which increased to a median of 93% (Figure 5). These results were sustained for 18 months.

Several key interventions were identified that were critical to achievement of our goal. Standardization of the communication process through PPL was temporally associated with a shift in the median rate of call initiation from 52% to 72%. Use of the discharge order to initiate discharge communication was associated with an increase from 72% to 97%. Finally, the percentage of completed verbal handoffs increased to more than 93% following batching of phone calls to PCPs at specific times during the day.

DISCUSSION
We used improvement and reliability science methods to implement a successful process for improving verbal handoffs from HM physicians to PCPs within 24 hours of discharge to 93%. This result has been sustained for 18 months.

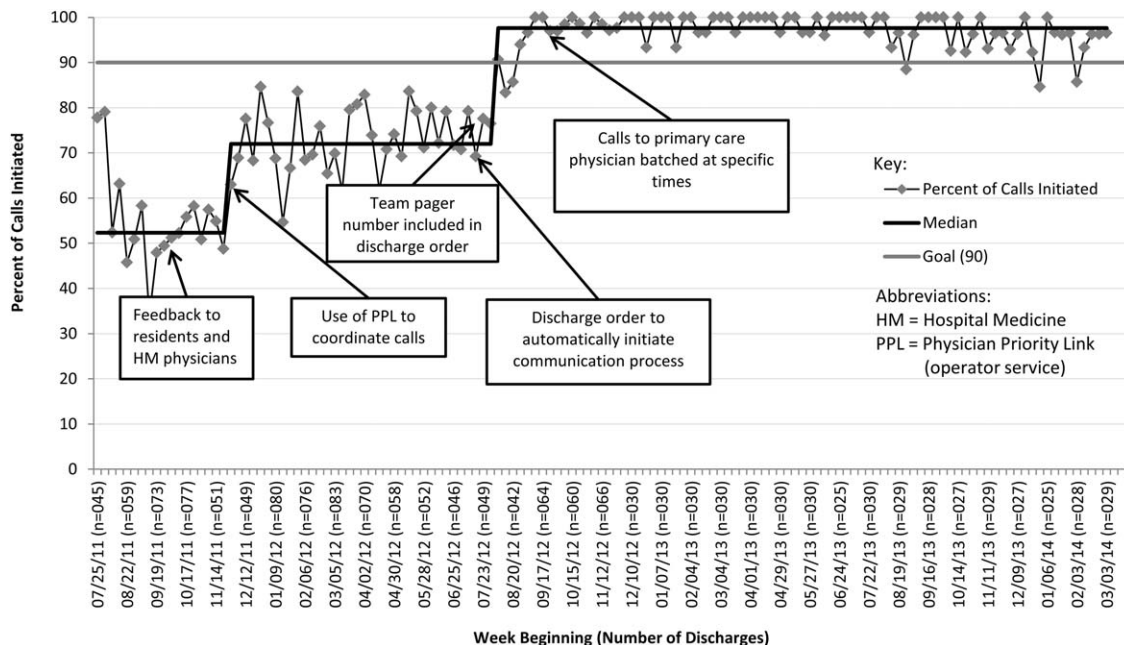Utilization of the PPL call center for flexible call facilitation along with support for data analysis and

FIG. 4. Percent of calls made to primary care physicians within 24 hours of hospital discharge.
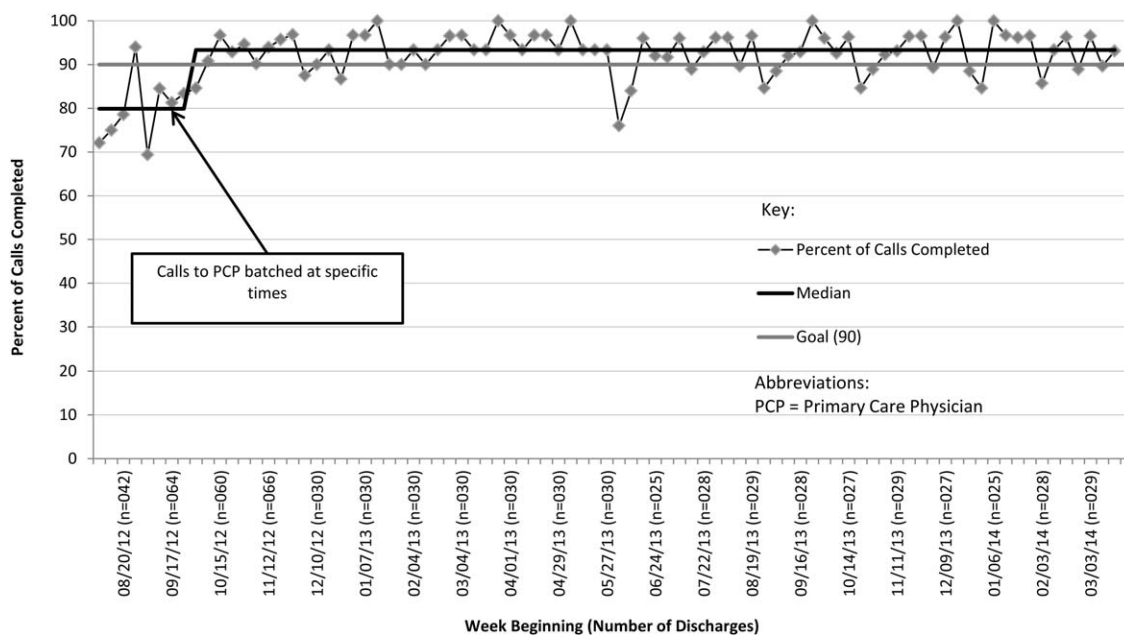

FIG. 5. Percent of calls to primary care physicians completed within 24 hours of discharge.

leveraging the EHR to automate the process increased reliability, leading to rapid improvement. Prior to mandating the use of PPL to connect discharging physicians with PCPs, the exact rate of successful handoffs in our institution was not known. We do know, however, that only 52% of calls were initiated, so clearly a large gap was present prior to our improvement work. Data collection from the PPL system was automated so that accurate, timely, and sustainable data could be provided, greatly aiding improvement efforts. Flexibility in call-back timing was also crucial, because coordinating the availability of PCPs and discharging physicians is often challenging.

The EHR-initiated process for discharge communication was a key intervention, and improvement of our process measure to 97% performance was associated with this implementation. Two final interventions: (1) assignment of responsibility for communication to a team pager held by a designated resident and (2) batching of calls to specific times streamlined the EHR-initiated process and were associated with achievement of our main outcome goal of >90% completed verbal communication.

There are several reports of successful interventions to improve receipt or content of discharge summaries by PCPs following hospital discharge available in the

literature.[14–20] Recently, Shen et al. reported on the success of a multisite improvement collaborative involving pediatric hospitalist programs at community hospitals whose aim was to improve the timely documentation of communication directed at PCPs.[21] In their report, all 7 hospital sites that participated in the collaborative for more than 4 months were able to demonstrate substantial improvement in documentation of some form of communication directed at PCPs (whether by e-mail, fax, or telephone call), from a baseline of approximately 50% to more than 90%. A limitation of their study was that they were unable to document whether PCPs had received any information or by what method. A recent survey of PCPs by Sheu et al. indicated that for many discharges, information in addition to that present in the EHR was desirable to ensure a safe transition of care.[6] Two-way communication, such as with a phone call, allows for senders to verify information receipt and for receivers to ask questions to ensure complete information. To our knowledge, there have been no previous reports describing processes for improving verbal communication between hospitalist services and PCPs at discharge.

It may be that use of the call system allowed PCPs to return phone calls regarding discharges at convenient stopping points in their day while allowing discharging physicians to initiate a call without having to wait on hold. Interestingly, though we anticipated the need for additional PPL resources during the course of this improvement, the final process was efficient enough that PPL did not require additional staffing to accommodate the higher call volume.

A key insight during our implementation was that relying on the EHR to initiate every discharge communication created disruption of resident workflow due to disregard of patient, resident, and PCP factors. This was reflected by the improvement in call initiation (our process measure) following this intervention, whereas at the same time call completion (our outcome measure) remained below goal. To achieve our goal of completing verbal communication required a process that was highly reliable yet flexible enough to allow discharging physicians to complete the call in the unpredictable environment of inpatient care. Ultimately, this was achieved by allowing discharging physicians to initiate the process when convenient, and allowing for the EHR-initiated process to function as a backup strategy to identify and mitigate failures of initiation.

An important limitation of our study was the lack of PCPs on the improvement team, likely making the success of the project more difficult than it might have been. For example, during the study we did not measure the time PCPs spent on hold or how many reattempts were needed to complete the communication loop. Immediately following the completion of our study, it became apparent that physicians returning calls for our own institution's primary care clinic were

experiencing regular workflow interruptions and occasional hold times more than 20 minutes, necessitating ongoing further work to determine the root causes and solutions to these problems. Though this work is ongoing, average PCP hold times measured from a sample of call reviews in 2013 to 2014 was 3 minutes and 15 seconds.

This study has several other limitations. We were unable to account for phone calls to PCPs initiated outside of the new process. It may be that PCPs were called more than 52% of the time at baseline due to noncompliance with the new protocol. Also, we only have data for call completion starting after implementation of the link between the discharge order and the discharge phone call, making the baseline appear artificially high and precluding any analysis of how earlier interventions affected our outcome metric. Communication with PCPs should ideally occur prior to discharge. An important limitation of our process is that calls could occur several hours after discharge between an on-call resident and an on-call outpatient physician rather than between the PCP and the discharging resident, limiting appropriate information exchange. Though verbal discharge communication is a desirable goal for many reasons, the current project did not focus on the quality of the call or the information that was transmitted to the PCP. Additionally, direct attending-to-attending communication may be valuable with medically or socially complex discharges, but we did not have a process to facilitate this. We also did not measure what effect our new process had on outcomes such as quality of patient and family transition from hospital or physician satisfaction. The existence of programs similar to our PPL subspecialty referral line may be limited to large institutions. However, it should be noted that although some internal resource reallocation was necessary within PPL, no actual staffing increases were required despite a large increase in call volume. It may be that any hospital operator system could be adapted for this purpose with modest additional resources. Finally, although our EHR system is widely utilized, there are many competing systems in the market, and our intervention required utilization of EHR capabilities that may not be present in all systems. However, our EHR intervention utilized existing functionality and did not require modification of the system.

This project focused on discharge phone calls to primary care physicians for patients hospitalized on the hospital medicine service. Because communication with the PCP should ideally occur prior to discharge, future work will include identifying a more proximal trigger than the discharge order to which to link the EHR trigger for discharge communication. Other next steps to improve handoff effectiveness and optimize the efficiency of our process include identifying essential information that should be transmitted to the primary care physician at the time of the phone call,

developing processes to ensure communication of this information, measuring PCP satisfaction with this communication, and measuring the impact on patient outcomes. Finally, though expert opinion indicates that verbal handoffs may have safety advantages over nonverbal handoffs, studies comparing the safety and efficacy of verbal versus nonverbal handoffs at patient discharge are lacking. Studies establishing the relative efficacy and safety of verbal versus nonverbal handoffs at hospital discharge are needed. Knowledge gained from these activities could inform future projects centered on the spread of the process to other hospital services and/or other hospitals.

CONCLUSION

We increased the percentage of calls initiated to PCPs at patient discharge from 52% to 97% and the percentage of calls completed between HM physicians and PCPs to 93% through the use of a standardized discharge communication process coupled with a basic EHR messaging functionality. The results of this study may be of interest for further testing and adaptation for any institution with an electronic healthcare system.

Disclosure: Nothing to report.

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