Handoff Practices in Undergraduate Medical Education

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BACKGROUND: Growing data demonstrate that inaccuracies are prevalent in current handoff practices, and that these inaccuracies contribute to medical errors. In response, the Accreditation Council for Graduate Medical Education (ACGME) now requires residency programs to monitor and assess resident competence in handoff communication. Given these changes, undergraduate medical education programs must adapt to these patient safety concerns.

OBJECTIVES: To obtain up-to-date information regarding educational practices for medical students, the authors conducted a national survey of Clerkship Directors in Internal Medicine (CDIM) members.

DESIGN AND PARTICIPANTS: In June 2012, CDIM surveyed its institutional members, representing 121 of 143 Departments of Medicine in the U.S. and Canada. The section on handoffs included 12 questions designed to define the handoff education and practices of third year clerkship and fourth year sub-internship students.

KEY RESULTS: Ninety-nine institutional CDIM members responded (82 %). The minority (15 %) reported a structured handoff curriculum provided during the internal medicine (IM) core clerkship, and only 37 % reported a structured handoff curriculum during the IM sub-internship. Sixty-six percent stated that third year students do not perform handoff activities. However, most respondents (93 %) reported that fourth year sub-internship students perform patient handoff activities. Only twenty-six (26 %) institutional educators in CDIM believe their current handoff curriculum is adequate.

CONCLUSIONS: Despite the growing literature linking poor handoffs to adverse events, few medical students are taught this competency during medical school. The common practice of allowing untrained sub-interns to perform handoffs as part of a required clerkship raises safety concerns. Evidence-based education programs are needed for handoff training.

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BACKGROUND

Since the landmark Institute of Medicine (IOM) report "To err is human" was published in 2000,[1] national focus has been on patient safety and preventing medical errors. In 2003, the Accreditation Council for Graduate Medical Education (ACGME) put in place work hours restrictions in an effort to improve patient safety by reducing fatigue; however, unintended consequences resulted. Mortality was not decreased, potentially due to the increased frequency of patient transfers and handoffs that were necessitated from these work hour restrictions.[2] At one major U.S. academic medical center, 15 handoffs occurred per patient during a typical 5-day hospital stay, and each intern on the medical service was involved in more than 300 handoffs over a 1-month rotation.[3] Due to the sheer number of handoffs that occur, the potential for harm is enormous. There are growing data demonstrating a high prevalence of inaccurate handoffs leading to medical error and harm in patient care.[3–5]

Given the high-risk nature of inpatient care[6] and the frequency of communication-error-related harm, handoff practices are an important target for U.S. healthcare improvement. Since 2006, The Joint Commission has identified handoff communication as a National Patient Safety Goal. In 2010, the ACGME recognized this as a crucial competency and put into place requirements for programs to ensure resident competency in this skill, as well as ensuring an effective, monitored handoff process.[7] Institutions across the country have been working to develop residency education programs that comply with these requirements.[8,9] In light of these changes, undergraduate medical education programs will need to adapt to meet these learner needs and ensure patient safety. There have been recent reports describing successful pilot initiatives designed to teach medical students handoff skills.[10,11] However, the current status of widespread educational practices is unclear. A survey of clerkship directors in 2004 revealed that only 8 % of medical

schools formally taught patient handoffs, with 86 % of medical students learning about handoffs through unstructured teaching by their interns or residents.[12,13] This is especially concerning in light of the over-confidence that interns demonstrate with regard to handoff skills.[14]

OBJECTIVES

In order to define the current educational practices for third and fourth year medical students regarding handoffs, we conducted a national survey of Clerkship Directors in Internal Medicine (CDIM) members.

DESIGN AND PARTICIPANTS

In June 2012, CDIM surveyed its North American institutional members, representing 121 of 143 Departments of Medicine in the U.S. and Canada. CDIM membership consists of university-affiliated academic programs with a medical school. Each of these academic programs has one CDIM member designated as the institutional member representative, most commonly the core Internal Medicine Clerkship Director. All CDIM institutional members were sent an electronic mail cover message that explained the purpose of the survey and contained a link to the confidential, electronic survey. Members were instructed to seek out information from others involved in medical education (i.e. sub-internship directors, site specific directors) as needed to accurately complete the survey. Non-respondents were contacted up to three additional times by e-mail and once by telephone. Participants were blinded to any specific hypothesis of the study.

Survey Development

After reviewing the literature on the topic of handoffs in undergraduate medical education, we developed a series of questions and submitted these for inclusion in the CDIM annual survey. Members of the CDIM Research Committee reviewed submissions and identified topics of interest. Questions were reviewed, organized, and edited by members of the CDIM Research Committee. They were presented to CDIM Council and further revised. The CDIM Research Committee members then completed the questions in an initial draft of the on-line survey and submitted this for another review by the CDIM Council. These survey pilot results were analyzed for non-responses, missing data and comments by respondents, which led to additional revisions.

Survey Content

The final version of the 2012 CDIM annual survey consisted of a total of 125 items over four different topics, with additional questions soliciting background information. Some sections contained items that branched (or involved skip-logic), so that respondents could bypass sections that were not relevant to them. The section on handoffs was comprised of 12 questions including multiple choice and free response questions designed to define the handoff education and practices of third year clerkship and fourth year sub-internship students (Appendix 1, available online). Questions posed asked clerkship directors to identify structured curriculum and methods in the Internal Medicine (IM) core clerkship and the sub-internship courses. In addition, clerkship directors were asked about student participation in hand-off activities. Respondents indicated whether or not these were 'informal' or 'structured' activities. No additional instructions were given to distinguish between informal or structured designations, and each respondent individually determined the most appropriate label. Clerkship directors were asked about plans for future curricular changes and perceived adequacy of the current educational practices. Descriptive statistics were used to analyze the data.

The Institutional Review Board (IRB) at Case Western Reserve University reviewed the protocol and determined that the CDIM Survey research protocol did not fit the definition of human subjects' research per 45 CFR 46.102, declaring the study exempt from further IRB review.

KEY RESULTS

Ninety-nine institutional CDIM members responded (82 %) to our survey. Sixty-four percent of respondents identified their school as public and 36 % indicated their school was private. Members primarily identified themselves as Core Clerkship Directors (86 %), with other indicating Sub-Internship Director (5 %), Vice-Chair for Education in the Medicine Department (5 %) and Assistant/Associate Dean in the Medical School (4 %).

Only thirteen respondents (15 %) indicated that there is a structured curriculum provided during the IM core clerkship on handoffs. Of the thirteen departments that offer a structured curriculum during the IM core clerkship on handoffs, most utilize small group discussions as an educational method. Other methods included lecture, simulation/role play, and online curriculum (Table 1). Similarly, in most institutions, third year clerkship students do not perform patient handoff activities (65 %). The 29 (34 %) respondents who indicated that third year core clerkship students performed patient handoff activities reported multiple settings in which this occurs. At these institutions, third year students perform structured verbal sign-out of patients at night and structured verbal sign-in of patients during the day. Third year students also perform informal verbal sign-outs of patients at night, informal

Table 1. Educational Methods

In programs where a structured curriculum on handoffs is offered		
	Clerkship Students (N=13)	Sub-internship students (N=31)
Lecture	5 (38 %)	8 (25 %)
Small group discussions	10 (71 %)	23 (75 %)
Online curriculum	2 (15 %)	3 (10 %)
Simulations	4 (31 %)	4 (13 %)
Direct observation with feedback	0 (0 %)	16 (32 %)

verbal sign-in of patients during the day, and write sign-out notes. Nine of the 13 departments who offer a structured handoff curriculum to third years also indicated that these students participate in handoff activities.

The minority of respondents (37 %) also indicated that there is a structured curriculum during the IM sub-internship on handoffs. Of the 31 departments (37 %) that do offer a structured curriculum during the IM sub-internship on handoffs, most utilize small group discussions as an educational method. Other methods reported were direct observation with feedback, lecture, simulation and online curriculum (Table 1). The majority of respondents (93 %) did, however, report that fourth year sub-internship students perform at least one of the following patient handoff activities: informal verbal sign-out of patients during the day, informal verbal sign-out of patients at night, written sign-out notes by sub-internship students, structured verbal sign-in of patients during the day, and structured verbal sign-out of patients at night (Table 2). All departments who offer a structured handoff curriculum to fourth years also indicated that these students participate in handoff activities.

In addition to involvement in handoff activities, third year students and sub-interns write (or dictate) hospital discharge summaries. The majority of respondents reported that formal curricular activities for fourth year sub-interns on handoffs have not changed in the past 2 years (77 %), and do not intend to change the curriculum regarding handoffs in the IM core clerkship rotation in the near future (69 %). Only 26 (26 %) institutional educators in CDIM believe their current handoff curriculum is adequate for medical student education. A substantial proportion of respondents reported that the current curriculum offered to medical students on handoffs was inadequate (49 %), with the remainder indicating uncertainty.

Table 2. Patient Handoff Activities

In programs where students perform patient handoff activities		
	Clerkship Students (N=29)	Sub-internship students (N=77)
Structured verbal sign-out of patients at night	14 (48 %)	48 (62 %)
Structured verbal sign-in of patients during the day	10 (34 %)	37 (48 %)
Informal verbal sign-out of patients at night	8 (28 %)	21 (27 %)
Informal verbal sign-in of patients during the day	9 (31 %)	14 (18 %)
Students write sign-out notes	12 (41 %)	36 (47 %)
Students write (or dictate) hospital discharge summaries	8 (28 %)	32 (42 %)

CONCLUSIONS

Our data suggest that nationally, very few Departments of Medicine have a structured formal curriculum to teach handoff skills for third year clerkship students. Although more departments are teaching these during the sub-internship, more than two-thirds do not. This is concerning and somewhat surprising data, given the recent focus on handoff education and competence to ensure patient safety. In a 2010 survey of Program Directors in Internal Medicine, handoffs were given the highest priority of expected competencies for incoming interns,[15] suggesting that this is extremely important for graduating medical students. Residency Program directors need to be aware of the lack of formal curricular programs on handoffs in undergraduate medical education as they design “bootcamp” activities or create educational programs to teach and assess residents on handoff competence.

A large percentage of departments do allow sub-interns experience in conducting handoffs for authentic patients. However, the ‘see one, do one, teach one’ approach to such an important skill is likely sub-optimal,[16] especially given that nearly one-fifth of malpractice claims involving medical trainees center on handoff problems.[5] Many institutions rely on ineffective sign-out methods and few residency programs have comprehensive systems in place to manage these transfers of care.[17] In addition, house-staff themselves frequently report errors in written sign-outs and uncertainty in patient care after verbal sign-outs.[18,19] Without formal training, sub-interns are likely to fall prey to the same errors and inaccuracies seen with interns. Although less common at the third year level, our study shows that medical students are participating in care transitions. Sub-interns sign out patients at night at almost one-half of the responding institutions. At one-third of these departments, sub-interns are writing discharge summaries, another integral component in transitions of care. A recent study at the University of Chicago suggests that this may be more common at specific institutions, particularly when reported by the students directly.[20] Our survey did not ask details about supervision during these activities. However, given the widespread practice, institutions must consider these early learners when addressing patient safety concerns related to handoffs and adverse events related to care transitions.

The 2011 ACGME Common Program Requirements emphasize transitions of care as a core requirement. Residency programs not only have to ensure safe and effective handoff processes, but must also monitor them for patient safety. Such emphasis at the medical student level has not yet been required. Although the ACGME clearly delineates competen-

cies regarding handoff skills during residency, the Liaison Committee on Medical Education (LCME) does not. Additional LCME guidelines for undergraduate medical education might help to highlight the importance of these skills and stimulate curricular development and implementation. Approximately one-quarter of departments intend to change the curriculum regarding handoffs in the internal medicine core clerkship rotation in the near future. Although this is a minority, it represents a large increase over current practices as we have defined them, which implies a greater focus on handoffs is likely to be seen in the upcoming years.

A minority of respondents believe the current educational practices on handoffs to be adequate, underscoring the need for widespread study on effective curriculum. Simulation appears to be successful and may be an opportunity for growth. A recent pilot course simulating clinical scenarios in which students practiced handing off a patient to residents was received positively, with perceived improvement in preparedness.[10] At the University of Colorado, a 2-hour structured program using small groups and simulation was instituted with improved knowledge and attitudes regarding hand-off skills.[11] In, addition, web-based resources are well received by students, and afford the opportunity to teach asynchronously.[21] Structured programs likely contribute to safe care by promoting adoption of a handoff system [like SBAR (Situation, Background, Assessment and Recommendation], and others) or teaching key concepts such as "read-backs," which are rarely performed by physicians, yet are proven to reduce communication errors.[22] Studies in the field of handoff education are limited by the lack of validated tools to evaluate hand-offs skills and a reliance on student perceptions as a measure of efficacy. However, a recent publication has demonstrated the internal consistency of the Handoff CEX (clinical evaluation exercise), and this may prove to be a useful tool for future educational studies and interventions.[23]

Our study surveyed clerkship directors of internal medicine at institutions in North America. We had an excellence response rate (82 %). However, the majority of institutional members were clerkship directors and not sub-internship directors. Although CDIM asks institutional members to speak with sub-internship directors when appropriate to accurately complete the survey, our data may better reflect core clerkship practices than sub-internship practices. In addition, we only asked one discipline to self-report educational practices. These may not reflect education on handoffs in other clerkships. We also do not know the level of supervision for handoffs and discharge summaries performed by the students. Finally, clerkship directors are reporting based on their perception of student participation in handoff activities, which may differ from actual student involvement. Future surveys of medical students, such as inclusion of handoff items on the American Association of Medical Colleges Graduate Questionnaire, could help to validate clerkship director perception of student involvement in care transitions and provide more accurate data.

Overall, we demonstrate that curriculum designed to teach handoffs is taught to medical students in internal medicine at a minority of departments across North America, yet students are often allowed to perform high-stakes handoffs for real patients without structured training. Evidence-based education programs are needed to incorporate hand-off training into medical student experiences to address this educational gap and ensure patient safety, particularly if competence is an expectation of residency program directors for entering interns.

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Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

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APPENDIX 1

Handoffs

Is there a structured curriculum during the **IM core clerkship** on handoffs?

a. Yes
b. No

If yes, which of the following educational methods are used? Please check all that apply:

a. Lecture
b. Small group discussions
c. Online curriculum
d. Simulations
e. Other (please specify)

Do **third** year core clerkship students **perform** any patient handoff activities (for example do they sign out their patients to the intern or sub-intern on call)?

a. Yes
b. No

If yes, in which activities? Please check all that apply:

a. Structured verbal sign-out of patients at night
b. Structured verbal sign-in of patients during the day
c. Informal verbal sign-out of patients at night
d. Informal verbal sign-in of patients during the day
e. Clerkship students write sign-out notes
f. Clerkship students write (or dictate) hospital discharge summaries
g. Other (please specify)

Is there a structured curriculum during the **IM sub-internship** on handoffs?

a. Yes
b. No

If yes, which of the following educational methods are used? Please check all that apply:

a. Lecture
b. Small group discussions
c. Online curriculum
d. Simulations
e. direct observation with feedback
f. Other (please specify)

Do Sub-I **students (4th year) perform** patient handoff activities (for example do they sign out their patients to the intern, resident on call, or another sub-I student on call)?

a. Yes
b. No

If yes, in which activities? Please check all that apply:

a. Structured verbal sign-out of patients at night
b. Structured verbal sign-in of patients during the day
c. Informal verbal sign-out of patients at night
d. Informal verbal sign-in of patients during the day
e. Clerkship students write sign-out notes
f. Clerkship students write (or dictate) hospital discharge summaries
g. Other (please specify)

Have formal curricular activities for **4th year sub-interns on handoffs** changed at your school in the past two years?

a. Yes
b. No

If yes, how have the requirements for 4th year sub-interns on handoffs changed? Please describe:

Do you intend to change the curriculum regarding handoffs in the **IM core clerkship rotation** in the near future?

a. Yes
b. No

If yes, how do you intent to change the curriculum regarding handoffs? Please describe:

Do you believe that your current curriculum for medical students on handoffs is adequate?

a. Yes
b. No
c. Not sure