Academic Emergency Medicine
Official Journal of the Society for Academic Emergency Medicine

EDUCATIONAL ADVANCE

Handoff Practices in Emergency Medicine: Are We Making Progress?

H. Gene Hern, Jr., MD, MS, Fiona E. Gallahue, MD, Boyd D. Burns, DO, Jeffrey Druck, MD, Jonathan Jones, MD, Chad Kessler, MD, MHPE, Barry Knapp, MD, and Sarah Williams, MD, MHPE, Representing the Council of Residency Directors, Transitions of Care Task Force

Abstract

Objectives: Transitions of care present a risk for communication error and may adversely affect patient care. This study addresses the scope of current handoff practices amongst U.S. emergency medicine (EM) residents. In addition, it evaluates current educational and evaluation practices related to handoffs. Given the ever-increasing emphasis on transitions of care in medicine, we sought to determine if interval changes in resident transition of care education, assessment, and proficiency have occurred.

Methods: This was a cross-sectional survey study guided by the Kern model for medical curriculum development. The Council of Residency Directors Listserv provided access to 175 programs. The survey focused on elucidating current practices of handoffs from emergency physicians (EPs) to EPs, including handoff location and duration, use of any assistive tools, and handoff documentation in the emergency department (ED) patient's medical record. Multiple-choice questions were the primary vehicle for the response process. A four-point Likert-type scale was used in questions regarding perceived satisfaction and competency. Respondents were not required to answer all questions. Responses were compared to results from a similar 2011 study for interval changes.

Results: A total of 127 of 175 programs responded to the survey, making the overall response rate 72.6%. Over half of respondents (72 of 125, 57.6%) indicated that their ED uses a standardized handoff protocol, which is a significant increase from 43.2% in 2011 ($p = 0.018$). Of the programs that do have a standardized system, a majority (72 of 113, 63.7%) of resident physicians use it regularly. Significant increases were noted in the number of programs offering formal training during orientation (73.2% from 59.2%; $p = 0.015$), decreases in the number of programs offering no training (2.4% from 10.2%; $p = 0.013$), and no assessment of proficiency (51.5% from 69.8%; $p = 0.006$). No significant interval changes were noted in handoffs being documented in the patient's medical record (57.4%), the percentage of computer/electronic signouts, or the level of dissatisfaction with handoff tools (54.1%). Less than two-thirds of respondents (80 of 126, 63.5%) indicated that their residents were "competent" or "extremely competent" in delivering and receiving handoffs.

Conclusions: An insufficient level of handoff training is currently mandated or available for EM residents, and their handoff skills appear to be developed mostly informally throughout residency training with varying results. Programs that have created a standardized protocol are not ensuring that the protocol is actually being employed in the clinical arena. Handoff proficiency most often goes unevaluated, although it is improved from 2011.

ACADEMIC EMERGENCY MEDICINE 2016;23:197–201

The delivery of medical care relies on effective, succinct, and ongoing communication between health care providers. The shift-work nature of emergency medicine (EM) may prevent an emergency physician (EP) from following a patient's course to the final disposition. Consequently, the patient handoff has

From the Department of Emergency Medicine, Alameda Health System - Highland Hospital (HGH), Oakland, CA; the Department of Emergency Medicine, University of Oklahoma, School of Community Medicine (BDB), Tulsa, OK; the Department of Emergency Medicine, University of Colorado (JD), Denver, CO; the Department of Emergency Medicine, University of Mississippi (JJ), Jackson, MS; the Department of Emergency Medicine, Veterans Affairs Health System (CK), Chicago, IL; the Department of Emergency Medicine, Eastern Virginia Medical School (BK), Norfolk, VA; the Division of Emergency Medicine, University of Washington (FEG), Seattle, WA; and the Division of Emergency Medicine, Stanford University (SW), Stanford, CA.
Received May 15, 2015; revision received September 10, 2015; accepted September 23, 2015.
The authors have no relevant financial information or potential conflicts to disclose.
Supervising Editor: Lalena Yarris, MD.
Address for correspondence and reprints: H. Gene Hern, MD, MS; e-mail: emergentt@gmail.com.

doi: 10.1111/acem.12867
ISSN 1069-6563
PII ISSN 1069-6563583

become a critical part of the patient care process and so has appropriately come under increased scrutiny as a possible source of medical error. Literature concerning patient handoffs has grown in recent years.[1] Handoff standardization was made a National Patient Safety Goal by The Joint Commission in 2006[2] and was also required by the Accreditation Council for Graduate Medical Education (ACGME), with requirements such as "Sponsoring institutions and programs must ensure and monitor effective, structured hand-over processes to facilitate both continuity of care and patient safety."[3] However, it is unclear if this directive has influenced handoff practices in the emergency department (ED) or whether the task of training health care professionals how to perform effective handoffs has been addressed.

Transitions of care (or so-called "handoffs") present a risk for communication error. Although standardization is widely believed to be a means to improve handoff efficacy, consensus on the procedural and logistical components of an "effective" handoff and its standardization has not been reached.[1,4] Omission of important clinical information has been identified as one source of error in studies of handoff proficiency.[5,6] Tools such as handoff templates or mnemonics (e.g., Situation-Background-Assessment-Recommendation [SBAR], Illness severity, Patient summary, Action list, Situational awareness, Synthesis by receiver [IPASS], and others) have been suggested as methods to promote consistency.[7] The ACGME holds transitions of care in such high regard that they have made them one of six primary foci in institutional Clinical Learning Environment Review (CLER) visits.[8]

The lack of consensus on what an effective handoff entails is a potential barrier for progress. Despite the lack of fundamental work in this area, transition of care education has been posited as a way of improving handoffs. The few studies that implemented handoff curricula have yielded promising results.[9,10] One recently published report confirms the implementation of a handoff tool showed a 23% reduction in errors.[11]

The objectives of the survey study were to 1) assess the scope of current handoff practices amongst EM residents through the experience of their residency program director and/or other senior faculty and 2) to assess current educational and evaluation practices related to handoffs. The current survey is a follow-up survey to our initial 2011 study of U.S. EM residencies.[12] Given the ever-increasing emphasis on transitions of care in medicine, we sought to determine if interval changes in resident transition of care education, assessment, and proficiency have occurred. If changes have not occurred, despite an increasing emphasis on transitions of care, more resources may be required to be in compliance with national mandates.

METHODS

Study Design

This was a cross-sectional survey developed to assess educational needs regarding handoff processes in accordance with the six-step Kern model for medical curriculum development.[13] The first two stages, 1) problem identification and 2) creation of a targeted needs assessment, are described in this paper. Establishing validity evidence was an important consideration throughout the process. Validity evidence comes in the form of content, response process, internal structure, relationship to other variables, and consequences.[14] A review of transition of care literature was conducted to review common practices and sources of error and to discover handoff education techniques. One identified problem was the dearth of formal handoff education available or required during residency training. Moreover, a call for increased handoff education was noted within current literature.[5,15] The institutional review board at Alameda Health System–Highland Hospital (Oakland, CA) granted exempted approval to this study.

Survey Content and Administration

A literature review provided the framework for the targeted needs assessment survey, which was created by the 12-member Council of Emergency Medicine Residency Directors (CORD) Transition of Care Taskforce. This task force included EM residency program directors (PDs), academic chairpersons, and other EM faculty. The survey content underwent a thorough development process.[12] The expertise of those involved in the development of the survey contributed to the validity of its content.[14] Response process validity was ensured in two ways. First, the survey target responders were colleagues and peers of the survey developers in the hope that the questions formulated were interpreted similarly by similarly trained professional colleagues. Furthermore, the feedback after the first survey in 2011 suggested that no question was difficult to interpret or answer. The survey (Data Supplement S1, available as supporting information in the online version of this paper) focused on elucidating current practices of handoffs from EPs to EPs, including handoff location and duration, use of any assistive tools, and handoff documentation in the ED patient's medical record. Multiple-choice questions were the primary vehicle for the response process; however, the survey also contained options for qualitative and "check all that apply" responses. A four-point Likert-type scale was used in questions regarding perceived satisfaction and competency. Respondents were not required to answer all questions.

Members of CORD were invited to complete the survey electronically. The CORD e-mail listserv is exclusive and comprised of residency PDs from EM residency programs. The listserv was used to reach 175 different programs. Additionally, many associate PDs and other senior-level EM administrative faculty are also members of this listserv. Responses that did not identify their affiliation or location were eliminated from the final analysis. While multiple responses were possible (both PDs and associate PDs may have responded), there were only five programs with multiple responses. Submissions that responded in the affirmative (about techniques or processes) were considered in this analysis.

The survey was created and distributed using the online survey tool SurveyMonkey. All CORD members were invited to participate on a voluntary basis through the CORD listserv. Survey responses were collected and compiled. The principal investigator reviewed reported

data, and they were further analyzed to elicit descriptive statistics.

Data Analysis

When results were compared with the prior survey results in 2011, data were analyzed using the two-sample test of proportions when there were enough responses. There was one question where the responses in one category were so few that Fisher's exact test was employed. Statistical analysis completed with the use of Stata version 13.0 for confidence intervals (CIs) and p-values.

RESULTS

A total of 127 of 175 programs responded to the survey, an overall response rate 72.6%. Over the course of 4 years, significant increases were noted in the number of programs that used a handoff system and offered formal training during orientation, while showing significant decreases in programs who offered no training at all and no formal assessment of handoff proficiency (Table 1).

Of the programs that state they have a "standardized" system, a majority (72 of 113 or 63.7%, 95% CI = 54.5% to 72.0%) of resident physicians use it regularly (defined as either "all the time" or "most of the time" on the Likert scale). Many respondents (45 of 113, 39.8%, 95% CI = 31.3% to 49.0%) indicated that handoffs should occur at patient bedside; however, handoffs at the bedside occurred in only 14 respondent programs (Data Supplement S2, available as supporting information in the online version of this paper). Interestingly, almost as many (42 of 113, 37.2%, 95% CI = 28.3% to 46.1%) felt that handoffs should occur at individual computer workstations. This was not significantly different from the 2011 data, where 28.9% (95% CI = 21.2% to 36.5%) of respondents felt computer workstations were the ideal location (p = 0.166).

Handoffs are documented in the patient's medical record at 66 of 115 (57.4%, 95% CI = 48.4% to 66.4%) responding programs, which is not a statistically significant change from 69 of 146 (47.3%, 95% CI = 39.2% to 55.4%) in 2011 (p = 0.104). Respondents report that computer or electronic signouts comprise a component of the handoff process at 59 of 124 programs (47.6%, 95% CI = 38.8% to 56.4%) compared with 59 of 146 in 2011 (40.4%) (p = 0.237.) There appears to be ongoing dissatisfaction with handoff tools, as the number of programs that were either "somewhat satisfied" or "unsatisfied" with its tool has not dramatically changed (46 of 85 or 54.1%, 95% CI = 43.5% to 64.7%) from 66 of 115 or 57.4% (95% CI = 48.4% to 66.4%) in 2011 (p = 0.645; Data Supplement S3, available as supporting information in the online version of this paper).

Most programs also report that handoff training occurs through instruction by attending physicians or senior residents within the clinical environment: 91 of 127 (71.7%, 95% CI = 63.8% to 79.5%). This percentage has not changed significantly since 2011 when 69.4% of programs (95% CI = 61.9% to 76.8%) reported such instruction (p = 0.682). The number of programs that offered no training in handoffs has dropped significantly, from 15 of 145 programs in 2011 (10.2%, 95% CI = 5.3% to 15.1%) to three of 127 programs (2.4%, 95% CI = 0.0% to 5.0%; p = 0.013).

Respondents indicated that perceived handoff safety and effectiveness showed improvement from the 2011 results, but still do not show resounding confidence in their handoff processes. Among current program directors, 57 of 126 (45.3%, 95% CI = 36.5% to 53.9%) indicated their systems were either "not safe/effective" or "somewhat safe/effective." This compares with 57% (95% CI = 49.1% to 65.0%; 85 of 149) of respondents who indicated this in 2011. This compares with 57% (95% CI = 49.1% to 65.0%; 85 of 149) of respondents who indicated this in 2011 (p = 0.051 for the comparison of current vs. 2011; Data Supplement S4, available as supporting information in the online version of this paper).

Perceived resident competency in delivering and receiving handoffs remains a cause for concern. On the current survey, less than two-thirds of respondents (80 of 126, 63.5%, 95% CI = 55.1% to 71.9%) indicated their residents were "competent" or "extremely competent" in delivering and receiving handoffs. These results are similar to 2011 data (91 of 149, 61.1%, 95% CI = 53.2% to 68.9%; p = 0.680).

Table 1
Significant Changes in Emergency Resident Transitions of Care

Change	Yes	No	Total	Percent Yes	95% CI	p-value*
Use a handoff system						
2015	72	53	125	57.6	48.9–66.3	0.0181
2011	64	84	148	43.2	35.3–51.2	
Formal training offered during orientation						
2015	93	34	127	73.2	65.5–80.9	0.0146
2011	87	60	147	59.2	51.2–67.1	
No training offered						
2015	3	124	127	2.4	0.0–5.0	0.013
2011	15	132	147	10.2	5.3–15.1	
No assessment of proficiency						0.0058
2015	66	43	109	60.6	51.4–69.7	
2011	106	32	138	76.8	69.8–83.9	

*Fisher's exact test.

DISCUSSION

Our results provide insight on handoff practices and training of EM residents as reported by their program leadership and show not only an increase in prevalence of formal handoffs and training, but also a trend toward improved perception among them of increasing effectiveness. The data also show that there has been a significant drop in programs that are not assessing resident proficiency at all. This is likely due to the increasing focus the ACGME has placed onto transitions of care during the CLER program.[8] Programs without education in handoffs are likely to be at a disadvantage during their CLER site visit.

There appears to be no significant change in doing signouts at computers or documenting handoffs in the chart. There also remains an ongoing culture of informal training in the clinical environment which, like much of medical education, can be variable.

Ongoing dissatisfaction with handoffs continues, as more than half of all respondents stated continued dissatisfaction with their handoff tools. In addition, while there was a trend that more PDs felt their residents' handoffs were safe and effective, almost half still did not express confidence in their current systems. In comparison, PDs believed their residents were either competent or extremely competent 63.5% of the time. This disparity is interesting; even though they felt that their handoff systems were neither safe nor effective, PDs still rated their residents as being more competent in both delivering and receiving handoffs. It is possible that residents were rated as competent within their system, but that the systems themselves may not be perceived as safe or effective.

Our results indicate that handoff standardization has not been aggressively implemented or evaluated. A formal system for handoff education followed by periodic assessment of handoff proficiency could improve patient safety and compliance within the ED. This would allow alignment with the ACGME mandate that "Programs must ensure that residents are competent in communicating with team members in the hand-over process."[3] However, it is important to note that methods for training, including modalities such as simulation, are still in need of development.[4]

While fewer survey respondents believe their current handoff system is either unsafe/ineffective or only somewhat safe/effective compared to the 2011 cohort, there is still room for improvement, as over 45% indicated marginal safety/effectiveness. A previous study demonstrated that residents tend to overestimate their own handoff effectiveness; this supports the importance of regular handoff proficiency evaluations.[16] While the lack of handoff documentation in the patient's medical record is improving (now over 50%), the transfer of care is considered the primary function of a handoff and should likely warrant proper documentation.[1,14]

Prior studies have mainly focused on individual department handoff content, identification of sources of error, and the development of standardized methods.[5,17–20] This descriptive study is unique as it provides a snapshot of current handoff practices at multiple academic institutions across the United States as well as documents the evolution of handoff education and practices over the past several years. These data suggest a need for more rigorous implementation of standardized handoffs, for a handoff curriculum, and for a more systematic and formalized evaluation process.[11,21–23] Similarly, a review of successful handoff practices from other occupations may provide additional practices for adoption.[24–26]

LIMITATIONS

A limitation of this study is the survey response rate of 72.6%, perhaps making the results difficult to generalize to all academic EDs. The targeted needs assessment was distributed to the CORD listserv and all members of this listserv were able to take the survey, regardless of their position. Therefore, it was possible to have multiple respondents from the same residency program, resulting in overrepresentation of that program. Five programs submitted two separate responses. However, it is common practice among programs to have a single designated "responder" who completes listserv surveys. If the respondent was an associate or assistant PD, he or she may have less overall experience as a faculty member than the PD. Alternatively, if the respondent was a senior member of the department who happens to have retained his or her listserv membership (such as a vice chair or ex-PD), he or she may have more experience than the PD. Further, each respondent made comments based on his or her perceptions of the handoffs—there was no exact measurement of the prevalence of handoffs nor was there a measure of their actual safety or effectiveness. Construct underrepresentation and irrelevant variance represent threats to the validity of clinical performance ratings in this study.[27] PDs could have responded based on too few observations of residents' clinical behavior or having incomplete observations or responded with low-reliability ratings. Survey, rater, and recall bias could have affected the results.

In addition, the safety/effectiveness question (which was posed in the original 2011 survey) combined the question of safety and effectiveness of the program's handoff system. The question likely conflates the two distinct questions of safety and effectiveness. An ideal handoff system would be both safe and effective. The question was attempting to address the reality versus the ideal.

CONCLUSIONS

The results of this targeted needs assessment showcases continued major deficiencies and variability in current handoff practice, although there has been significant improvement. Based on this updated survey, an insufficient level of handoff training for emergency medicine residents continues despite increasing federal requirements for transitions training and assessment. Although residents are regularly tested on their clinical knowledge and skill, their handoff proficiency most often goes unevaluated. Further research and resources should be aimed at resolving these shortcomings, with increased attention to implementing a standard model or toolbox, objective evaluation methods and timelines, and identification of high-risk clinical situations.

References

1. Cohen MD, Hilligoss PB. The published literature on handoffs in hospitals: deficiencies identified in an extensive review. Qual Saf Health Care 2010;19:493–7.
2. Joint Commission. 2006 Critical Access Hospital and Hospital National Patient Safety Goals #2E, 2006. Available at: http://www.neodevices.com/resources/CR_NationalPatientSafetyGoals.pdf. Accessed Nov 9, 2015.
3. Accreditation Council for Graduate Medical Education. Common Program Requirements, Section VI.B.2. Available at: http://www.acgme.org/acgmeweb/tabid/429/ProgramandInstitutionalAccreditation/CommonProgramRequirements.aspx. Accessed Nov 9, 2015.

4. Cheung DS, Kelly JJ, Beach C, et al. Improving handoffs in the emergency department. Ann Emerg Med 2010;55:171–80.
5. Nagpal K, Abboudi M, Fischler L, Schmidt T, Vats A, Manchanda C. Evaluation of postoperative handover using a tool to assess information transfer and teamwork. Ann Surg 2011;253:831–37.
6. Beach C, Croskerry P, Shapiro M. Profiles in patient safety: emergency care transitions. Acad Emerg Med 2003;10:364–7.
7. Reisenberg LA, Leitzsch J, Little BW. Systematic review of handoff mnemonics literature. Am J Med Qual 2009;24:196–204.
8. Weiss KB, Wagner R, Nasca TJ. Development, testing, and implementation of the ACGME Clinical Learning Environment Review (CLER) program. J Grad Med Educ 2012;4:396–8.
9. Horwitz LI, Moin T, Green ML. Development and implementation of an oral sign-out skills curriculum. J Gen Intern Med 2007;22:1470–4.
10. Berkenstadt H, Haviv Y, Tuval A, Shemesh Y, Megrill A, Perry A. Improving handoff communications in critical care: utilizing simulation-based training toward process improvement in managing patient risk. Chest 2008;134:158–62.
11. Starmer AJ, Spector ND, Srivastava R, West DC, Rosenbluth G, Allen AD. Changes in medical errors after implementation of a handoff program. N Engl J Med 2014;371:1803–12.
12. Kessler C, Shakeel F, Hern HG, et al. A survey of handoff practices in emergency medicine. Am J Med Qual 2014;29:408–14.
13. Kern DE. Curriculum Development for Medical Education: A Six Step Approach. Baltimore, MD: Johns Hopkins University Press, 1998.
14. Downing SM. Validity: on the meaningful interpretation of assessment data. Med Educ 2003;37:830–37.
15. Patterson ES, Wares RL. Patient handoffs: standardized and reliable measurement tools remain elusive. Jt Comm J Qual Improv 2010;36:52–61.
16. Chang VY, Arora VM, Lev-Ari S, D'Arcy M, Keysar B. Interns overestimate the effectiveness of their hand-off communication. Pediatrics 2010;125:491–96.
17. Anwari JS. Quality of handover to the postanaesthesia care unit nurse. Anaesthesia 2002;57:484–500.
18. Apker J, Mallak LA, Applegate EB III, et al. Exploring emergency physician-hospitalist handoff interactions: development of the handoff communication assessment. Ann Emerg Med 2010;55:161–70.
19. Matthews AL. Emergency physician to admitting physician handovers: an exploratory study. Proceedings of the Human Factors and Ergonomics Society. 46th Annual Meeting. Baltimore, MD, 2002, pp 1511–5.
20. Ye K, Taylor DM, Knott JC, Dent A, MacBean CE. Handover in the emergency department: deficiencies and adverse effects. Emerg Med Australas 2007;19:433–41.
21. Horwitz LI, Meredith T, Schuur JD, Shah NR, Kulkarni RG, Jenq GY. Dropping the baton: a qualitative analysis of failures during the transition from emergency department to inpatient care. Ann Emerg Med 2009;53:701–10.
22. Farnan JM, Paro JA, Rodriguez RM, et al. Hand-off education and evaluation: piloting the observed simulated hand-off experience (OSHE). J Gen Intern Med 2010;25:129–34.
23. Clark E, Squire S, Heyme A, Mickle ME, Petrie E. The PACT Project: improving communication at handover. Med J Austral 2009;190(11 Suppl):S125–7.
24. Garcia AC, Vivacqua AS. So Much Training and So Many Accidents: Understanding the Problems with Handoffs in Medicine and Offshore Oil Process Plants. Available at: http://www.addlabs.uff.br/Novo_Site_ADDLabs/images/documentos/publicacoes/publicacoes_pdf/trabalhos_anais_congresso/2010/20130809160503_2010%20-%20So%20much%20training%20and%20so%20many%20accidents.pdf. Accessed Nov 9, 2015.
25. Patterson ES. Handoff strategies in settings with high consequences for failure: lessons for health care operations. Int J Qual Health Care 2004;16:125–32.
26. Patterson ES. Communication strategies from high-reliability organizations. Ann Surg 2007;245:170–2.
27. Downing SM, Haladyna TM. Validity threats: overcoming interference with proposed interpretations of assessment sata. Med Educ 2004;38:327–33.

Supporting Information

The following supporting information is available in the online version of this paper:

Data S1. 2015 emergency medicine provider to provider handoff survey.

Data S2. Where do EM residents conduct signouts?

Data S3. Satisfaction with handoff tool.

Data S4. How safe/effective is your signout tool?