A Quality Improvement Project on the Use of the I-PASS System in Written Physician Hand-Off Documents and Reduction in Unexpected Events

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Background

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) began restricting resident work hours. The reduction in duty hours may have decreased resident fatigue, but the downfall has been an increase in patient handoffs and decrease in continuity of care of patients. One study has suggested that patients may be seen by up to three physicians during first 24 hours of a hospital admission. Each handoff represents a susceptible point in the exchange of data, responsibility, and understanding among physicians. An increase in physician handoffs lead to an increase in opportunities for communication failure. In fact, communication failures are the most common root cause of sentinel events contributing to up to two out of every three events with over half involving patient handoff. The Joint Commission has come to recognize the challenges and dangers of patient handoffs. In 2006, as part of it’s National Patient Safety Goals, the Joint Commission requires that physician handoffs be “reasonably standardized in order that sufficient patient-specific information is consistently communicated to facilitate continuity of care and patient safety.” Furthermore, the ACGME requires training programs to provide formal instruction in handoffs and monitor handoff quality. Unfortunately, little research has been done to identify best practices.

The I-PASS pneumonic was developed by Boston Children’s Hospital and serves as a framework for oral and written patient handoff. The pneumonic is used as follows: I: illness severity, P: patient summary, A: action list, S: situation awareness and contingency planning, S: synthesis by receiver. One particular study conducted by Boston Children’s Hospital was a prospective intervention study of resident hand-off in nine academic hospitals. The intervention included the implementation of I-PASS Handoff Bundle which included a workshop on teamwork and communication skills including I-PASS handoff techniques, role-playing and simulation session, direct observation tools, and a process-change, culture-change campaign. In the study, 10,740 admissions were reviewed. A 23% relative reduction in rate of all medical errors and a 30% relative reduction in the rate of preventable adverse events was observed following the intervention. The reduction in errors was observed without an increase in the time required to complete handoffs.

At Palmetto Health Children’s Hospital the written hand-off tool currently used by Pediatric residents is a word processing document that is not connected to the EMR and requires clinician entry of all data. A systematic verbal handoff method is not used across the Pediatric residency. Evening hand-off occurs at 6:15p and involves all members of the inpatient team including interns and senior residents. Typical make-up of inpatient team includes 4-5 senior pediatric residents (PGY 2 or 3), 4-5 pediatric
interns, and 2-3 off service rotators from Family Medicine (PGY 1 or 2) or Emergency Medicine (PGY 1). The written document includes important patient demographics, problems, medications, and a “To-Do” column (Figure 1a). Currently, there is not a standardized verbal handoff method. With the present handoff process, the written document serves as an aid to the verbal presentation. Ultimately, this means that more information is transferred verbally than written. The aim of the study is to decrease the number of resident reported unexpected events that occur overnight on the General Pediatric Ward at Palmetto Health Children’s Hospital by 20% during a 4 week period by implementing an I-PASS based written handoff document.

Methods

The study took place at Palmetto Health Children’s Hospital in Columbia, South Carolina. Participants included all residents on the In-Patient Service rotation during a two month period. Residents included pediatric residents of all PGY years and off-service rotators from Family Medicine and Emergency Medicine residency programs. The first component of the intervention was a PowerPoint based presentation on the I-PASS system including the use of the system and examples of physician hand-offs using the system. The presentation was taken from curriculum provided by Boston Children’s Hospital. The presentation was given at a Pediatric noon conference approximately 2 weeks prior to the beginning of data collection. Unfortunately, off-service rotators were not present at this conference. Following the presentation, the written handoff document using the I-PASS system was reviewed. Changes between the original document (Figure 1a) and the new document (Figure 1b) were highlighted. Primary changes were the addition of illness severity and expanding on the problem list to include patient summary. The patient summary portion is meant to include more details on the pre-hospital course and hospital course thus far. Examples of use of the I-PASS document were provided. The overall process of the project was reviewed including important aspects of Resident participation.

Figure 1a: Original written physician hand-off document
In both the pre and post-intervention months, information was collected via anonymous survey regarding the quality of evening check-out and unexpected events. An “unexpected event” was defined as any event that occurred that the Night Team felt should have been anticipated by the primary care team and a contingency plan given. Surveys were completed by members of the night team, which included a pediatric night float PGY-1 resident, pediatric PGY-3 night float resident, and supervising pediatric resident (either PGY-2 or PGY-3) from the primary care team. The survey specifically asked about the quality of patient hand off using a Likert scale and the absence or presence of unexpected events. An example of the survey is seen in Figure 2. If an unexpected event occurred, additional information was obtained. Surveys were collected from January 13-February 7, 2015 (pre-intervention) and February 8 – March 8, 2015 (post-intervention). As a balancing measure, the duration of evening check-out was recorded.
Figure 2: Post Call Survey

Post-Call Survey

Date: PGY 1 2 3

Please answer the following questions based on your most recent call night. All individual results will remain strictly confidential and will be anonymous.

1. How would you rate your most recent call night? Please circle the correlating number.
   1 Slow 2 Medium 3 4 5 Busy

   How many patients were you responsible for caring for when you started call? ____
   How many patients did you transfer to the PICU while on call? ____

2. Did anything happen while you were on call that you were not adequately prepared for after sign-out? NO____ YES____
   If you answered YES to question 2, please pick the most important/recent incident that happened during your call night to answer questions 3-6, otherwise skip to question 9.

3. Was there information that would have been useful that you DID NOT receive during sign-out?
   NO_____ If you answered NO, please skip to question 7.
   YES____ If you answered YES, please continue with question 4.

4. Where did you go to get that information that you did not receive during sign-out? (Check all that apply)
   ______ resident progress note
   ______ consultant note
   ______ Call Attending/Consultant
   ______ Ask patient/patient’s family
   ______ Other (please specify)

5. Should this situation have been anticipated and discussed during sign-out? NO_____ YES____

6. Had you previously cared for this patient (either during a previous call night or a previous day shift)? NO_____ YES____

7. Overall, how would you rate the sign-out you received at the beginning of your call night?
   1 Inadequate to answer call questions 2 3 4 5 Adequate to answer call questions

8. Other suggestions for improvement of patient hand-off

Results

A total of 31 surveys were collected from the pre-intervention time period reflecting 16 different physician hand-offs. In the post-intervention period, 14 surveys were collected which represented 14 different physician hand-offs. Prior to the intervention, average rating of check-out was 4 using a 5 point Likert scale. This was unchanged following the intervention. Of the 31 surveys collected pre-intervention, 54% had an unexpected event documented, which is 17 unexpected events. All 17 events were thought to be avoidable with proper checkout. Information collected from surveys
is depicted in Figure 3 and Table 1. Post-intervention, 14 surveys were collected with 10 unexpected events recorded, which is about 43% of returned surveys with an unexpected event documented. Again, all 10 events were thought to be avoidable with adequate physician hand-off. In pre-intervention collection period, information that was not received during hand-off was most frequently obtained from consultant notes as shown in Figure 4a. Post-intervention, information was most frequently obtained from resident progress notes as seen in Figure 4b. The average duration of check-out was 18 minutes pre-intervention compared to 24 minutes post-intervention.

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Days</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Number of surveys returned</td>
<td>31</td>
<td>14</td>
</tr>
<tr>
<td>Average check out rating</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Average duration (min)</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Total number of unexpected events</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Events avoided by proper checkout</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td># of interns (PGY-1) completing survey</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td># of seniors (PGY-2 or 3) completing survey</td>
<td>17</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 1: Survey Data

Figure 3: Survey Data
Figure 4a

Location of Information Obtained Not Provided at Check-Out: Pre-Intervention

- Progress Note: 31%
- Consult Note: 26%
- Call Attending: 4%
- Ask family: 0%

Figure 4b

Location of Information Obtained Not Provided at Check-Out: Post Intervention

- Progress Note: 50%
- Consult Note: 40%
- Call Attending: 0%
Discussion

Numerous studies have shown that failure of communication is a leading cause of patient harm in the hospital setting. Boston Children’s Hospital has done a significant amount of work in developing the I-PASS system as standardized format for written and verbal patient handoffs. The goal of this project was to decrease the number of resident reported unexpected events over a four week period by 20%. As displayed in Figure 3, pre-intervention, 17 unexpected events occurred. Following the introduction of a new written check-out sheet that utilized the I-PASS system, 10 unexpected events occurred. This is a decrease of 41.2%. While this does fulfill the aim of this study, there are several limitations to the interpretation of this data.

First, data was collected from surveys. During the pre-intervention period, a total of 31 surveys were returned which reflected on the events of 16 separate nights. Post-intervention, only 14 surveys were collected which reflected 14 separate nights. Because multiple surveys reflected on events of the same night, it is possible that the same events were recorded twice. In the post-intervention group, multiple surveys of the same night were not obtained. Furthermore, the use of surveys can be unreliable as well.

An “unexpected event” was any event that occurred that the Night Team felt should have been anticipated and a contingency plan should have been provided by the primary team. This definition leaves room for interpretation by individual residents. A resident’s definition of an unexpected event may vary based on experience and level of training. A senior level resident may feel more comfortable handling situations using own medical decision making An intern, on the other hand, may require a pre-defined plan to handle situations. In the pre-intervention period, 8 events were reported by Interns. In the post-intervention period, no surveys were completed by interns. Therefore, no reported events by interns.

Data collection occurred during a two month period which represented two rotation blocks. Unfortunately, different residents were involved in the pre and post-intervention data collection. Also, the I-PASS lecture was given for all Pediatric residents. Off-service rotators from Family Medicine and Emergency Medicine are also involved in check-out and did not receive any training on the I-PASS system. In fact, it was noted on pre-intervention surveys that off-service rotators consistently provided check-out that was felt to be inferior to Pediatric counterparts.

Additional data was also collected through the surveys. Another key piece of data that is important to discuss is from where omitted information was obtained. Pre-intervention, over 50% of the time, information was obtained from physician documentation (progress note or consultant notes). During this time, information was obtained from patient’s family 22% of the time. Following the intervention, information was obtained from patient’s family 40% of the time. Again, it was obtained from physician documentation 50% of the time. While it always important to involve families
in the care of patient, it is alarming that families were asked regarding information that should have been given during physician hand-offs 40% of the time. This could potentially cause families to question the competency of the medical team and the quality of the care provided due to repeated issues in communication among team members.

The balancing measure of this study was duration of check-out. The average length of check-out did increase from 18 minutes to 24 minutes. There are many factors that could account for increase in duration. It is recognized in this study that training on the use of the I-PASS system was limited and leaves room for improvement. More extensive training including an integrated lecture series with role playing and modeling of physician hand-offs would be beneficial. Because this was an introduction of an unfamiliar system, it is necessary to monitor this further before drawing conclusions about possible prolonged duration due to I-PASS method.

While the written document form changed, it still requires Residents to re-enter information from the medical record, which leaves room for errors. Perhaps a future improvement is to begin the use of an electronic hand-off, which would link with the electronic medical record. The EMR at Palmetto Health Richland now has a physician hand-off feature, which does use the I-PASS system. Unfortunately, it was not feasible to use the paper document of this EMR generated hand-off due to the length of the document. The Word-based document used in this project is actually quite similar to individual EMR generated hand-offs available through Cerner. Changing to an electronic hand-off system would require all residents to have a tablet or IPad, which is a large financial burden on residency programs.

The specific goal of this study was to decrease the number of unexpected events by transitioning to an I-PASS written document, thus requiring a corresponding verbal handoff. The broader goal was to improve physician hand-offs. Unfortunately, transitioning to this system requires extensive education, but perhaps more importantly cultural change. A curriculum or lecture series on physician hand-offs does not currently exist within the residency program. Furthermore, physician hand-offs are resident run processes with little to no attending involvement. In the future, it may be helpful to encourage attending involvement so that residents can receive feedback to further improve verbal handoffs.

Conclusion

While the aim of this study was accomplished as evidenced by a 41.2% reduction in the number of unexpected events, the interpretation is limited largely due to insufficient data. For full implementation of the I-PASS system, additional education is needed.
Resources