Improving Transitions of Care with I-PASS:

A Hematopoietic Cell Transplantation Quality Improvement Project

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Abstract

Background: Inadequate transitional care and gaps in communication lead to fragmented patient care with increased frequency of errors and care coordination failures. Evidence supports use of standardized discharge documentation to reduce errors in handoff and increase provider satisfaction.

Local problem: The purpose of this quality improvement (QI) project was to standardize the transitional care of hematopoietic cell transplant (HCT) patients at discharge and improve provider handover.

Methods/Interventions: This QI project consisted of a standardized discharge summary template using a modified I-PASS model (illness severity, patient summary, action list, and contingency plans). Elements included an electronic health record smart phrase to standardize documentation and improve team communication, and pre- and post-intervention data to measure satisfaction, quality, and utility of the intervention. Data analysis included measurement of errors in the discharge note (e.g. inaccurate or omitted details in plan of care) and readmission rates.

Results: Baseline data was collected from the six months prior to intervention and post-implementation data from July-November 2021. Findings indicate the discharge template increased inclusion of key elements for follow-up care and a statistically significant reduction in errors by 87% ($p<0.001$). Readmission rates in the first month post-HCT discharge was reduced by 63%. Of the outpatient survey respondents, 80% strongly agreed the discharge template provided the vital information needed to assume care of the patient post-discharge.

Conclusions: Findings suggest implementation of this standardized handoff tool is a safe, feasible, and effective method to increase the clarity of interprofessional communication at a critical point in patient transitional care.

Keywords: provider handover, discharge summary, transitional care, handoff tool

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Problem Description

The Joint Commission has identified communication failure as the root cause of most sentinel events (Blazin et al., 2020; Fryman et al., 2017; Sheu et al., 2015). Reportedly, half of all hospitalized patients experience at least one medical error during their transitional care due to communication failures between healthcare providers (Kripalani et al., 2007; Prince et al., 2019). This statistic further illustrates hospital discharge as a high-risk period of transitional care and a period prone to medical errors, adverse events, and missed patient follow-up (Dean et al., 2016; Prince et al., 2019; Sheu et al., 2015; Starmer et al., 2014). Hematopoietic cell transplant (HCT) is a complex treatment process with multiple points of transition in patient care. Effective transitional care involves accurate, complete, and timely communication designed to ensure continuity and safe coordination of the complex health care needs during points of transition (Prince et al., 2019).

Coordination of discharge care is a common focus for improvement. Inadequate transitional care or gaps in provider communication leads to fragmented patient care with increased risk and frequency of medical and medication errors, adverse events, communication lapses, and care coordination failures (Blazin et al., 2020; Patel & Landrigan, 2019; Prince et al., 2019). Delays in patient care and preventable medical errors related to incomplete and delayed communication between providers is a common theme presented in the literature (Blazin et al., 2020; Huth et al., 2016; Patel & Landrigan, 2019; Prince et al., 2019; Starmer et al., 2014). Frequently the primary means of communication between inpatient and outpatient providers is the discharge summary (Prince et al., 2019). However, hospital discharge summaries frequently lack essential information such as pertinent pieces in the plan of care and follow-up, creating patient safety issues or other adverse outcomes, and increased risk for hospital readmissions (Patel & Landrigan, 2019; Prince et al., 2019; Schwarz et al.,

2019; Weetman et al., 2019). For HCT patients, the transition at discharge from inpatient to outpatient management is a point susceptible to these described errors, particularly due to prolonged period of hospitalization, multiple providers involved over the course of care impacting continuity, and complex medical condition requiring careful follow-up. Additionally, HCT patients have a high risk of 30-day readmissions due to profound myelosuppression, prolonged immune suppression, and other transplant comorbidities (Kharfan-Dabaja & Alvarnas, 2019). Therefore, ensuring high-quality standardized discharge communication between inpatient and outpatient providers is essential in reducing adverse patient outcomes.

Available Knowledge

Current state of the science and evidence for best discharge practices focuses on standardized communication and the discharge process to ensure safe and comprehensive handoff and improved continuity of care. Many studies have emphasized the need for improved communication of key elements in transitional care including active medical issues, test results, medication changes, and specific follow-up and recommended management plans (Lenert et al., 2014; Schwarz et al., 2019; Sheu et al., 2015). Checklists and discharge handoff templates are effective tools in improving transitional care by facilitating communication, ensuring continuity, and lead to improvements in patient safety and quality care (Patel & Landrigan, 2019; Prince et al., 2019; Unnewehr et al., 2015). A quality improvement project to standardize hospital discharge transitional care by Prince and colleagues (2019) saw a statistically significant increase in post-discharge follow-up appointments and improved communication between inpatient and outpatient providers prior to discharge with implementation of an evidence-based discharge checklist and discharge handoff tool. The importance of tailored handoff or communication tools that increase accurate and timely communication between providers is a consistent theme in the literature (Blazin et al., 2020; Fryman et al., 2017; Prince et al., 2019; Starmer et al., 2014; Unnewehr et al., 2015).

In a landmark multi-institutional study utilizing rigorous methodology, Starmer et al. (2014) demonstrated the I-PASS structured handoff communication tool resulted in significant reduction in medical errors by 23% ($p<0.001$) and preventable adverse events by 30% ($p<0.001$). Additionally, while the quality of both written and oral handoff improved, there was no significant increase in duration of oral handoff or negative impact on workflow, indicating the tool increased efficiency during handoff (Starmer et al., 2014). While the I-PASS was initially developed for resident physician handoff, Blazin et al. (2020) demonstrated the broad applicability of the standardized and structured handoff tool as a means of information exchange between providers in other practice contexts and disciplines. Communication, and subsequently patient safety, improved as providers utilized the I-PASS tool to concisely synthesize the relevant patient information during handoff (Blazin et al., 2020). Additionally, Blazin et al. (2020) demonstrated sustainability of the tool with adherence rates that exceeded the study goal and remained at 90% for the duration of the project. Due to the strong evidence supporting the I-PASS handoff in reducing medical errors, and growing evidence that it can be broadly adapted, this validated tool is quickly being incorporated into a variety of institutions and practice settings to improve communication and quality of patient care (Blazin et al., 2020; Patel & Landrigan, 2019).

This literature provides evidence that implementation of structured communication handoff tools increases the effective communication between providers, reduces medical errors, and prevents patient harm; particularly at periods of transition in care (Blazin et al., 2020; Pandya et al., 2019; Patel & Landrigan, 2019; Prince et al., 2019; Starmer et al., 2014; Zavodnick et al., 2019). With careful attention to the inherent challenges in complexity of hospitalized HCT patients, process improvement efforts to improve communication can result in sustainable practice changes and improve patient safety and care.

Rationale

While research in the use of I-PASS during the transitional care of HCT patients is not yet extensive, there are strong indicators that implementation of this handoff tool is a safe, efficient, and

effective method in standardizing communication between providers, preventing adverse events, and can be adopted in various settings (Blazin et al., 2020; Patel & Landrigan, 2019; Prince et al., 2019; Starmer et al., 2014; Zavodnick et al., 2019). The HCT team did not have a standardized discharge checklist or discharge documentation template and the I-PASS tool was identified as a fitting tool for improving these processes.

This quality improvement (QI) project was designed using the Model for Improvement developed by the Institute for Healthcare Improvement (IHI) (Institute for Healthcare Improvement, n.d.; Langley et al., 2009). This model was selected as the framework due to its practical and comprehensive format to drive innovative and meaningful change. The Model for Improvement while grounded in systems theory and psychology, uses a small-scale Plan-Do-Study-Act (PDSA) cyclical testing method to systematically identify problems, implement intervention, measure for improvement, and refine and scale the intervention over time (Institute for Healthcare Improvement, n.d.; Langley et al., 2009). Additionally, the *Transmission Model of Communication* was chosen as a theoretical framework for this project as it supports the importance of focusing on both the sender and the message as the change targets when working to ensure message clarity and effectiveness within a communication encounter (Mohorek, & Webb, 2015). This model supports the linear process of communication between providers through electronic-mediated handover with the discharge summary.

Specific Aims

The purpose of this project was to standardize the discharge transitional care of HCT patients and improve provider handover at a PNW regional academic health center by updating the discharge checklist and summary. The specific aim was for the I-PASS discharge summary template tool be used in 90% of the HCT discharge documentation.

Methods

Context

This quality improvement project was implemented at a 151-bed urban academic teaching children's hospital in the Pacific Northwest (PNW). This hospital is the only pediatric HCT center in the state and serves patients across Oregon, SW Washington, Alaska, Idaho, Hawaii, Guam, and international patients from Chile and Fiji. The HCT team performs 40-45 transplants per year with inpatient care provided on the 21-bed inpatient Hematology/Oncology/Hematopoietic cell transplant unit and outpatient clinic seeing four to eight patients per day for ongoing complex medical care. Inpatient clinical care is provided by a rotating multidisciplinary care team consisting of a combination from four pediatric nurse practitioners, five fellow physicians, eleven attending physicians, 37 pediatric nurses, and ancillary staff including case management; the outpatient care team consists of one primary pediatric nurse and four HCT attending physicians. The average admission time for HCT is 3-6 weeks, however patients can remain admitted for several months due to transplant related complications during which time patients will be cared for by multiple providers and consultants.

Targeted interventions to improve handoff and communication at points of transition, such as between the inpatient and outpatient settings, are crucial to ensure patient safety and optimal care during the various stages of the transplant process. Given the ongoing medical complexity of the HCT patients, the variability in daily provider management, and current lack of standardized discharge communication between the inpatient and outpatient team, the intervention needed to be efficient, effective, and feasible.

Intervention

To understand breakdowns in the current discharge process, a pre-intervention needs assessment was completed with members of the HCT team. The feedback obtained from 83% (n=5) of the outpatient multidisciplinary team members included challenges with inconsistent content within discharge documentation, missing details on home care orders, incomplete medication pre-authorization, and lack of appropriate follow-up care. Key elements in safe and effective discharge

communication and tools were identified from the literature and incorporated into the final transitional care plan. A standardized discharge summary template incorporating I-PASS was created as a method to standardize discharge workflow and communication between the inpatient and outpatient providers. I-PASS includes five components of information for concise and effective handoff including illness severity, patient summary, action list, situational awareness and contingency plans, and synthesis by the receiver (Blazin et al., 2020; Patel & Landrigan, 2019; Prince et al., 2019; Starmer et al., 2014). Information considered critical to safe transitional care as well as important action items for follow-up were included. An electronic health record smart-phrase was created for the discharge summary template to standardize documentation among the various providers. The use of an EHR smart-phrase for note documentation was consistent with current model of practice. The discharge note template was designed to minimize work burden by portions automatically generated from the EHR and improve handover with other portions of the note organized for a brief narrative that provided guidance for medical decision making and synthesized recommendations for ongoing clinical care.

Education for implementation including the tools and standardized discharge process was introduced to the entire HCT team during provider and fellow meetings as well as an NP huddle to ensure all involved team members were updated. In-person training was performed with the primary inpatient team members responsible for writing the discharge summary. Additionally, an electronic copy of the new discharge template including recommended information to include was given to all providers prior to implementation for ongoing reference. Implementing the Plan-Do-Study-Act (PDSA) model, the intervention and improvement project were reviewed at one, two, four, and five months. Post-intervention surveys were distributed to staff to measure satisfaction, evaluate work-burden, and assess the quality and utility of the intervention.

Study of the Intervention

The discharge summaries for all HCT patients were assessed. Pre-intervention data was collected for baseline comparison via retrospective chart review of the six months prior to implementation of the discharge summary template. Intervention cohort records were reviewed for utilization of the standardized discharge template, inclusion of the identified key elements for follow-up, accuracy of information, and appropriate outpatient plan of care including follow-up appointment requests. To measure usability and the perceptions or satisfaction of the intervention, post-intervention surveys were administered. To identify areas of improvement, data was analyzed at 1-month, 2-months, 4-months, and 5-months post tool implementation.

Measures

The primary outcome was the utilization rate of the created standardized I-PASS discharge template. These data were obtained via chart review of discharged HCT patients. The secondary outcome measures included outpatient provider satisfaction evaluated through anonymous survey. Process measures included objective handoff communication measures including discharge template completion rate, the number of appropriate outpatient follow-up appointments, and appropriate outpatient orders for plan of care. Balancing measures tracked included increased work burden, readmissions, and adverse events. Data collection occurred over five months using retrospective chart review for accuracy and completeness as well as provider surveys to monitor for satisfaction.

Analysis

Both quantitative descriptive statistics and qualitative survey data were used to measure the improvement with implementation of the I-PASS discharge template. To evaluate for patterns of improvement in the discharge process, quantitative descriptive statistics were collected and compiled in an excel spreadsheet. Frequency statistics, measures of central tendency, and outliers were reported. Graphical displays were used to report relevant findings. Survey results were qualitatively analyzed for dominant themes and recurring themes were reported out.

Ethical Considerations

This project was evaluated by the university's institutional review board and deemed exempt from human subject review.

Results

A total of 63 hospital discharge notes of HCT patients were reviewed over the course of the project. Relevant patient demographics associated with each discharge summary were recorded (Table 1). Baseline data was collected from January through June 2021 with a total of 29 discharge encounters reviewed and data post-implementation of the discharge note template collected July through November 2021 with 34 discharge encounters reviewed. Findings indicate the discharge template increased inclusion of key elements for follow-up care including identifying home health company (4% vs 84%, $p<0.001$), labs pending at time of discharge (4% vs 80%, $p<0.001$), action items for follow-up (0% vs 92%, $p<0.001$), and contingency planning (3% vs 84%, $p<0.001$) (see Figure 4). Utilization of the discharge template was associated with a statistically significant reduction in obvious gaps or errors (62% vs 8%, $p<0.001$) (see Figure 3). Total readmission rates were reduced in the post-implementation period (59% vs 38%) (see Table 1). Data also showed a reduction in readmission within the first month post-HCT discharge since implementation of the discharge template (24% vs 9%) (see Table 1). Of the outpatient survey respondents, 80% strongly agreed the discharge template was both an effective communication tool in facilitating follow-up care and provided all information needed to assume care of the patient post-discharge (see Figure 5). Additionally, 100% of respondents agreed/strongly agreed the tool improved provider satisfaction and provided qualitative comments regarding satisfaction with its implementation (see Figure 5). During the implementation phase of the project, the new discharge summary template was utilized for 73% of the HCT discharge summaries (see Figures 1 and 2).

Discussion

There were several gaps in the discharge documentation prior to the intervention which resulted in sub-optimal handover communication and impacted the quality of patient care. This QI project demonstrated improved provider satisfaction and reduction in errors or omissions with the use of a discharge documentation template incorporating I-PASS elements as a method to communicate medical decision making, intended management recommendations, and other necessary clinical information to appropriately assume care of the patient. A key strength of the findings from this project is the ability to frame the discharge note as a tool for provider handover. Findings from this project suggest implementation of this handoff tool is a safe, feasible, and effective method to standardize communication between providers, potentially improving patient safety and quality of care. While there was significant improvement in the discharge documentation with tool use, adoption and utilization of the discharge template for note documentation did not achieve the targeted goal of 90%. This lower compliance is likely attributed to a laggard effect as described by Roger's (2003) *Diffusion of Innovations* theory, as the intervention involved a change in clinical workflow and required a paradigm shift to focus on the discharge documentation as a communication tool for handover between providers. This challenge in adoption of change was likely compounded or intensified by the altered workflow and increased stressors within the microsystem due to the COVID-19 pandemic. Additionally, the lack of accountability for tool utilization and the increased time required for documentation could be contributing barriers.

Survey participants' responses were overall positive and supported the discharge template in improving communication between providers.

Interpretation

This QI project is among the first described using a modified I-PASS approach for provider handoff in the discharge summary post-HCT, but builds on the many examples of improving the content of discharge summaries through checklists or discharge note templates (Dean et al., 2016; Lenert et al.,

2014; Prince et al., 2019; Sakaguchi & Lenert, 2015; Unnewehr et al., 2015). The results from this project are important for several reasons. This QI project adds to the literature, showing that I-PASS can be modified for written documentation and can improve information quality at discharge. Handover from a complex hospitalization was achieved by incorporating elements of I-PASS into the discharge note template, specifically regarding action items and contingency planning. These new components communicate the required post-discharge care including guidance for clinical trajectory, key elements to monitor, and next steps in the management plan (Sakaguchi & Lenert, 2015). The reduction in perceived errors with I-PASS is consistent with prior studies, but the 87% relative reduction is significantly higher, which may be attributed to the comparatively smaller numbers of discharges in this QI project (Blazin et al., 2020; Starmer et al., 2014).

Limitations

Although this project had positive results it had several limitations that should be considered. First, this QI project used a single data abstractor and there was no process for interrater reliability. However, pre-intervention and post-intervention findings were concordant with the survey responses which increases the validity of the observed results. Second, the project focused on the transitional care at discharge of a very specific subset of patients with significant medical complexity at a single teaching hospital. While this may raise concern regarding the generalizability to other settings, the designed approach of developing a smart-phrase note template to standardize discharge documentation represents a process that can be easily adapted and implemented at other institutions with similar resources. Lastly, it is important to note that this QI project was developed and implemented in the context of the COVID-19 pandemic and did not evaluate for provider burnout or other unexpected stressors that may have impacted the clinical documentation or other aspect related to the implementation of this project.

Conclusions

This QI project demonstrates the feasibility in adopting a discharge summary template to improve handoff communication for the transitional care of HCT patients. After implementation of the discharge summary template, clinician satisfaction increased and the perceived quality of information necessary to treat patients safely improved. The discharge summary template tool increased the clarity of communication between providers at a critical point in the transitional care of HCT patients by creating a standardized format of organizing information critical to the ongoing care and management. However, sub-optimal compliance with the tool when completing the discharge summary documentation indicates the need for further strategies for clinician engagement during implementation. Continued research on transitional care of HCT patients is needed to ensure their complex discharge needs and ongoing management are appropriately understood and addressed.

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Table 1. Patient Characteristics		
Variable	Pre-Implementation (n= 29)	Post-Implementation (n=34)
Transplant Type		
Allogeneic	24	28
Autologous	5	6
Median Age	12 years (10 months-18 years)	12 years (4 months-18 years)
Sex		
M	16	25
F	13	9
PICU Admission	4	6
Length of Stay	2-97 days Median: 20 days	1-82 days Median: 21 days
Readmission Rate	17 (59%)	13 (38%)
≤30 days	7 (24%)	3 (9%)
>30 days	10 (35%)	10 (29%)
Reason for Readmission		
GVHD	3	5
Infection	4	6
Fever <100 days	2	
Graft Failure	1	
TMA/AKI	1	
PRES	2	
Hemolytic Anemia	2	
Other (drug reaction, pancreatitis, renal stone, broken central line)	2	2

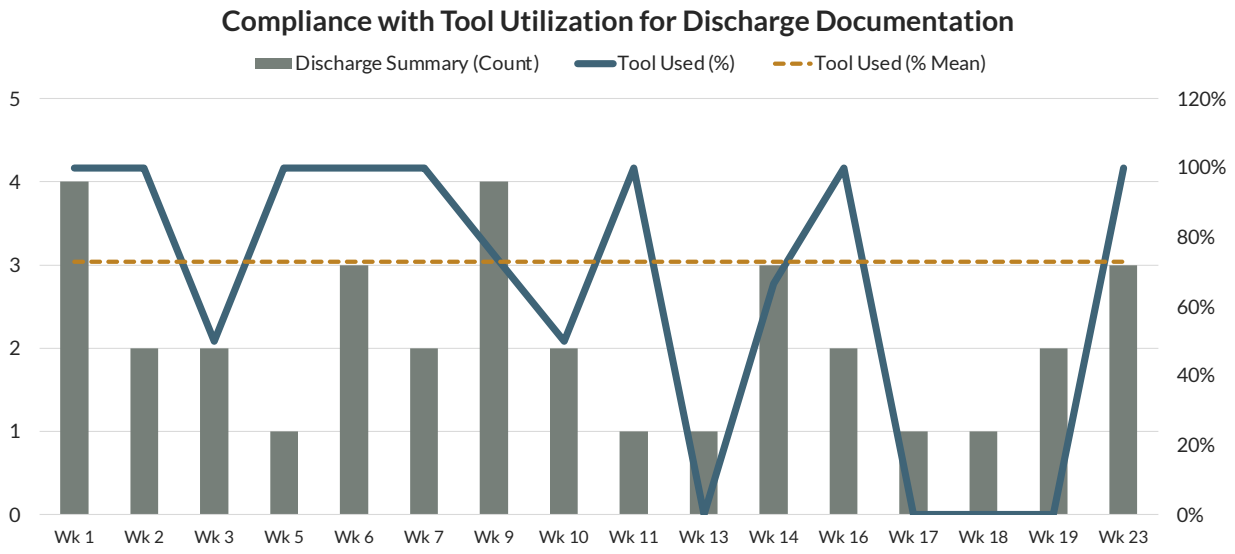

Figure 1. Utilization (blue) of the discharge template tool in relation to the total number of discharges (green) during the intervention period.

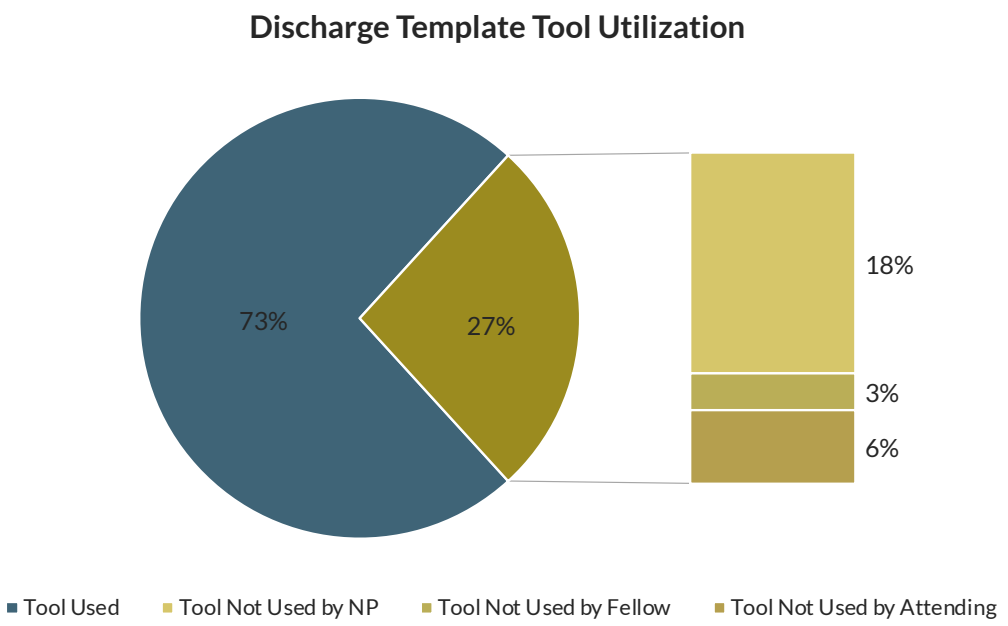

Figure 2. Percentage of discharge template tool use (blue) and tool not used (green) with distribution by provider type (NP: 18%, Fellow physician: 3%, and Attending physician: 6%)

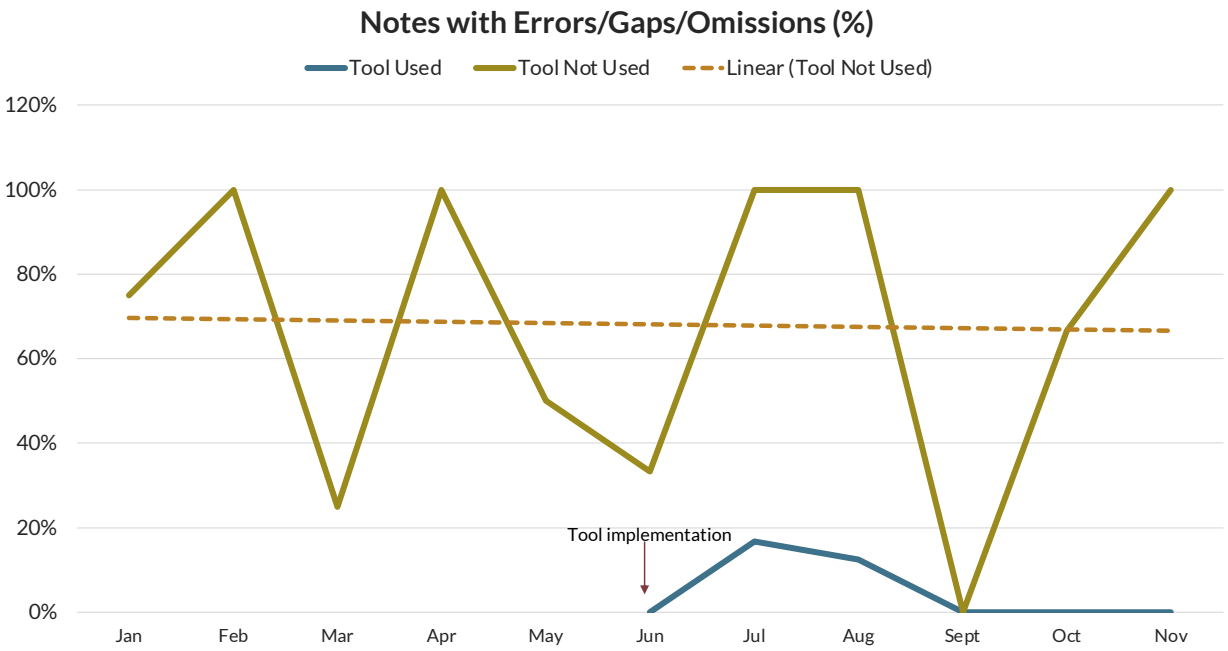

Figure 3. Demonstrates a significant reduction in percentage of notes with errors with utilization of note template (blue) compared to baseline/when tool not used (green).

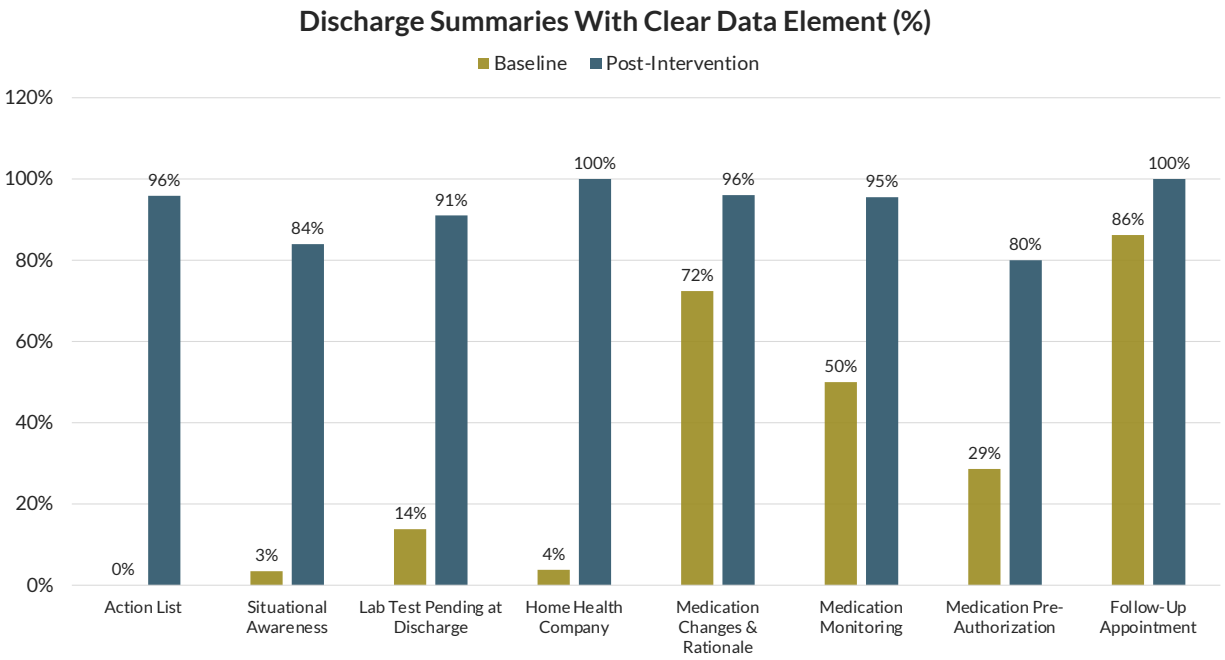

Figure 4. Percentage of discharge summaries that documented with clarity the identified key elements with baseline (green) and with template tool use (blue)

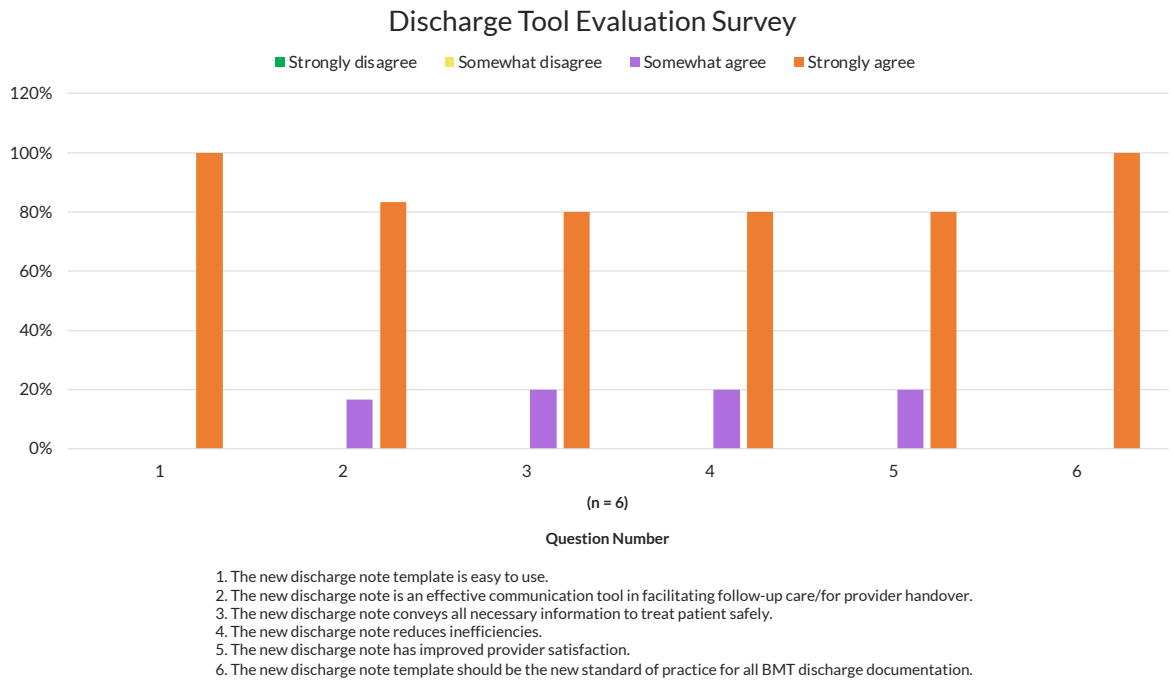

Figure 5. This user-satisfaction survey assesses quality, utility, work-burden, and satisfaction following implementation of the new discharge template tool. The questions are ranked on a 4-point Likert scale.