

# Standardizing and Evaluating Transitions of Care in the Era of Duty Hour Reform: One Institution's Resident-Led Effort

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## Abstract

**Background** Compliance with the Accreditation Council for Graduate Medical Education duty hour standards may necessitate more frequent transitions of patient responsibility.

**Intervention** We created a multidisciplinary Patient Safety and Quality Council with a Task Force on Handoffs (TFH), engaging residents at a large, university-based institution.

**Methods** The TFH identified core content of effective handoffs and patterned institutional content on the SIGNOUTT mnemonic. A web-based module highlighting core content was developed for institutional orientation of all trainees beginning summer 2011 to standardize handoff education. The TFH distributed handoff material and catalogued additional program initiatives in teaching and evaluating handoffs. A standard handoff evaluation tool, assessing content, culture, and communication, was developed and "preloaded" into the institution-wide electronic evaluation system to

standardize evaluation. The TFH developed questions pertaining to handoffs for an annual institutional survey in 2011 and 2012. Acceptability of efforts was measured by program participation, and feasibility was measured by estimating time and financial costs.

**Results** Programs found the TFH's efforts to improve handoffs acceptable; to date, 13 program-specific teaching initiatives have been implemented, and the evaluation tool is being used by 5 programs. Time requirements for TFH participants average 2 to 3 h/mo, and financial costs are minimal. More residents reported having education on handoffs (58% [388 of 668] versus 42% [263 of 625],  $P < .001$ ) and receiving adequate signouts (69% [469 of 680] versus 61% [384 of 625],  $P = .004$ ) in the 2012 survey, compared with 2011.

**Conclusions** Use of a multispecialty resident leadership group to address content, education, and evaluation of handoffs was feasible and acceptable to most programs at a large, university-based institution.

*Editor's Note: The online version of this article contains the handoff evaluation tool developed in this study as used by the Department of Medicine (paper version) and as adapted by the Department of Pediatrics (web version;*

*Page 1 of 2); and 4 handoff-related questions that were incorporated into the Duke Graduate Medical Education Designated Institutional Official Housestaff Survey.*

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## Introduction

In July 2011, changes to the Accreditation Council for Graduate Medical Education (ACGME) Common Program Requirements, which included new duty hour standards, resulted in more handoffs at many institutions. Increased handoff frequency can increase errors if information is inaccurate or fails to predict likely patient events.<sup>1-5</sup> As a result, transitions of care are increasingly the focus of studies on patient safety and quality initiatives.<sup>4,6,7</sup>

In the past, handoffs education was rarely standardized.<sup>8-10</sup> Studies have shown that a single session on handoffs, emphasizing content, improves self-perception of handoff quality.<sup>8,11</sup> In another study, improvements lasted 2 months after educational sessions.<sup>12</sup> The optimal timing or strategy for such education is unknown; however, coordinating sessions across an institution may be difficult.

Similarly, the best process for evaluating handoffs remains unclear, although studies reported improved quality perception with attending supervision.<sup>13,14</sup> As institutions strive to meet ACGME requirements, institutional examples may provide insight on improving handoff quality. The purpose of our project was to determine whether a multispecialty, resident-led task force could drive standardization of handoff content, improve education on handoffs, and develop evaluation tools acceptable to most individual training programs.

## Methods

### Setting and Participants

Duke University Hospital (DUH; Durham, NC) sponsors 79 ACGME programs and 60 internal programs that involve approximately 1000 residents. In 2010, a multispecialty group of DUH residents organized an institutional Graduate Medical Education (GME) Patient Safety and Quality Council, incorporated under the institution's GME Committee for Peer Review Protection. The group meets monthly and has faculty participation (Health System Patient Safety Officer, Chief Medical Officer, and Associate Director of GME). Early on, the Council emphasized handoffs as a major focus, creating a Task Force on Handoffs (TFH), composed of residents from 13 DUH departments, to facilitate meeting ACGME requirements and improving handoff quality, as described previously.<sup>15</sup>

### Interventions

**Standardizing Handoff Content** The TFH convened during academic year 2010–2011 in preparation for July 2011, when new requirements took effect. The TFH's first goal was to standardize handoff content throughout DUH, as suggested by multiple authors and organizations.<sup>9,11,16,17</sup> To standardize handoff content, the TFH identified a review of published mnemonics.<sup>18</sup> After considering multiple mnemonics and principles recommended by the Society for Hospital Medicine, the TFH agreed on a set of content based on the SIGNOUTT mnemonic (Sick/not sick, Identifying information, General hospital course, New events of the day, Overall trajectory, Upcoming events, Tasks for overnight, Time for questions) because that mnemonic provided a baseline for inpatient services and flexibility for implementation across departments.<sup>8,17</sup>

The TFH emphasized the following critical content in an effective handoff: (1) patient demographics; (2) concise medical history and current problems/issues; (3) pending laboratory results, radiography results, and other results; (4) anticipatory guidance; (5) plan or to-do list; and (6) time for questions. Handoffs were encouraged to be performed face to face to create protected environments.<sup>10</sup>

### What was known

Compliance with the Accreditation Council for Graduate Medical Education's duty hour standards may necessitate more frequent transitions of patient responsibility.

### What is new

A multidisciplinary Patient Safety and Quality Council with a Task Force on Handoffs, engaging residents at a large, university-based institution.

### Limitations

The tool to evaluate resident handoffs was not validated; self-reporting bias may overestimate quality of handoffs.

### Bottom line

Use of a multispecialty resident leadership group to address content, education, and evaluation of handoffs was feasible and acceptable to most programs at a large, university-based institution.

Departments could add content, such as requiring a code status in medicine or the Foley catheter status in urology. Additionally, programs maintained unique, electronic handoff lists with that information available to oncoming providers.

**Identifying Unique Handoffs** Many programs identified “primary” transitions of care. Programs with ward teams focused on inpatient care, whereas those without inpatients identified transitions in care relevant to their practice of medicine.

**Resident Education** The TFH identified resident education on handoffs as integral for patient safety. A 22-slide, 20-minute, online module on handoffs was created by the TFH as a required component of Duke's annual Housestaff Orientation. In the module, a video created by Arora et al<sup>19</sup> illustrates the pitfalls of poor handoffs. Thereafter, narrated slides identify Duke's standardized handoffs content and the need for defined times and locations for handoffs. Two questions on core content were included in the orientation questions, which all incoming residents must answer with 100% accuracy. The module was revised in 2012 to illustrate evaluation tools and amended in 2013 to show patient lists. The module is available to programs for use in additional educational sessions or for retesting resident knowledge.

To spread awareness, a TFH member made a presentation during a semiannual workshop for program directors, and a video of that presentation was uploaded to the GME office's educational website. The TFH initiated additional program-specific education on handoffs in conversations with program representatives. Many departments identified specialty-specific challenges, leading to the creation of educational sessions that were often timed to coincide with the orientation of new residents.

Additionally, many programs wished to provide information regarding handoffs (eg, core content) within printed resident resource materials.

**Development of an Evaluation Tool** Residents in the Department of Medicine developed a third-party, “observer” evaluation tool for shift handoffs (provided as online supplemental material) as a quality improvement project. That tool was based on standardized content and contained features important to medicine services (Do Not Attempt Resuscitation status, for example) based on a 4-point competency scale. Components evaluated by the tool included core content, the process of the verbal transition, and the culture or setting of the handoff. An observer of the handoff completed the evaluation tool, which was entered into the institutional electronic evaluation system for facile tracking and electronic documentation. The tool was piloted in the internal medicine services in 2010 and was informally noted by residents to allow constructive feedback. The TFH adapted that evaluation tool and “preloaded” it into the DUH online evaluation system (provided as online supplemental material), so all programs could use or amend the inherent questions for their needs. Attending physicians, program directors, chief residents, and senior residents have used this tool to evaluate interns and junior residents and to provide directed feedback. Those evaluations are typically uploaded into a resident’s file for future review and for documentation to meet ACGME requirements. Some programs, such as pediatrics, added or omitted questions within the online evaluation system (provided as online supplemental material).

**Institutional Evaluation** The winter survey of the DUH GME designated institutional official was amended in 2011 and 2012 to include 4 questions about handoffs (provided as online supplemental material). Those questions were developed by the TFH and were not piloted or validated before inclusion in the institutional survey.

### Outcomes

Outcomes of this work included (1) the acceptability of the TFH efforts at the individual and program levels; (2) the feasibility, as measured in time and financial costs; and (3) the results from an institutional survey. For acceptability, the numbers of incoming trainees who successfully completed the orientation’s education module and who answered questions within the institutional survey were compiled. The number of programs providing additional handoff education or using the evaluation tool was measured as well.

To document feasibility, resident and faculty time for participation in the TFH and the associated information technology and GME staff time for module development or dissemination were estimated. Further time estimates were

made for program educational sessions. Costs for participation and tools were also estimated.

The results of the questions about handoffs on an annual institutional survey were calculated for 2011 and 2012 to measure resident awareness of educational efforts, to determine self-reported prevalence of receiving poor handoffs, and to rate personal confidence in providing adequate handoffs.

The questions for the institutional survey were reviewed and exempted by the Duke University School of Medicine Institutional Review Board.

### Analysis

The data from the annual institutional survey were analyzed using  $\chi^2$  statistics in Stata version 9.2 (StataCorp LP, College Station, TX). All postshift survey results were calculated as simple proportions.

## Results

### Acceptability

All incoming DUH residents, beginning in July 2011 ( $n = 310$ ) and 2012 ( $n = 312$ ), underwent training on handoffs using the module and passed the required posttest. Institution-wide, 679 of 958 residents (71%) responded to the institutional survey in 2012, compared with 625 of 954 residents (66%) in 2011. Residents rated the module favorably (3.98 on a 5-point scale).

Thirteen programs currently provide additional education on handoffs to their residents as outlined in TABLE 1. Some sessions, such as the internal medicine orientation, predated the TFH. Examples of specific education approaches include dedicated lectures or conferences, invited GME speakers, and resident-led modeling of handoffs for incoming residents. This latter approach was favored during program-specific orientations to provide practical experience. Radiation oncology, alternatively, provided written information.

Programs also responded on their evaluation practices. Fewer programs adopted the evaluation tools; however, 7 programs evaluated most of their residents by May 2012, with 5 programs (71%) using the tool.

### Feasibility

Time involvement for members of the Patient Safety and Quality Council began at 1 h/mo. Members of the Executive Committee met for an additional hour with the main faculty for the project. Additional time required for projects or separate TFH meetings was estimated at 1 to 3 h/mo. One team member kept and distributed minutes for the meetings and forwarded samples of project materials, requiring 3 h/mo. Additional time was required for creation of the orientation module, which was approximately

TABLE 1 EDUCATION PRACTICES REGARDING TRANSITIONS OF CARE, BY PROGRAM<sup>a</sup>

Program	Education Strategies
Anesthesiology	Program-wide conference on handoffs from OR to ICU or PACU during academic year
Dermatology	Senior residents educate junior residents on handoffs process for each specific rotation at outset of rotations
General surgery	Intern session on handoffs (with modeling) led by senior residents during individual program orientation
Internal medicine	Intern session on handoffs (with modeling) led by outgoing interns during individual program orientation; reference on handoffs (including core content) as part of <i>Survival Guide</i>
Neurology	Intern session on handoffs (as above) during internal medicine internship program orientation; reference on handoffs (including core content) as part of <i>Survival Guide</i>
Neurological surgery	Program-wide education session led by chief residents during academic year and annual lecture on handoffs
Obstetrics and gynecology	Browser lists updated for all services and interns educated on use by upper-level residents
Ophthalmology	First-year resident session on handoffs led by chief residents during individual program orientation
Pediatrics	Intern session on handoffs (with modeling) led by senior residents during individual program orientation; reference on handoffs (including core content) as part of <i>Survival Guide</i>
Psychiatry	Intern session on handoffs led by chief residents during individual program orientation
Radiation oncology	Reference on handoffs (including core content) as part of <i>Resident Handbook</i>
Radiology	Program-wide conference on features of callbacks
Urology	Intern session on handoffs led by senior residents during individual program orientation; reference on handoffs (including core content) as part of <i>Survival Guide</i>

Abbreviations: OR, operating room; ICU, intensive care unit; PACU, postanesthesia care unit.

<sup>a</sup>Programs not included do not have program-specific educational sessions or material regarding handoffs.

6 hours of combined resident and information technology support time initially and required 2 hours annually to update. Analysis of the institutional survey was done by GME staff and was supported by GME information technology resources. Programs typically allowed approximately 1 hour for additional training conferences or sessions, with members of the TFH leading sessions. Costs for the committee included 2 presentations at national meetings and were supported directly by the GME department. Faculty members were not compensated financially for the time they devoted to the TFH.

### Institutional Survey

Results of the institutional survey are summarized in TABLE 2 and show increased awareness of handoff education and reception of adequate handoffs.

### Discussion

At our large, university-based institution, residents led the effort to improve handoffs. Significant findings from this experience were that residents recognized the importance of safe handoffs and were eager to improve them; that programs were willing to accept resident input on this topic

TABLE 2 DESIGNATED INSTITUTIONAL OFFICIAL SURVEY RESULTS FOR HANDOFF QUESTIONS, 2011 AND 2012<sup>a</sup>

Question	Desired Responses, No. (%)		P Value
	2011	2012	
Have you received any formal training on the process of signing out? <sup>b</sup>	263 (42)	388 (58)	< .001
Have there been situations when the signout you received was inadequate? <sup>c</sup>	384 (61)	469 (69)	.004
Rate your level of comfort/confidence giving an adequate signout. <sup>d</sup>	389 (62)	455 (67)	.07

<sup>a</sup>Different response rates exist for each question, as answering each question was not mandatory in order to complete the survey.

<sup>b</sup>Desired response is "Yes" for this question.

<sup>c</sup>Desired response is "No" for this question.

<sup>d</sup>Desired response is "9 or 10" on a scale of 1 to 10 for this question.

and to adopt educational practices to improve resident perception of the quality of handoffs; that programs without traditional inpatient services identified and educated residents on transitions within and across their disciplines; and that tools could be developed for evaluating handoffs, and those tools could be shared among departments with minimal changes. Additionally, those changes could be performed at minimal financial cost.

Most important, GME efforts were structured to give residents across multiple specialties leadership in handoffs. Similar to the approach described by Horwitz et al,<sup>20</sup> a committee composed of individuals from different programs directed work on handoff education. Unlike the approach of Horwitz et al,<sup>20</sup> residents took the main role in discussing and advancing improvement at DUH. In our experience, standardizing core content across the institution (as Horwitz et al<sup>20</sup> did) and developing an orientation module and posttest highlighting that content aimed at giving all first-year, second-year, and future residents a baseline level of competence.<sup>8,20</sup> After implementation of the module and increasing program-specific sessions, residents who have taken the designated institutional official survey increasingly identified handoff educational opportunities, and fewer residents reported having received inadequate signouts. We will analyze the results of our institutional survey annually to see whether that trend continues as a higher proportion of residents receive education on handoff procedures.

A second point, as discussed in the literature, is that a flexible approach is required, so the various GME programs accept changes in handoff requirements or standardization.<sup>21,22</sup> Providing flexibility encourages maximal resident and program adherence and frees programs from obligations to create novel handoff strategies and tools. After starting with a basic framework of content and institution-wide education, programs can add individual education sessions or materials specific to their field when desired. At DUH, 13 programs currently are providing additional education.

An important part in increasing the acceptance of the program at DUH was identifying unique transitions of care in clinical departments without inpatient services. Although a significant amount of literature exists regarding handoffs in specialties with a large component of inpatient care, little information is available in others, such as radiology or radiation oncology. In our effort, emergency medicine identified communication between residents and inpatient admitting teams as a target for teaching and evaluating handoffs. Radiology focused its efforts on notification of abnormal findings to appropriate providers and developed a structured communication format. Dermatology targeted direct communication of findings with the ordering staff via

electronic means. Radiation oncology, in which residents work with attending physicians for several months, focused on handoffs of service patients to oncoming residents at the end of rotations.

Defining handoffs in these fields is vital for meeting ACGME requirements and will hopefully improve care. Educational efforts at other institutions should highlight similar unique handoff situations.

Evaluation of handoffs at Duke is less robust than the educational effort, although 7 programs evaluated most of their residents for handoff competency, and most programs adopted the TFH evaluation tool. As programs work to continue to meet ACGME requirements, we will continue to offer access to this tool with the potential for modifications.

There are some limitations to our intervention. First, the tool to evaluate resident handoffs was not validated, and the residents or faculty evaluating the handoffs have not received formal training on evaluations and, therefore, may not provide consistent or optimal feedback. Second, as previously reported,<sup>5</sup> residents overestimated the quality of the handoffs they provide. That was highlighted in our institutional survey, in which two-thirds of residents reported they gave signout information of quality 9 or 10 on a 10-point scale, yet one-third of residents had received inadequate signout during the past year.

There are several areas for future work. They include studies to improve handoff systems, such as automatically abstracting core content or information into written handoff materials to minimize errors related to omission. In addition, information gathered about handoffs must be distributed back to the programs in a constructive format. Finally, metrics for demonstrating improved patient care outcomes related to handoffs are difficult to identify or to attribute to changes in the handoff process.

## Conclusion

Our intervention showed that residents can lead the standardization of handoffs across an institution, improve educational practices regarding handoffs, and take a formative role in the evaluation process. Implementing a similar approach at other institutions is feasible and has minimal costs. Time is a valuable commodity for both residents and faculty and is the most significant cost in this process; however, we were able to demonstrate the time commitment required for this intervention was feasible for participants during most months.

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