Multidisciplinary Handoffs Improve Perceptions of Communication

abstract

BACKGROUND: Communication errors during handoffs are a leading cause of sentinel events. The Accreditation Council for Graduate Medical Education 2011 duty hour standards (DHS) increase the frequency of handoffs.

OBJECTIVE: The goal of this study was to determine if a multidisciplinary group handoff bundle improves communication while working within the 2011 DHS.

METHODS: During 1-month pilot programs of the 2011 DHS, 2 groups were observed. Group A adopted a multidisciplinary group handoff bundle, including presence of residents and charge nurses, a standardized mnemonic in verbal and written form, and resident training. Group B received only a mnemonic pocket card. Residents completed preintervention and postintervention Likert scale surveys to assess handoff perceptions. Within-group preintervention to postintervention changes were analyzed by using the signed rank test. Measuring communication errors, an institutional tool was used to track unanticipated patient occurrences (UPOs) postintervention for both groups.

RESULTS: Significant improvements for the preintervention to postintervention surveys regarding the perceptions of quality of handoffs received, effective and efficient delivery of handoffs, comfort in giving handoffs, and handoff practices focusing on safety (all, \( P \leq .05 \)) were observed in group A. There were no significant changes in group B. Overall, 17% of collected group A UPO forms and 11% of group B UPO forms had at least 1 UPO recorded. The most common reason for a UPO was unaddressed nursing concerns.

CONCLUSIONS: A multidisciplinary group of residents and charge nurses and a handoff bundle was associated with improved resident perceptions of handoffs and communication within the 2011 DHS.

Handoffs are transitions in patient care that occur between members of a patient’s care team. Two systematic reviews of the handoff literature reinforced that little has been done to demonstrate handoff best practices, there is great diversity in handoff characteristics, and there is a scarcity of evidence to support any one particular practice.\(^1,2\) The Joint Commission’s report on quality and safety recognizes the variability in practice and calls health care providers to “implement a standardized approach to ‘handoff’ communications including an opportunity to ask and respond to questions.”\(^3\)

In July 2011, the Accreditation Council for Graduate Medical Education (ACGME) mandated changes in duty hour standards (DHS) restricting the number of sequential hours residents can work,\(^4\) resulting in concerns that transitions of patient care and patient safety may suffer.\(^5-7\) With these new DHS and ever-increasing turnover

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KEY WORDS
communication, duty hour standards, handoff, multidisciplinary, pediatric

ABBREVIATIONS
ACGME: Accreditation Council for Graduate Medical Education
CCHMC: Cincinnati Children’s Hospital Medical Center
EMR: electronic medical record
UPO: unanticipated patient occurrence
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of residents, the frequency of handoffs and variability within them has been a focus of attention.5,7,8 Because of the aforementioned concerns, there has been substantial interest in evaluating the effects of handoffs on patient safety and adverse events.9,10 Only 1 recent study demonstrated a significant decline in medical errors and adverse events postimplementation of a resident handoff bundle, which included a handoff mnemonic, computerized tool, and communication training.11 Other studies have addressed communication concerns by emphasizing communication training for staff,12 but they were unable to show an effect on patient safety. There is no evidence in the literature evaluating the implementation of a multidisciplinary handoff among residents and nurses, let alone in the context of the new 2011 resident DHS.

Given the significance of communication errors, the lack of standardization of handoffs across institutions, and the ACGME mandate to provide training in teamwork, communication, and transitions of care,4 we developed a multidisciplinary group handoff bundle at our institution while working within the new 2011 DHS. We hypothesized that implementation of a multidisciplinary handoff between residents and nurses, in combination with a standardized handoff mnemonic, would improve communication surrounding handoffs in the setting of the 2011 DHS.

METHODS
This study was a nonrandomized preintervention to postintervention trial of 2 handoff processes in the setting of the 2011 DHS. It was approved by the institutional review board of Cincinnati Children’s Hospital Medical Center (CCHMC).

Setting
CCHMC is a free-standing, academic children’s hospital with a large pediatric residency training program with >180 residents among categorical and combined programs. General pediatric patients are typically admitted to 1 of 2 inpatient units, each of which is staffed by 1 charge nurse.

Study Participants
This study occurred during 2 separate month-long pilot programs of the 2011 DHS, before the mandated implementation in July 2011. The first pilot took place in January 2011 on 4 general pediatric inpatient teams (group A) and the second in April 2011 on 2 subspecialty inpatient teams (group B). Group A participants included pediatric and medicine-pediatric residents as well as family medicine residents rotating from outside institutions. Only pediatric and medicine-pediatric residents participated in group B. These 2 months were chosen for the study based on adequate resident staffing numbers allowing for compliance with the 2011 DHS. Residents were reassigned to rotate in either month in July 2010. Consent forms were distributed to all residents in both group A (23 residents) and group B (11 residents). Consent was implied with completion of data collection forms.

Intervention: A Multidisciplinary Group Handoff Bundle
A multidisciplinary group handoff bundle was implemented for group A requiring that interns, senior residents, and charge nurses be present at the 8:00 PM handoff every evening. Interns were instructed to lead the handoff as they normally would. Senior residents were instructed to supervise and provide oversight as needed. Charge nurses from the team’s primary unit were given the responsibility of providing updates in patient status and inquiring about discharge and contingency planning when otherwise not shared.

Another component of the handoff bundle was a standardized mnemonic, known as “SAFETIPS,” which was used during verbal and written handoffs (Fig 1).13 Residents in group A received pocket cards illustrating the mnemonic and a training session on how to use the mnemonic. This brief 30-minute resident training session focused on use of a standardized mnemonic in both verbal and written format and changes to the overall handoff process during the study period. Study investigators collaborated with members of the Information Technology Department at CCHMC to change the electronic medical record (EMR) handoff document to reflect the SAFETIPS mnemonic.

In contrast, group B did not use the multidisciplinary group handoff bundle, and charge nurses did not attend the evening handoffs in group B. Senior residents were given

<table>
<thead>
<tr>
<th>S</th>
<th>Stats</th>
<th>Name, MRN, DOB, age, allergies, room no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Assessment</td>
<td>“One liner”: diagnosis and focused differential</td>
</tr>
<tr>
<td>F</td>
<td>Focused Plan</td>
<td>Issues on current problem list</td>
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<tr>
<td>E</td>
<td>Exam</td>
<td>Pertinent baseline examination</td>
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<td>T</td>
<td>To Do</td>
<td>Prioritized tasks</td>
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<tr>
<td>I</td>
<td>If/Then</td>
<td>Eg: “If patient spikes a fever then...”</td>
</tr>
<tr>
<td>P</td>
<td>Pointers</td>
<td>Eg: “DNR, NPO, visitor restrictions”</td>
</tr>
<tr>
<td>S</td>
<td>Sick-o-meter</td>
<td>Watcher vs nonwatcher</td>
</tr>
</tbody>
</table>

FIGURE 1 Adapted SAFETIPS mnemonic card. DOB, date of birth; DNR, do not resuscitate; MRN, medical record number; NPO, nothing by mouth.
the option of attending the intern-to-intern handoff, but it was not required. Participants were given SAFETIPS pocket cards without training. In addition, the written handoff document remained housed in a Microsoft Word document, separate from the hospital EMR and subject to variability. Table 1 illustrates the study design and handoff structures of each group.

Data Collection Tools and Procedures

The 2 groups were each followed up for a 1-month period. Residents completed preintervention to post-intervention surveys to assess their perceptions of handoff processes. The surveys were developed de novo by the study team and reviewed by experts in research and education from the Division of Hospital Medicine and the residency program. The surveys used a 5-point Likert scale (1 = very poor, 5 = very good) to assess resident perceptions of the new 2011 DHS in terms of the quality of handoffs received, effective and efficient delivery of handoffs, comfort in giving a handoff, and handoff practices focusing on safety. The survey was distributed via e-mail with a hyperlink to an electronic survey platform.14

To measure success of handoffs and quantify lapses in communication, we used an unanticipated patient occurrence (UPO) tracking tool. The UPO tracking tool (Fig 2) was developed during another safety initiative at our institution as a way to track communication errors in the handoff process that represent potential triggers for adverse events or as a precursor to safety events; however, it has not been formally validated. This form was filled

| TABLE 1 Characteristics of the Study Groups and Handoff Structure |
|---------------------------|---------------------------|
| **Characteristic**       | **Group A**               | **Group B**               |
| Study period             | January 2011              | April 2011                |
| No. of teams             | 4                         | 2                         |
| Team composition         | General pediatric inpatient | Cardiology and pulmonology inpatient |
| No. of residents         | 23                        | 11                        |
| Resident work hours design | 2011 ACGME DHS               | 2011 ACGME DHS               |
| Handoff group structure  |                           |                           |
| Charge nurse at handoff  | Yes                       | No                        |
| Senior resident at handoff | Yes                     | Rarely (not required)    |
| Handoff mnemonic         |                           |                           |
| Pocket cards             | Yes                       | Yes                       |
| Posted on workstations   | Yes                       | No                        |
| Documentation            | Embedded in EMR           | Stand-alone electronic Microsoft Word document |
| Training                 | Yes                       | No                        |

* Compliant with ACGME standards: interns restricted to work ≤16 hours, seniors to 24 hours + 4 hours of care transitions; 80-hour workweek.

FIGURE 2 UPO tracking form. IVF, intravenous fluids; MRT, medical response team; PEWS, pediatric early warning score.
out by residents after completion of an overnight shift as a means of reporting errors in communication that affected patient care during their shift. The overnight residents recorded UPOs that they identified in ≥1 patient. The tool was collected the following morning by a research assistant.

Statistical Analyses
Resident preintervention to postintervention survey responses within the same group were analyzed by using the signed rank test. The number and proportion of UPO forms for each question with at least 1 reported UPO event were presented according to group. Given the inherent differences between groups A and B, analysis occurred within each group, and results were not directly compared between groups.

RESULTS
Preintervention and postintervention surveys were completed by 19 (83%) of the 23 residents in group A and by 7 (64%) of the 11 residents in group B. The mean ± SD daily combined census among all 4 teams during the study month for group A was 33.7 ± 7.8 patients per day; among the 2 teams during the study month for group B, it was 39.6 ± 8.0 patients per day. Preintervention to postintervention survey changes were observed in group A, with significant improvements in perceptions of the quality of handoffs received, effective and efficient delivery of handoffs, comfort in giving a handoff, and of handoff practices focusing on safety (all, \( P < .05 \), resulting in a median paired difference (post minus pre) of 1 for all 4 questions. In group B, there were no significant preintervention to postintervention changes in responses, resulting in a median paired difference of 0 for all 4 questions (Table 2).

For group A, there were 10 (17%) of 60 total forms with at least 1 recorded UPO. Of the 10 UPO forms, 1 had 7 UPOs, 4 had 2 UPOs, and 5 had 1 UPO, for a total of 20 UPOs for group A. The most common reason for a UPO was nursing concerns not conveyed, followed by unexpected code/medical response team activation, incorrectly ordered medication/intravenous fluids, inadequately conveyed parent concerns, and unanticipated transfer to the PICU (descending order). In group B, 3 (11%) of 28 total forms had at least 1 UPO recorded. Two forms had 1 UPO, and 1 form had 3 UPOs, for a total of 5 UPOs for group B. Nursing concerns not conveyed during handoff were again the most common reason for a UPO, followed by lack of notification of abnormal vital signs/examination findings and inadequately conveyed parent concerns (descending order).

<table>
<thead>
<tr>
<th>Question</th>
<th>Group A (n = 19)</th>
<th>Group B (n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of handoffs received</td>
<td>3 (3, 4)</td>
<td>4 (3, 5)</td>
</tr>
<tr>
<td>Effective and efficient delivery of handoffs</td>
<td>4 (3, 4)</td>
<td>4 (4, 4)</td>
</tr>
<tr>
<td>Comfort giving a handoff</td>
<td>3 (3, 5)</td>
<td>4 (4, 5)</td>
</tr>
<tr>
<td>Handoff practices focus on safety</td>
<td>3 (3, 4)</td>
<td>4 (3, 4)</td>
</tr>
</tbody>
</table>

Data are presented as median (25th, 75th percentile) for Likert scale scores ranging from 1 = very poor to 5 = very good. *Signed rank test \( P < .05 \) for paired preintervention to postintervention differences.
the many differences between groups A and B and that this information was only collected postintervention; however, the common reasons for communication errors based on the UPO form are apparent and potentially influential for targeting of future interventions.

We acknowledge several limitations to our study. The study was conducted over short periods of time at 1 institution, making the generalizability of our results uncertain. In addition, the UPO tool has not been validated, making the results difficult to generalize and, as a self-report tool, minor UPOs may have been overlooked. Our sample size of residents was small. There are also inherent differences between the 2 groups, especially in terms of patient complexity, length of stay, and acuity, making direct comparisons between the 2 groups challenging. By sharing the mnemonic with group B, we also cannot strictly divide and compare the groups as having all or none of the bundle but rather by having all or some of the bundle. An additional limitation is that the study subjects and investigators were not blinded; therefore, there is a potential for response bias for both survey and UPO outcomes.

CONCLUSIONS

The 2011 ACGME DHS have garnered a great deal of attention because of the direct effect of increasing the number of handoffs in care between residents. Results from previous studies on resident handoffs and communication lend insight into the complex nature of this topic and have demonstrated varying success. However, most of these studies focused on the use of discrete interventions such as a standardized handoff sheet or use of a mnemonic, whereas none has involved the implementation of a multidisciplinary group handoff bundle. Our study demonstrated statistically significant improvements in resident perceptions of handoffs and communication with the implementation of a multidisciplinary group handoff bundle in the setting of the 2011 DHS. These findings suggest that the inclusion of nursing staff and presence of a multidisciplinary care team at the time of handoff in conjunction with a standardized handoff mnemonic, resident training, and embedding the written handoff document into the EMR can improve communication and overall satisfaction of care team members. We were unable to directly compare groups A and B due to inherent differences in patient and team composition and could not draw conclusions about the impact on patient safety through measurement of UPOs. Additional prospective studies are necessary to further evaluate the feasibility of long-term sustainment of these interventions and to elucidate the effects these interventions have on patient safety and medical errors.

REFERENCES