

Implementation of a Handoff Report Tool Among Trauma Intermediate Care Nurses

by

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Abstract

Problem and Purpose: An estimated 80% of serious errors and sentinel events are attributable to miscommunication during patient handoffs. Since 2010, the JCAHO has required that during transitions in care, healthcare providers engage in handoff communication between the giver and receiver of hospitalized patients. Inadequate patient handoff communication remains a key contributor to medical errors, preventable adverse events, and sentinel events. The illness severity, patient summary, action list, situational awareness and contingency planning, and synthesis by receiver (I-PASS) method was created with use of a tool to improve handoff communication practices. The handoff tool was designed to decrease medication errors and enhance the safety and quality of patient care. Among nurses working in a multi-trauma intermediate care unit, a standardized patient handoff process with the critical elements of communication was lacking at a tertiary academic hospital in the Mid-Atlantic region. The nurse manager of a trauma intermediate care unit reported large nursing staff turnover and concerns about novice staff members' handoff communication effectiveness. With high acuity and a complex patient population, effective handoff is essential to maintaining patient safety as well as minimizing omissions in care and potential errors.

Methods: The purpose of this Doctor of Nursing Practice quality improvement project was to implement and evaluate the I-PASS handoff tool for perceived handoff report communication among nurses. Compliance with the verbal communication and written report tools were audited weekly. A pre/post perceived handoff communication survey was also distributed prior to and after the 15-week project period.

Results: Findings indicated that staff compliance with the I-PASS handoff report tool reached or exceeded the goal of 75% from week five to week 14. When using the handoff report tool,

perceived handoff communication increased significantly by 9% post implementation ($p < 0.05$).

The medication error event rate declined by 47% during the implementation period.

Conclusions: The I-PASS handoff report tool improved perceived handoff communication among nurses. Subsequent quality improvement projects are recommended to evaluate the use of adapted unit-specific I-PASS handoff report tools to further validate the method's effectiveness and potential to improve medication-related and patient safety events.

Introduction

An estimated 80% of serious medical errors occur due to miscommunication when patients are transferred between caregivers (The Joint Commission Perspectives, 2012). Handoff refers to the manner in which patient information is communicated from one caregiver to another (Nether, 2017). Inadequate patient handoff communication remains a key contributor to medical errors, preventable adverse events, and sentinel events. Since 2010, the Joint Commission of Health Care Organizations has required that handoffs, as a form of discussion, be used to improve giver–receiver communication during handoff of hospitalized patients (Sentinel Event Alert, 2017). This discussion allows for clarification of patient information by the receiver so that vital patient information is relayed, and the plan of care is continued. Even the potential for minor patient harm is possible when the receiver obtains inaccurate information or if information is omitted. Scott et al. (2017) identified handoff failures as a primary contributing factor to sentinel events. Shahian et al. (2017) found that patients in teaching hospitals were particularly vulnerable to such failure due to complex case mix and frequent handovers, hence the need for clear communication to prevent adverse outcomes. Moreover, hospital patient handoffs occur between all health care disciplines, and information omission or miscommunication is particularly prevalent during these times.

Starmer et al. (2012) developed a tool to facilitate handoff communication referred to as the I-PASS. The I-PASS acronym refers to the following components or domains: I: Illness severity; P: Patient summary; A: Action list; S: Situational awareness and contingency planning; S: Synthesis by receiver. This method was initially developed to improve inpatient pediatric residents' handoff practices but has consistently led to decreases in medical errors and preventable adverse events in various patient populations (Shahian et al., 2017). The purpose of

I-PASS is twofold: (a) to encourage anticipatory problem solving for situations that might occur in a patient's hospital course and (b) to provide opportunities to perform checkback or readback of information that facilitates giver–receiver discussion. These two domains are essential to provide an accurate and complete informative handoff (a transfer of patient-specific communication) to enhance staff's understanding of patients. Moreover, I-PASS has been implemented to standardize verbal and written handoff practices in numerous healthcare disciplines. The purpose of this Doctor of Nursing Practice (DNP) quality improvement (QI) project was to implement and improve compliance in the use of I-PASS as a standardized handoff tool to improve perceived handoff communication among nurses on a trauma intermediate care unit (IMC).

Literature Review

A literature review was conducted to appraise evidence-based handoff tools adopted in hospitalized settings, focusing on evidence of such tools found to enhance communication among hospital staff (Appendix A). Starmer et al. (2014) prospectively implemented I-PASS across nine hospitals in the United States among 875 pediatric residents; the purpose of their QI study was to evaluate rates of medical errors and preventable adverse events. Results revealed a 30% relative decrease in preventable adverse events ($p < 0.001$) and a 23% relative decrease in medical errors across all sites ($p < 0.001$). Miscommunication resulting in near misses and nonharmful medical errors declined by 21% ($p < 0.001$). Starmer et al.'s (2014) implementation science indicated improved the frequency, quality, and efficiency of key handoff elements, thus demonstrating the benefits of communicating patient information in a structured manner. Similarly, in a prospective study by Huth et al. (2016), I-PASS improved key data elements in

written handoffs, improved collaborative efforts, and organization of verbal handoffs, without increasing handoff duration.

In a large-scale implementation of I-PASS at Massachusetts General Hospital, Shahian et al. (2017) reported improved handoff communication in three of the five I-PASS domains among 600 physicians, nurses, and therapists. For example, illness severity during nursing handoffs increased from 14% to 78% pre-/post-implementation, respectively. The accuracy of illness severity is important, as it conveys the patient's acuity and identifies patients at risk of decompensating. Additionally, significant improvements were observed in pre/post-implementation situational awareness/contingency planning (from 53% to 96%) and synthesis (from 27% to 87%). These improvements are crucial to creating a shared mental model between caregivers to prevent adverse events. Shahian et al.'s (2017) work marked the first large-scale QI study conducted to show that I-PASS could be applied across multiple disciplines to improve handoff communication practices.

Starmer et al. (2017) carried out a QI project and identified noteworthy improvements in the quality of nursing communication on a 29-bed pediatric medical-surgical intensive care unit when using I-PASS. No negative effects were observed on nursing workflow after I-PASS implementation, indicating the tool's ease of use. Findings related to key handoff communication data elements included isolation or medical precautions, opportunities to ask questions, recent abnormal exam findings, patient identifiers, and pertinent vital signs. Moreover, five verbal handoff elements improved significantly pre- and post-implementation: overall health status (from 68% to 96%; $p < 0.001$), general hospital course (from 43% to 79%, $p < 0.001$), upcoming possibilities (from 55% to 82%; $p = 0.003$), and tasks to complete during the next shift (from 44% to 84%; $p < 0.001$). Interestingly, 65% of nurses cited inadequate training on how to

effectively hand off patient information as a barrier to effective communication during nursing handoffs. Ultimately, however, using an evidence-based standardized handoff report tool may improve communication of key patient data during handoff transitions among nurses.

Caruso et al. (2015) adapted I-PASS for a post-anesthesia care unit (PACU) to standardize handoffs. The goal of this QI project was to improve communication between operating room nurses/anesthesiologists and receiving PACU nurses by measuring transfer of information. Information transfer scores increased from 49% to 83% pre- and post-implementation, respectively ($p < 0.001$). Nurse satisfaction also increased due to I-PASS, thus promoting the method's adoption as well as project sustainability. Clements (2017) described how I-PASS was successfully implemented among nurses across a critical care unit, post-anesthesia unit, telemetry, medical-surgical floor, and emergency department. Qualitative data revealed that novice nurses embraced the I-PASS format, which enabled them to ask and answer questions despite their reluctance to pose questions to more senior nurses. The "synthesis by receiver" (S) domain of I-PASS reduced nurses' time spent reviewing patients' electronic medical records or asking their peers questions that should have been clarified during the handoff process. Additional qualitative data indicated that novice and expert nurses stated that the I-PASS tool standardized report facilitated comprehensive handoff. The I-PASS tool represents an important communication process that institutions should consider to decrease medical errors and improve the quality and safety of patient care.

The preceding evidence-based review of the literature supports the reliability of a standardized and structured handoff tool such as the I-PASS in improving communication in various clinical settings. As noted, the I-PASS was found to decrease medical errors and preventable adverse events while increasing nursing staff satisfaction (Shahian et al., 2017;

Starmer et al., 2013, 2014, 2017). The I-PASS tool has been embraced by resident physicians and novice nurses thanks to its ease of use. Although the method was initially developed to improve resident physician handoff in pediatric patients, it has since been adopted by nurses and implemented at more than 50 institutions (I-PASS Patient Safety Institute, n.d.). Landrigan and Lyons (2012) envisioned enacting I-PASS in all inpatient areas as a common platform for interdisciplinary rounds to optimize communication and patient safety.

Theoretical Framework

Everett Rogers's (1962) theory of diffusion of innovations (DOI) was used as the theoretical framework to implement this QI project. Rogers (1962) first defined diffusion as the process through which innovation is communicated across channels over time among members of a social system. He later described diffusion as a unique form of communication intended to disseminate new ideas (Rogers, 2003). The four major elements of this theory include innovation, communication channels, time, and the social system. Innovation involves how individuals perceive ideas as new. Communication refers to the process by which members create and share information to reach mutual understanding. Time is a crucial element in any aspect of communication; and the social system consists of interrelated units engaged in problem solving to accomplish a common goal (Rogers, 1962). Rogers's DOI theory was selected for this QI project to evaluate the rate at which I-PASS was adopted by nurses and how this innovation improved patient safety and quality of care.

The five adopter groups of innovation consist of innovators, early adopters, early majority, late majority, and laggards. The innovation-decision process refers to how decision makers determine whether to adopt or reject a new idea. The five time-sequenced steps that occur in the innovation-decision process are knowledge, persuasion, decision, implementation,

and confirmation. In applying this theory to the QI project, the innovation-decision process began with the distribution of evidence related to I-PASS (i.e., the innovation). This information dissemination led to the persuasion stage, during which favorable or unfavorable attitudes were generated. I-PASS adoption occurred in the decision stage as the target groups engaged in activities that informed their ultimate decisions. During the implementation phase, the I-PASS handoff report tool was adopted amidst relative uncertainty regarding the innovation's anticipated outcomes. Support for the tool became apparent during the confirmation stage.

Methods

This QI project was implemented in a large tertiary academic medical center in the Mid-Atlantic region of the United States. Thirty-two nurses were educated on the I-PASS method and corresponding handoff report tool. During the 15-week implementation period, the patient census averaged 11 patients daily. Approximately 1,155 patients with a primary diagnosis of a traumatic injury or multiple traumatic injuries were exposed to the intervention. No exclusion criteria applied in this project.

The first step in this QI project involved identifying and recruiting unit champions (i.e., senior nurses) to support the I-PASS handoff report tool. These professionals offered feedback about potential tool modifications and approved a final handoff report tool that had been tailored to the unit's needs. Champions participated in one-on-one training sessions and helped organize staff huddles for education. The project leader and the unit champions worked together to reinforce and clarify information regarding the handoff tool domains with staff as needed.

Following approval by the unit champions, the I-PASS handoff report tool (Appendix B) was kept at the central nursing station for all staff to use. Immediately after education, all staff achieved a competency assessment score of 80% or higher (Appendix C). Educational boards

with I-PASS evidence were also placed in the staff breakroom, medication room, and bathroom (Appendix D). Additionally, each computer workstation received an I-PASS handoff card listing specific domain criteria for reference along with additional education cards (Appendices E & F). Furthermore, nursing staff received education on the I-PASS evidence and handoff report tool in small-group huddles; these informational sessions were held during all shifts every day of the week until all 32 nurses received the education. Permission for use of I-PASS material was granted by the I-PASS study group (Appendix G).

Nursing staff's perceived handoff communication was assessed via pre- and post-implementation surveys with all items scored on a Likert scale (Appendix H). Nurses' compliance with the I-PASS handoff report tool was monitored by random weekly audits in which verbal and written handoffs were assessed during shift change (Appendices I, J, & K). Following verbal handoff audits, feedback was immediately provided to improve situational awareness and synthesis for future handoffs. Written handoff report tools were placed in a folder at the end of every shift that was kept in a secure location and collected weekly for analysis.

In terms of data analysis, Likert-scale data were converted to interval data, and mean scores and percentages were assessed pre- and post-project implementation. Data were examined weekly based on audits of verbal I-PASS handoffs and the written I-PASS handoff tool. A score of 20% (total of 100%) was assigned to each of the five domains (i.e., illness severity, patient summary, action list, situational awareness/contingency planning, and synthesis) if I-PASS had been used during verbal and written handoffs. Compliance and goal trends were tracked and analyzed using run charts; the chart results were then shared with the unit nursing staff, nurse manager, and clinical site representative throughout implementation.

Permission to proceed with this DNP QI project was granted by the organization's Institutional Review Board after the project was designated as non-human subject research. Audit tools were assigned a number and stored in a locked file cabinet in a locked office at the organization. Pre- and post-survey information was exported into Microsoft Excel via the anonymous option on Survey Monkey and stored on an encrypted, password-protected computer in a locked office.

Results

Nearly 1,155 patients were exposed to the I-PASS handoff report tool over the 15-week implementation period. Throughout this period, 32 staff nurses received I-PASS education and passed the competency assessment. It was not anticipated that nursing students who rotated on the unit would also require the educational sessions on I-PASS, although they used the handoff report tool. Moreover, it was not expected that staff nurses floating from other units to the trauma IMC would be exposed to the tool. Unit crossover presented a potential barrier although educational resources were readily available. Thirteen nurses completed the perceived handoff communication survey pre-implementation and 20 nurses completed the survey post-implementation (Table 1). The mean score on the pre-implementation survey questions was 32 ($SD = 4$) compared to a mean post-implementation score of 35 ($SD = 3$); highest possible score was 50. Data analysis revealed a 9% increase in perceived handoff communication among nurses on the trauma IMC. An independent samples *t*-test was used to evaluate the difference between the means of the perceived handoff communication survey. Results indicated a significant increase in perceived handoff communication post-implementation ($p < 0.05$).

Perceptions of handoff communication were evaluated for a percentage increase pre-/post-implementation (Table 1). Specifically, questions one, three, seven, nine, and ten had the

most improvement: “I feel that my communication during handoff is always clear” (from 75% to 84%); “Overall verbal handoff communication seems disorganized” (from 75% to 89%); “Handoff communication is comprehensive and rarely misses important data” (from 60% to 83%); “The current handoff tool has improved communication practices” (from 75% to 85%); “The current handoff tool has proven to be successful in improving communication” (from 74% to 87%). Compliance with I-PASS handoff report domains was analyzed based on weekly run charts (Figures 1 & 2). Figure 1 displays verbal handoff compliance over the 15-week implementation period, where the 75% goal was achieved upon implementation at week five after education and competency assessments were performed during weeks one to four. Additionally, the 100% goal for verbal handoff compliance was achieved by week 11. Figure 2 demonstrates written handoff compliance, which did not meet the goal of the QI project. The written I-PASS handoff tool domains of “situational awareness/contingency planning” and “synthesis by receiver” were not well utilized on the handoff tool but were applied effectively during verbal handoffs.

Medication event rates were retrospectively evaluated 15 weeks prior to implementation, revealing 34 events. Sixteen medication events were identified during the implementation period, indicating a 47% decline in medication events. Upon further analysis, medication events were found to be attributable to either human error or miscommunication. The QI project was facilitated by novice staff nurses who were eager and receptive to improving their handoff communication. A few senior nursing staff who believed they already possessed effective handoff skills posed an implementation barrier. These individuals participated in one-on-one, evidence-based informational sessions with a focus on improving patient quality of care and

safety during handoff transitions. These discussions helped to secure complete buy-in related to the handoff report tool.

Discussion

Similar to findings in the literature, the outcomes of this QI project included a 47% decrease in medication events during the implementation period. Starmer et al.'s (2014) QI study revealed a 23% decrease in medical errors and a 30% decrease in preventable adverse events. Overall tool compliance also increased during the current project, consistent with research, especially in the domains of illness severity, situational awareness/contingency planning, and synthesis. Compliance inconsistencies may have been related to variable staff perceptions of the importance of using the handoff tool. Also, when short-staffed, the handoff tool may not have been well utilized due to the stress of accomplishing patient specific tasks, such as medication administration and routine cares. Another factor contributing to variation with tool use might have been the day versus night shift nursing priorities. Efforts to incorporate illness severity were not sustained at the end of implementation; staff may not have found this domain particularly important, hence the lack of 100% compliance with the I-PASS handoff report tool. Illness severity reporting increased from 14% pre-implementation to 60% post-implementation during large-scale I-PASS implementation among nurses at an academic medical center (Shahian et al., 2017).

Comparatively, the current QI project indicated that nurses were not using or identifying illness severity pre-implementation. Such identification increased to 50% upon I-PASS implementation but declined to 20% upon project completion. Although an intended 25% increase in perceived staff communication was not observed during this project, an increase was still observed. These findings echo those of Clements (2017), who found that staff reported

through informal inquiries and meetings that I-PASS improved communication and decreased opportunities for errors. Physicians also commented on nursing staff engaging in more effective communication (Clements, 2017). Starmer et al. (2014) discovered that physician residents' quality of communication during handoffs improved when using I-PASS. For the current QI project, minor tool revisions were implemented based on feedback from senior nursing leadership and a few staff members; these modifications ensured that critical unit-specific components were included in the tool.

A particular strength of this QI project was that nursing leadership, most nursing staff on the trauma IMC unit, and the organization embraces quality improvement and evidence-based practice projects. The nurse manager wanted to ensure that nurses possessed a comprehensive handoff tool that would improve handoff communication. Shahian et al. (2017) came to similar conclusions during I-PASS implementation with strong support from hospital leadership, department chairs, senior physicians, and nurses who were committed to quality care and patient safety. For this QI project, small-group sessions with two to three nursing staff members allowed for discussion and opportunities to ask questions about the tool along with the importance of creating a shared mental model. The small-group sessions also helped to promote the three critical elements of I-PASS handoffs, namely personal credibility, trust, and contextual clarity and coherence (Kitzmiller et al., 2017).

Limitations of this QI project include the lack of the generalizability of the unit-specific I-PASS handoff tool to other clinical settings; the tool would not suit the needs of every nursing handoff. Another limitation to the findings related to perceived communication handoff was that different groups of nurses completed pre-/post surveys, which may pose a threat to internal validity. Likewise, the change agent was an employee and knew the staff well, a pre-existing

relationship may have encouraged project-related buy-in from staff. Although the unit nursing staff were committed to improving the quality of patient care, several organizational QI rollouts occurred during project implementation. These included system-wide, large-scale implementations focusing on falls and patient-/family-centered care, which may have affected the staff's motivation for adherence due to "implementation fatigue."

Conclusion

By complying with the I-PASS handoff report tool, a modest increase in nurse perception of handoff communication was achieved. Medication-related events also declined by 47% during implementation as compared to pre-implementation. Subsequent QI projects should be conducted to evaluate the use of the I-PASS handoff report tool relative to the duration of verbal handoffs. Staff satisfaction with the I-PASS handoff report tool should also be evaluated to obtain a clearer understanding of nurses' attitudes towards this tool.

Implications for practice include the dissemination of scholarly work to capture improvements in healthcare delivery. The potential sustainability and expansion of this QI project may involve incorporating the I-PASS handoff report tool into the electronic health record. The project spread could be further extended if other nursing units adapt the tool to suit their unit's unique needs. Ongoing assessment of medication events and patient incident reports should be performed when implementing I-PASS in the future, particularly to determine the tool's effect on improving communication. Instilling a culture of situational awareness and contingency planning, affirmed through synthesis, would also help to promote closed-loop communication to improve patient care handoffs.

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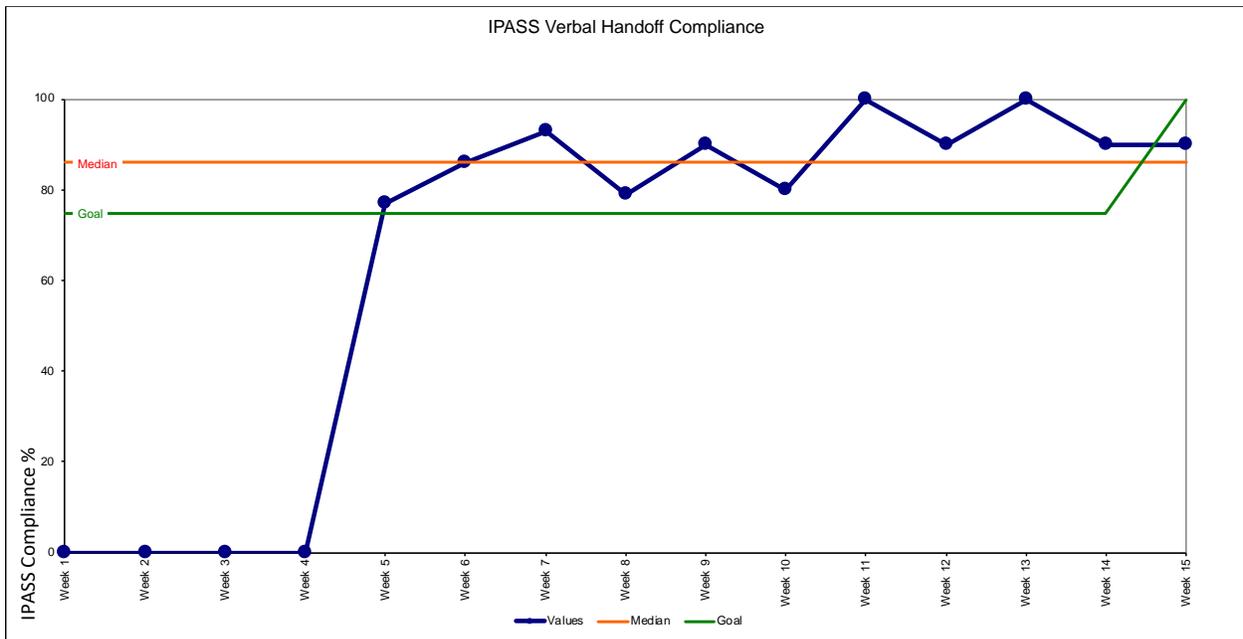
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Table 1*Pre-/post-implementation Comparison of Perceived Handoff Communication*

	% Pre- Implementation (n=13)	% Post- Implementation (n=20)	% change
1. I feel that my communication during handoff is always clear.	75%	84%	12%
2. I think there is room for improvement in handoff communication practices.	42%	40%	-4.8%
3. Overall, verbal handoff communication seems organized.	75%	89%	19%
4. I feel that I am a good communicator during the handoff process.	82%	89%	9%
5. I believe my colleagues communicate well during handoff.	75%	83%	11%
6. Overall, verbal handoff communication seems disorganized.	49%	37%	-24%
7. Handoff communication is comprehensive and rarely misses important data.	60%	83%	38%
8. I sometimes do not communicate what I don't understand because I don't want my colleagues to know.	40%	38%	-5%
9. The current handoff tool has improved communication practices.	75%	85%	13%
10. The current handoff tool has been proven to be successful in improving communication.	74%	87%	18%

Figure 1

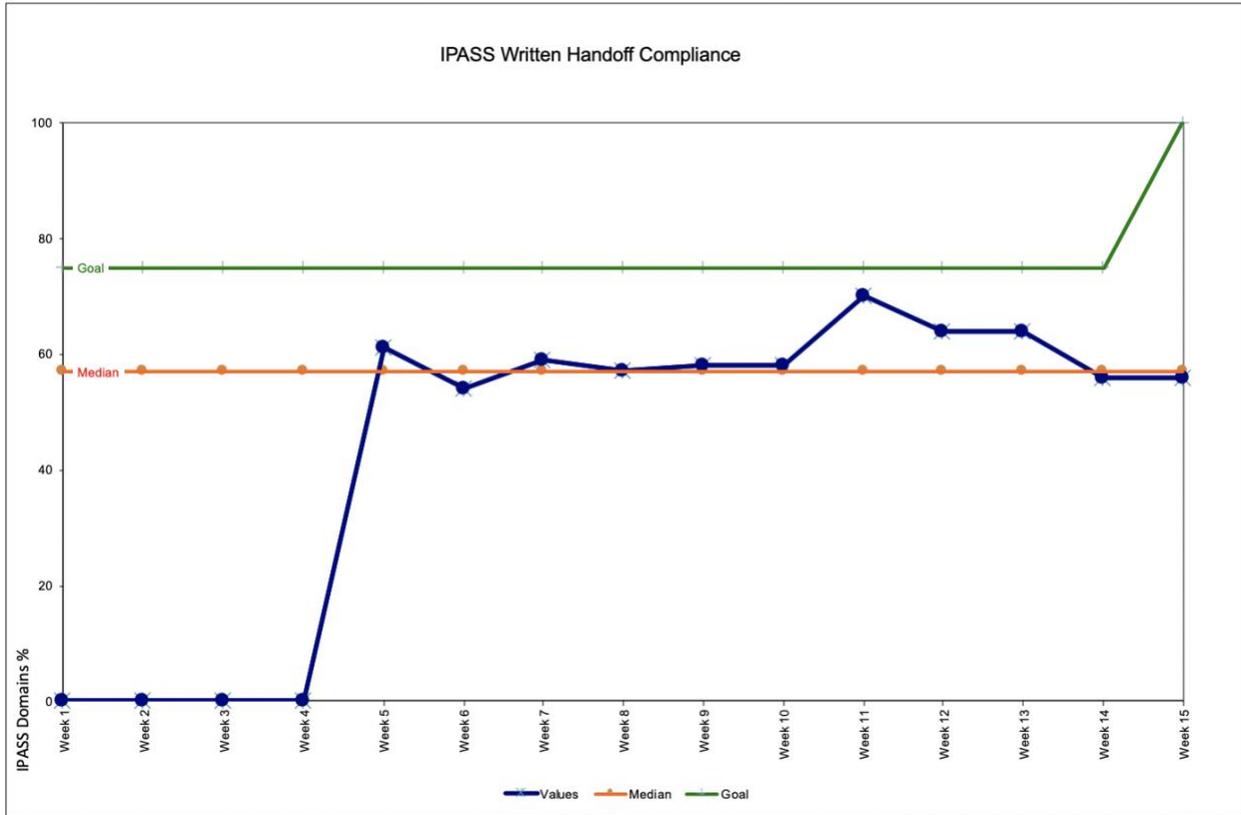
I-PASS Verbal Handoff Compliance Run Chart



Note. Percentage of weekly compliance using the I-PASS verbal handoff method. Staff education and competency assessments performed during the first four weeks.

Figure 2

I-PASS Written Compliance Handoff Run Chart



Note. Percentage of weekly compliance using the I-PASS handoff report tool. Staff education and competency assessments performed during the first four weeks.

Appendix A

Evidence Review Table

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
Huth, et al. (2016)	Implementation and evaluation of I-PASS on clinical handoff quality, duration and the ability to identify unstable patients. **Resident physician handoff**	Prospective cohort study	N=1275 physician handoff observations N=28 physician No power analysis	Primary Outcome: Impact of I-PASS on quality of verbal and written communication Handoff duration	Significant increase in 7 out of 11 key elements. No significant difference of I-PASS on the inclusion of patient identification, medications, or investigational results. A significant decrease was seen with physical exam findings Allergies: OR 566.15 (95% CI, 105.28-3044.65, $p<0.05$) Illness severity: OR 476.96 (95% CI, 174.68-1302.36, $p<0.05$) Past medical history: OR 29.42 (95% CI, 13.2-65.57-1302.36, $p<0.05$) Weight: OR 10.05 (95% CI, 6.44-15.66, $p<0.05$) Contingency plans: OR 6.86 (95% CI, 4.72-9.98, $p<0.05$) IV access: OR 5.23 (95% CI, 3.52-7.77, $p<0.05$) To-do/action list: OR 2.64 (95% CI, 1.93-3.6, $p<0.05$) Handoff duration was not significant: 1.7 minutes post-implementation, 95% CI -2-5, $p=0.38$	Level: IV Quality: B

<p>Shaian, et al. (2017)</p>	<p>Implement I-PASS across several disciplines at Massachusetts General Hospital to improve handoff communication and ultimately reduce medical errors and adverse events.</p> <p>**Multiple disciplines: physicians, nursing**</p>	<p>Pre/Post Study Design-Quality improvement project</p>	<p>N=33,100 hospital staff (N=25,000 physicians) (N=880 residents/interns) (N=4800 nurses) (N=25,000 full-time or part-time personnel); convenience sample</p> <p>No power analysis</p>	<p>Primary outcome: Observation frequency in using I-PASS domains by nursing staff during bedside handoff (Illness severity, Patient summary, Action list, Situational awareness/contingency planning, Synthesis by receiver).</p>	<p>Rapid increase in illness severity, situational awareness/contingency planning and synthesis post-implementation in the nurses.</p> <p>No p values reported</p> <p>Use of I-PASS Illness severity pre-implementation and post-implementation observed: 14% to 73%.</p> <p>Use of I-PASS Situational awareness/contingency pre-implementation and post-implementation observed: 53% to 92%.</p> <p>Use of I-PASS Synthesis pre-implementation and post-implementation observed: 27% to 89%.</p> <p>High and stable scores for patient summary and action list, since they were already present in handoff practices.</p> <p>Data for medical errors and adverse events will be conducted in phase II.</p>	<p>Level: IV</p> <p>Quality: B</p>
<p>Starmer, et al. (2014)</p>	<p>Implementation of a resident handoff-improvement program with I-PASS to measure rates of medical errors, preventable adverse events,</p>	<p>Prospective cohort study</p>	<p>N=875 residents (9 pediatric hospitals with a range 36-182 residents in each site)</p> <p>Power analysis: 90% power to detect a 20% relative reduction in overall error rates and</p>	<p>Primary Outcomes: Rates of medical errors and preventable adverse events</p> <p>Secondary Outcomes:</p>	<p>Medical errors: 23% relative risk reduction across all sites (preintervention 24.5 vs. 18.8 postintervention errors per 100 admissions, $p < 0.001$).</p> <p>Preventable adverse events: 30% relative risk reduction (preintervention 4.7 vs. 3.3</p>	<p>Level: IV</p> <p>Quality: B</p>

	<p>miscommunications and resident workflow.</p> <p>**Resident physician handoff**</p>		<p>for 80% power to detect a 28% relative reduction in the rate of preventable adverse events at each site (alpha level of 0.025 with the use of a Bonferroni correction).</p>	<p>Resident workflow patterns and satisfaction</p>	<p>postintervention events per 100 admissions, $p < 0.001$).</p> <p>Near miss and non-harmful errors: 21% decrease (19.7 preintervention vs. 15.5 postintervention per 100 admission, $p < 0.001$).</p> <p>Nonpreventable adverse events: No significant change (3.0 preintervention to 2.8 postintervention events per 100 admissions, $p = 0.79$).</p> <p>Resident workflow: No significant change in percentage of time in a 24-hr period spent in contact with patients and families for all sites combined (preintervention 11.8% vs. 12.5% postintervention, $p = 0.41$).</p> <p>Creating or editing computerized handoff No significant change preintervention and postintervention: (1.6% vs. 1.3%, $p = 0.54$).</p> <p>Working at a computer No significant change preintervention and postintervention: (16.2% vs. 16.5%, $p = 0.81$).</p> <p>Writing on printed copies of the handoff document preintervention and postintervention: No significant change (0.5% vs. 0.6%, $p = 0.19$).</p>	
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<p>Starmer, et al. (2014)</p>	<p>Evaluate the association of a new handoff program with medical errors and preventable adverse events, decreased omission of key handoff data, improved verbal handoff and changes in resident-physician workflow.</p> <p>**Resident physician handoff**</p>	<p>Prospective cohort on two inpatient pediatric units</p>	<p>N=84 physician residents; convenience sample</p> <p>Power analysis: 80% power to detect a 20% reduction in the rate of total medical errors, assuming a 2-sided α error of 0.05.</p>	<p>Primary Outcomes: Rates of medical errors and preventable adverse events</p> <p>Secondary Outcomes: Omissions in handoff document</p> <p>Resident workflow</p>	<p>Medical errors pre-intervention vs. post-intervention: 33.8 (95% CI, 27.3-40.3) vs. 18.3 (95% CI, 14.7-21.9) per 100 admissions on both units ($p<0.001$)</p> <p>Preventable adverse events pre-intervention vs. post-intervention: 3.3 (95% CI, 1.7-4.8) vs. 1.5 (95% CI, 0.5-2.4) per 100 admission ($p=0.04$)</p> <p>Non-intercepted potential adverse events pre-intervention vs. post-intervention: 7.3 (95% CI, 5.0-9.6) vs. 3.3 (95% CI, 1.85-4.7) per 100 admission ($p=0.02$)</p> <p>Intercepted potential adverse events pre-intervention vs. post-intervention: 15.0 (95% CI, 11.2-18.7) vs. 8.3 (95% CI, 6.0-10.0) per 100 admission ($p<0.01$)</p> <p>Error with little or no potential for harm pre-intervention vs. post-intervention: 8.3 (95% CI, 5.4-11.1) vs. 5.2 (95% CI, 3.3-7.2) per 100 admission ($p=0.04$)</p> <p>No significant change in rates of nonpreventable adverse events pre-intervention vs. post-intervention: 1.7 (95% CI, 0.7-2.7) vs. 1.6 (95% CI, 0.5-2.7) per 100 admissions ($p=0.91$)</p> <p>Significant reductions in omissions of key data for both units combined</p> <p>Dated vital signs ($p<0.001$) Medication list ($p<0.001$)</p>	<p>Level: IV</p> <p>Quality: B</p>
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					<p>Code status ($p<0.001$) Dated lab results ($p<0.001$) To-do list ($p<0.001$) Dated physical examination findings ($p=0.03$) Contingency plans ($p=0.01$) Intravenous access ($p<0.001$) Past medical history ($p=0.02$) Patient summary ($p=0.04$) Allergies ($p=0.42$) Weight ($p=0.02$) Reason for admission ($p=0.30$) Name and medical record number ($p=0.30$)</p>	
<p>Starmer, et al. (2017)</p>	<p>Evaluating the effects of the I-PASS on communication and workflow among nurses</p> <p>**Nursing handoff**</p>	<p>Prospective cohort study</p>	<p>N=90 nurses; convenience sample</p> <p>Power analysis: 80% power to detect a 25% reduction in nursing work hours spent in direct patient care assuming a two-sided alpha error of 0.05.</p>	<p>Primary Outcome: Assessment of verbal handoffs including key hand off elements and interruption frequency</p> <p>Assessment of nursing workflow patterns</p> <p>Secondary Outcomes: Duration of handoff</p>	<p>Significant increase in key handoff elements</p> <p>Handoff elements: Identification of primary physician Pre and post intervention (6% vs. 26%, $p=0.004$)</p> <p>Parent contact information Pre and post intervention (12% vs. 75%, $p<0.001$)</p> <p>Isolation or medical precautions Pre and post intervention (19% vs. 49%, $p<0.001$)</p> <p>Opportunity to ask questions Pre and post intervention (34% vs. 73%, $p=0.001$)</p> <p>To do list Pre and post intervention (35% vs. 100%, $p<0.001$)</p> <p>Illness severity assessment Pre and post intervention (37% vs. 67%, $p=0.001$)</p>	<p>Level: IV</p> <p>Quality: B</p>

					<p>Recent abnormal exam findings Pre and post intervention (49% vs. 91%, $p<0.001$)</p> <p>Patient weight Pre and post intervention (54% vs. 76%, $p<0.001$)</p> <p>Laboratory results Pre and post intervention (60% vs. 100%, $p<0.001$)</p> <p>Patient identifiers (name, age, medical record number) Pre and post intervention (64% vs. 88%, $p=0.005$)</p> <p>Medication list Pre and post intervention (70% vs. 100%, $p<0.001$)</p> <p>Pertinent vital signs Pre and post intervention (84% vs. 100%, $p=0.004$)</p> <p>Significant reduction of interruption frequency pre and post intervention: (67% vs. 40%, $p=0.005$)</p> <p>No significant difference in duration of patient handoff pre and post implementation: (18.8 minutes vs. 19.9 minutes, $p=0.48$)</p>	
Caruso, et al. (2015)	The aim was to determine if the standardized I-PASS format for OR to PACU handoff process would minimize loss of	Prospective cohort study	N=22 nurses; convenience sample No power analysis	Primary Outcome: Increase in patient information transfer by 25%	Overall information transfer scores increased significantly. Mean score of 49% (standard deviation [SD] 9.8%) to 83% (SD 15%), ($p<0.001$).	Level: IV Quality: C

	<p>patient specific information during transfer of care</p> <p>**Nursing handoff**</p>			<p>Secondary Outcome: Nurse satisfaction surveys conducted pre & post I-PASS implementation</p>	<p>Mean nurse total satisfaction scores increased significantly Mean score of 36 pre-implementation (SD 6.8) to 44 (SD 4.8) post-implementation ($p=0.004$).</p> <p>Surgeon presence: Increased significantly after implementation: 31.7% to 100% ($p<0.001$).</p> <p>Operating room nurse presence: 95.1% to 100% ($p=0.22$).</p> <p>Handoff duration: Pre-implementation 4.1 minutes (SD, 2.5).</p> <p>Postimplementation: 3.5 minutes (SD, 1.9, $p=1.0$).</p>	
<p>Clements, (2017)</p>	<p>Fostering a culture of high-reliability by standardizing nursing handoff with the I-PASS to improve handoffs during transitions of care</p> <p>**Nursing handoff**</p>	<p>Quality improvement project</p>	<p>N= 1 academic medical center</p> <p>(Nurses in the critical care unit, telemetry unit, postanesthesia care unit, medical-surgical unit and ED; number of nurses or number of handoffs not described in article)</p>	<p>Decrease omitted information, miscommunication and inconsistent report formats.</p>	<p>I-PASS improved nursing communication, increased staff satisfaction, and reduction in errors via verbal feedback during informal meetings.</p> <p>No statistical data measured.</p>	<p>Level: VI</p> <p>Quality: C</p>

Appendix B

Adapted I-PASS Handoff Report Tool

Illness Severity	Stable/"Watcher"			Stable/"Watcher"			Stable/"Watcher"		
Patient Summary	Room#:	Name:	Age:	Room#:	Name:	Age:	Room#:	Name:	Age:
	Isolation:	Team	Code:	Isolation:	Team	Code:	Isolation:	Team	Code:
	Allergies:			Allergies:			Allergies:		
	Admit Dx/Summary:			Admit Dx/Summary:			Admit Dx/Summary:		
	Past Medical Hx:			Past Medical Hx:			Past Medical Hx:		
	NEURO:			NEURO:			NEURO:		
	Pain-	Meds-		Pain-	Meds-		Pain-	Meds-	
	RASS-	GCS/A+Ox-		RASS-	GCS/A+Ox-		RASS-	GCS/A+Ox-	
	Pupils-	Strength/PT-		Pupils-	Strength/PT-		Pupils-	Strength/PT-	
	RESP:			RESP:			RESP:		
	Airway-	Lung sounds-		Airway-	Lung sounds-		Airway-	Lung sounds-	
	O ₂ Sat-	Resp Rate-		O ₂ Sat-	Resp Rate-		O ₂ Sat-	Resp Rate-	
	Cough/Sputum-	Imaging-		Cough/Sputum-	Imaging-		Cough/Sputum-	Imaging-	
	CV:			CV:			CV:		
	Ryth/Rate-	Pulses/BP-		Ryth/Rate-	Pulses/BP-		Ryth/Rate-	Pulses/BP-	
	Finger Sticks-	Temp-		Finger Sticks-	Temp-		Finger Sticks-	Temp-	
	Antibiotics-	Labs-		Antibiotics-	Labs-		Antibiotics-	Labs-	
	IV Access-	Last T&S:		IV Access-	Last T&S:		IV Access-	Last T&S:	

GI:

Diet- Appetite-
 BS/Gas- LBM-
 Distended- Tender-

GU:

Voiding- Amount/Color-

SKIN: Bath Day/Night
 Wounds/Drains

Plan:

GI:

Diet- Appetite-
 BS/Gas- LBM-
 Distended- Tender-

GU:

Voiding- Amount/Color-

SKIN: Bath Day/Night
 Wounds/Drains

Plan:

GI:

Diet- Appetite-
 BS/Gas- LBM-
 Distended- Tender-

GU:

Voiding- Amount/Color-

SKIN: Bath Day/Night
 Wounds/Drain

Plan:

Action
List/To Do

Situational
Awareness

Synthesis
by
Receiver

Appendix C

I-PASS Competency Assessment

Correct answers are underlined

1. The correct domains of IPASS are which of the following?
 - a. Illnesses, Patient, Attending, Significant Events, Sender
 - b. Illness Severity, Patient Summary, Action List, Situation Awareness, Synthesis
 - c. Information, Patient, Actions, Situation Awareness, Safety
 - d. Illness, Patient Safety, Summary, Synthesis
2. What are the three levels of Illness Severity?
 - a. Stable, Watcher, Unstable
 - b. Stable, Unstable, End of Life
 - c. Hemodynamically Unstable, Stabilized, Watcher
 - d. None of the above
3. It is not necessary to go through each I-PASS domain systematically?
 - a. True
 - b. False
4. The definition of patient summary is most accurately described by which statement?
 - a. Includes the patient summary, events leading up to admission, and hospital course
 - b. Ongoing assessments
 - c. Patient plan by problem or diagnosis
 - d. All of the above
5. Interruptions during handoff should be limited?
 - a. True
 - b. False
6. I-PASS is an evidence-based tool that reduces _____ failures during patient handoff.
 - a. Communication
 - b. Nursing
 - c. Quality

- d. Some
7. The I-PASS “Action List” is a “To Do List” with attention to timelines, level of priority, assigned responsibility (if other than receiver), indication of completion (ie: checkbox)?
- a. True
 - b. False
8. During bedside handoff the day nurse tells the night nurse, “I don’t anticipate that anything will go wrong”. This statement aligns with which of the following I-PASS domains?
- a. Illness Severity
 - b. Patient Summary
 - c. Action List
 - d. Situational Awareness
 - e. Synthesis by Receiver
9. A shared mental model is best initiated as which of the following statements?
- a. A thought that one person shares with another regarding the patient’s condition
 - b. Soliciting check-back of salient points and clarifying questions during handoff
10. Which of the following best defines the domain, “Synthesis by Receiver”?
- a. Provides an opportunity for the receiver to restate the essential information in summary, obtain clarification, and have an active role in the handoff
 - b. Provides an opportunity for the giver to restate the essential information in summary, obtain clarification, and have an active role in the handoff

Appendix D

I-PASS Poster for Education Board



TeamSTEPPS™

- Briefs
- Huddles
- Debriefs
- Cross Monitoring
- Advocate & Assert
- Checkback
- Feedback

Verbal Handoff

- Begin with overview of entire service
- Need proper environment – limit interruptions
- Use IPASS mnemonic
- Employ closed loop communication

Written Handoff

- Supplements verbal handoff
- May import elements from EMR
- Keeps information current with updates
- Ongoing assessment
- Plan



Illness Severity

- Stable / Watcher / Unstable

Patient Summary

- Summary statement
- Events leading up to admission
- Hospital course
- Ongoing assessment
- Plan

Action Items

- To-Do List
- Timeline and Ownership

Situation Awareness & Contingency Planning

- Know what's going on
- Plan for what might happen

Synthesis by Receiver

- Receiver summarizes what was heard
- Asks questions
- Restates key action/to do items

Appendix E

I-PASS Workstation Card



- | | | |
|----------|--|--|
| I | Illness Severity | <ul style="list-style-type: none"> • Stable, “watcher,” unstable |
| P | Patient Summary | <ul style="list-style-type: none"> • Summary statement • Events leading up to admission • Hospital course • Ongoing assessment • Plan |
| A | Action List | <ul style="list-style-type: none"> • To do list • Timeline and ownership |
| S | Situation Awareness & Contingency Planning | <ul style="list-style-type: none"> • Know what’s going on • Plan for what might happen |
| S | Synthesis by Receiver | <ul style="list-style-type: none"> • Receiver summarizes what was heard • Asks questions • Restates key action/to do items |

Appendix F

ADDITIONAL I-PASS EDUCATION CARDS

I-PASS Handoff Essentials
Better handoffs. Safer Care

Structured Verbal Handoff

- ✓ Begin with overview of entire service
- ✓ Need proper environment – limit interruptions
- ✓ Use IPASS mnemonic
- ✓ Employ closed loop communication

Printed Handoff Document

- ✓ Supplements verbal handoff
- ✓ May import elements from EMR
- ✓ Keeps information current with updates

High Level Skills

Patient Summary

- ✓ Be concise and focused
- ✓ Establish working diagnosis
- ✓ Include semantic qualifiers
- ✓ Ensure check-back with receiver

Contingency Plans – “If this happens, then...”

- ✓ Problem solve before things go wrong
- ✓ Know potential therapies or interventions
- ✓ Identify most worrisome patients
- ✓ Articulate chain of command

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Essentials of Team Function



Appendix G

I-PASS Copyright Permission

University of Maryland Mail - Form submission from: Material...

https://mail.google.com/mail/u/1/?ik=77f5898d0d&view=pt&se...



Shanna Fortune <sfortune@umaryland.edu>

Form submission from: Materials [EXTERNAL]

1 message

I-PASS Study <I-PASSStudy@childrens.harvard.edu>

Fri, Mar 22, 2019 at 9:28 AM

To: "sfortune@umaryland.edu" <sfortune@umaryland.edu>

Dear Shanna,

Thank you for your interest in the I-PASS handoff program. An account has been created for you. You may now access the I-PASS curricular materials at any time with the following information:

Username: Shanna.fortune

Password: umsn.md.ipass

To access the educational resources, go to <http://www.ipasshandoffstudy.com/user/login> > input your log-in information > navigate through the different components of the curriculum using the column on the lower right titled "Curriculum Menu."

There is no cost to use the I-PASS training and implementation materials; however, as they are copyrighted, we do request that proper original attribution is given for any type of research and throughout implementation. In addition, we would be interested to know if you plan to publish something or conduct research related to IPASS so that we can be aware of your findings. Finally, these materials should not be used for commercial purposes or distribution across large networks without our permission. Please check back with us to discuss any such interest in more detail.

If your goal is to institute this within a clinical setting or to achieve large-scale implementation across a hospital or health system, we offer help through the I-PASS Institute (www.ipassinstitute.com). I-PASS is a multi-faceted intervention that requires a thoughtful implementation to ensure uptake and sustainability. We created the I-PASS Institute to make it easier for healthcare systems to implement I-PASS, with the ultimate goal of a broader impact on patient safety. We have found it is often helpful to draw on the expertise of mentors who have had prior experience with I-PASS implementation (particularly when attempting institution-wide dissemination). The I-PASS Institute is available to offer longitudinal support and training to facilitate large scale implementation. Please let us know if you are interested in learning more about this opportunity by sending an email to info@ipassinstitute.com.

Best regards,

I-PASS Study Group

Appendix H

Perceived Staff Perceptions on Handoff Communication

For each question below, select the response that best characterizes how you feel about the statement, where 1=Strongly Disagree, 2=Disagree, 3=Neither Agree Nor Disagree, 4=Agree, 5=Strongly Agree

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1. I feel that my communication during handoff is always clear.	1	2	3	4	5
2. I think there is room for improvement in handoff communication practices.	1	2	3	4	5
3. Overall, verbal handoff communication seems organized.	1	2	3	4	5
4. I feel that I am a good communicator during the handoff process.	1	2	3	4	5
5. I believe my colleagues communicate well during handoff.	1	2	3	4	5
6. Overall, verbal handoff communication seems disorganized.	1	2	3	4	5
7. Handoff communication is comprehensive and rarely misses important data.	1	2	3	4	5
8. I sometimes do not communicate what I don't understand because I don't want my colleagues to know.	1	2	3	4	5
9. The current handoff tool has improved communication practices.	1	2	3	4	5
10. The current handoff tool has been proven to be successful in improving communication.	1	2	3	4	5

Appendix I

Printed Handoff Document Assessment Observation and Feedback Tool

Date and time tool printed: __/__/__(mm/dd/yy)__:__AM/PM

Service: _____

1. How well do you know the patients on the printed handoff document?

- Very well Somewhat well Not at all

2. Number of patients on printed handoff document: _____

Mnemonic	Description	Never	Rarely	Sometimes	Usually	Always
3. Illness Severity	Identification as stable, “watcher”, or unstable					
4. Patient Summary	Summary statement, events leading up to admission, hospital course, ongoing assessment, plan					
5. Action List	To do list; timeline and ownership					
6. Situation Awareness/ Contingency Planning	Know what’s going on; plan for what might happen					
7. Synthesis by Receiver	Written reminder to prompt receiver to summarize what was heard during verbal handoff					

Indicate how frequently each element of the I-PASS mnemonic is present on the printed handoff document.

8. How often are the following essential elements present and accurate on the printed handoff document:	Never	Rarely	Sometimes	Usually	Always
<ul style="list-style-type: none"> • Name • MRN • Room # • Weight • Age • Service / Team • Allergies • Medication name • Admission date 					

Rate the frequency with which the printed tool had:	Never	Rarely	Sometimes	Usually	Always
9. Patient summary with clearly specified plan for remainder of admission					
10. To-do items with clear if/then format when appropriate					
11. To-do list restricted to items that should be accomplished on next shift					
12. High quality contingency plans documented for items not on to-do list					

13. Rate the length of the printed handoff document:

- Very excessive length Excessive length Appropriate length Abbreviated length Very abbreviated length

Rate the following:	Poor	Fair	Good	Very Good	Excellent
14. Accuracy of Illness Severity Assessments					
15. Quality of Patient Summaries					

Rate the frequency with which the printed tool contained the following:	Never	Rarely	Occasionally	Fairly Often	Very often
16. Omissions of important information					
17. Irrelevant information					

18. Did you observe any erroneous information on the printed tool? Yes No

18a. If yes, how many times _____

19. What was especially effective about the printed tool?	20. What aspect(s) of the printed tool could be improved?	21. Additional comments:

21. Was nurse given feedback within 24 hours of observation? Yes No

Appendix J

Verbal Handoff Assessment: Observation and Feedback Tool for Giver

Name: _____ Date: __/__/__ (mm/dd/yy) Obs. Start Time: __: __ am/pm Obs. End Time: __: __ am/pm

Observer Information:

How well do you know the patients whose handoff you are evaluating? Very well Somewhat well Not at all

Nurse Information:

Name: _____ Total number of patients discussed during the handoff : _____

Type of Handoff

1. Please indicate the type of handoff you observed: Individual Team

Situational Overview (Big Picture)

2. Was a situational overview provided by the resident giving the handoff (e.g. description of the “big picture” of what will need to be prioritized by the receivers of the handoff): Yes No

Indicate the frequency that the specific element of the mnemonic was used throughout the handoff.

Verbal Mnemonic	Description	Never	Rarely	Sometimes	Usually	Always
3. Illness Severity	Identification as stable, “watcher”, or unstable					
4. Patient Summary	Summary statement, events leading up to admission, hospital course, ongoing assessment, plan					
5. Action List	To do list; timeline and ownership					
6. Situation Awareness/Contingency Planning	Know what’s going on; plan for what might happen					
7. Synthesis by Receiver	Ensures receiver summarizes what was heard, asks questions, restates key action/to do items					

Rate the frequency with which the nurse who gave the handoff did the following:	Never	Rarely	Sometimes	Usually	Always
8. Actively engages receiver to ensure shared understanding of patients (Encouraged questions, asked questions, considers learning style of receiver)					
9. Appropriately prioritizes key information, concerns, or actions					

Rate the frequency with which the nurse who gave the handoff did the following:	Never	Rarely	Occasionally	Fairly Often	Very Often
10. Miscommunications or transfer of erroneous information					
11. Omissions of important information					
12. Tangential or unrelated conversation					

13. Rate your overall impression of the pace of the handoff:

Very slow pace/ Slow pace/ Optimally paced/ Fast/pressured pace Very fast/pressured pace
 Very inefficient Inefficient Efficient but not rushed

14. What was especially effective about the handoff?	15. What aspect(s) of the handoff could be improved?	16. Additional comments:

17. Was the nurse given feedback within 24 hours of your observation? Yes No

Appendix K

Verbal Handoff Assessment: Observation and Feedback for Receiver

Observer Information:

Name: _____ Date: __/__/__ (mm/dd/yy) Obs. Start Time: __: __ am/pm Obs. End Time: __: __ am/ pm

How well do you know the patients whose handoff you are evaluating? Very well Somewhat well Not at all
Nurse Information:

Name: _____ Nurse Level: _____ Total number of patients discussed during the handoff _____

Type of Handoff

1. Please indicate the type of handoff you observed (check one): Individual Team

How frequently did the resident receiving the handoff do the following:	Never	Rarely	Sometimes	Usually	Always
2. Verbalize a concise, accurate summary of each patient					
3. Appear focused, engaged, and demonstrate active listening skills.					

4. Rate your impression of the number of clarifying questions asked by the receiver:

Insufficient number of questions Appropriate number of questions Excessive number of questions

5. What was especially effective about the handoff?	6. What aspect(s) of the handoff could be improved?	7. Additional comments:

8. Was the nurse given feedback within 24 hours of observing sign-out? Yes No