Inpatient Hand-Offs in Family Medicine Residency Programs:

A CERA Study

David S. Edwards, MD; Sandra K. Burge, PhD; Richard A. Young, MD; Lars E. Peterson, MD, PhD; Franklyn C. Babb, MD

BACKGROUND AND OBJECTIVES: Miscommunication during patient hand-off in the inpatient setting can lead to serious medical errors. Previous studies indicate heterogeneity in handoff practices among physicians in training. We sought to determine current practice patterns of patient hand-offs in family medicine residencies and training methods to reinforce effective transfer of care.

METHODS: We developed 13 questions relating to patient hand-offs that were included in the Spring 2014 CERA Family Medicine Program Directors Survey. Descriptive statistics were generated for each survey item.

RESULTS: We received 224 survey responses (response rate of 50%). The typical inpatient was subject to an average of seven transfers of care from a Thursday morning to a Monday morning. Use of two strategies consistent with best practices (face-to-face hand-off, use of a dedicated area) was very high. There was wide variation in training methods for patient transfer and infrequent use of national resources. Half of all residency programs relied on supervision as the primary method of instruction in patient hand-off. Estimated patient safety events in the last year attributed to a breakdown in hand-off procedure occurred "rarely/never" in 73% of programs.

CONCLUSIONS: The vast majority of family medicine residencies use at least two of three best practices in patient hand-offs, though there was wider variation in the processes of hand-offs. Frequent hand-offs associated with a night float system is a potential cause of increased errors, though we were unable to measure actual patient safety events.

(Fam Med 2015;47(5):362-6.)

Approximately 80% of serious medical errors result from poor communication between physicians at time of patient care transfer.[1] Patient hand-offs in residency training are becoming more frequent with changes in resident duty hours mandated by the Accreditation Council for Graduate Medical Education (ACGME) in 2003 and 2011. One study estimated that the average inpatient is subject to two transfers of care daily from the primary care team.[2] Complications, such as adverse drug events (particularly omitted medications), are common and can have inpatient and outpatient implications.[3] As hand-offs become more frequent, patients are also at risk for treatment delays, inappropriate treatment, omissions in care, increased length of stay, increased cost, and readmission.[4] A root cause of such adverse events is poor sign-out practices, often without face to face discussion, with omission of important clinical content.[5] Residents have witnessed such harm, as a survey of internal medicine and surgery residents found that 59% indicated that patients were harmed during their most recent clinical rotation due to miscommunication during hand-offs, and 31% of these residents characterized overall hand-off quality as "fair" or "poor."[6] A key concern for residency program directors is balancing regulating duty hour compliance while maintaining patient safety.

In a national survey of internal medicine residency programs, the majority of programs found

From Texas Tech University Health Sciences Center, Lubbock, TX (Drs Edwards and Babb); University of Texas Health Sciences Center, San Antonio (Dr Burge); John Peter Smith Health Network, Fort Worth, TX (Dr Young); The American Board of Family Medicine, Lexington, KY, and the Department of Family and Community Medicine, University of Kentucky (Dr Peterson).

significant heterogeneity in hand-off practices. Most programs had no requirement for oral and written sign-out, no mechanism for informing nurses that a transfer had occurred, and no formal training on hand-off skills.[2] We identified no studies that examined hand-off practices in inpatient services of family medicine residencies.

The aim of our survey was to identify practice patterns related to transfer of inpatient medical care as physicians change shifts in family medicine residencies. Questions pertained specifically to a residency's family medicine inpatient service and did not inquire about the presence of or time spent on internal medicine or other inpatient medicine teaching services. We did not inquire about the duration of inpatient service activity and assumed 3 months annually, as typical of most family medicine residency curricula. Use of "best practice" strategies such as face-to-face hand-off, use of a dedicated area, and standardized training resources were assessed. Our survey determined current practice patterns in patient hand-offs, estimated resident education in patient transfer methods, and assessed utilization of standardized tools and online resources to teach patient hand-off skills. We examined utilization of local and national educational methods used to facilitate patient transfer. We hypothesized that there would be wide variation in resident education methods and practice patterns related to patient hand-offs, including location, personnel involved, and mechanisms used.

Methods

Our study was part of the Council of Academic Family Medicine Educational Research Alliance (CERA) family medicine program director (FMPD) omnibus survey and was administered in the Spring of 2014. CERA survey methodology has been described elsewhere.[7]

We developed 13 questions that addressed our objectives and hypotheses. On the survey instrument, seven questions asked about current patient hand-off approaches in residencies. Two questions asked about resident education in hand-off methods. Another three questions asked about use of standardized tools and online resources. One question asked FMPDs to estimate the frequency with which patient safety was compromised in the past year as a result of a deficient hand-off.

We used descriptive statistics to characterize the respondent demographics and responses to each survey item.

The CERA survey received IRB approval through the American Academy of Family Physicians.

Results

Of the 451 FMPDs who received the survey, 224 responded, for a response rate of 49.7%. Residency programs sampled were from across the continental United States and Puerto Rico. Over half of respondents were in communities with over 150,000 residents. The majority of residency programs were community based and university affiliated (Table 1).

Table 2 describes patient handoff methods and resources. Most programs had a night float and carried an inpatient census of 14 patients, on average. They reported seven transfers of care over a weekend.

Table 1: Family Medicine Residency and Program Director Demographics

Program affiliation	
• University based	16%
• Community based, university affiliated	66%
• Community based, non-affiliated	13%
• Military	4%
Census region	
• East	37%
• Midwest	28%
• South	15%
• West	19%
Community size	Residency programs
• 75,000 or less	25%
• 75,001–150,000	18%
• 150,001–500,000	28%
• Over 500,000	28%
Age of program in years	Mean 31.8 (12.6)
Gender of family medicine program director (FMPD)	63% male, 35% female
Tenure as FMPD in years	Mean 6.2 (5.8)
• 0–6 years	64%
• 7+ years	34%
Number of residents in program	Mean 23.4 (8.3)

Table 2: Reported Family Medicine Residency Patient Hand-Off Practices and Curricula

Features of inpatient care	
• Uses night float coverage	76.3%
• Inpatient census	Mean 14.3 (6.7)
• Number of transfers of care from a Thursday morning to a Monday morning	Mean 7.2 (2.1)
Hand-off methods	
• Documented hand-off protocol	81.7%
• Hand-off template	
• Use almost all of the time (90% of the time)	58.5%
• Use most of the time (60%–89%)	12.5%
• Use about half of the time	6.3%
• Use rarely/not at all	19.6%
• Mechanism–face-to-face	90.6%
• People involved in hand-off	
• Attending physician to attending physician	1.3%
• Senior resident to senior resident	48.7%
• Intern to intern	12.1%
• Varied people involved	20.1%
• Location—dedicated room	85.7%
Training methods	
• Local resources used to train residents	
• Lecture at intern orientation	18.3%
• Supervision by a senior resident or faculty	48.2%
• Workshop at the beginning of each training year	16.5%
• Review of written templates	7.6%
• Resident manual	2.6%
• No formal training	3.6%
• National resources used to train residents	
• Mnemonics	29.5%
• Team STEPPS	16.5%
• American Medical Association (AMA) videos	3.1%
• Making Strides in Safety Program (AMA)	1.3%
• Targeted Solutions Tool (TST)	1.8%
• Other	20.5%
• None	43.4%

Programs utilizing a night float patient care system had more hand-offs over a weekend (7.49 versus 6.18, $P<.001$). Most programs had a documented protocol in place for hand-offs and conducted them face-to-face in a dedicated room. In half of the programs, attending physicians or senior residents conducted the transfers of care. More than half used a hand-off template "almost all the time." Training varied widely, with supervision being the most likely methodology. In our survey, 81.7% of residencies reported a documented handoff protocol in place, but only 2.7% of programs used a resident manual as an instructional tool. Likewise, use of a template was common in our study (71% "most" or "all the time"), but only 7.6% of residencies indicated review of written templates as part of their training method. Programs recorded some use of national resources such as mnemonics and AMA programs of TeamSTEPPS. Only 30% of FMPDs in our survey indicated use of mnemonics during hand-offs. However, most (71%) were "frequently" using hand-off templates. Attending physicians were involved in hand-off in only 1.3% of residency programs, leaving senior residents to conduct hand-offs in the remaining 48.7% of the programs that indicated presence of senior personnel at time of hand-off. Estimated patient safety events in the last year attributed to a breakdown in hand-off procedure occurred "rarely" or "never" in 72.8% of programs.

Discussion

While the topic of patient hand-offs has been studied in other medical fields (notably pediatrics, internal medicine, and surgery), the literature has not yet addressed patient hand-offs in family medicine residency programs. Our survey data could not demonstrate an association between actual patient safety events and use of traditional "best practices" for patient hand-off (face-to-face hand-off, use of a dedicated area, standardized training resources). However, we

found that the vast majority of residency programs (86%–91%) were already using two of these three practices (face-to-face hand-off, dedicated area), diminishing the variability in these factors and thus the ability to make comparisons.

Studies in other specialties have focused on evaluating the process and the accuracy of the communication that occurs during the hand-off process.[8,9] Most of these studies were not able to connect better communication with decreased medical errors.[10-13] Many interventions considered use of mnemonics as a central, formalized method to improve hand-off accuracy.[10-14] Others have used computer-based or paper-based forms.[15,16] One study boasted a decrease of 50% in medical errors after an intervention that did involve a mnemonic.[14] A study of internal medicine residents demonstrated that presence of a faculty member during sign-out even just twice a month can improve the quality of hand-offs, particularly when interns are performing hand-offs.[17]

Simply stated, more hand-offs provide more opportunities for miscommunication. Since programs utilizing a night float patient care system had more hand-offs over a weekend (7.49 versus 6.18), a focus on minimizing night float through use of 16- or 24-hour shifts on weekends may decrease adverse events.

FMPDs may be able to use these associations to make modifications within their residencies and develop effective hand-off curricula. Our findings show a shortage of standardized training about hand-offs, with half of all programs relying on supervision to convey effective strategies. Education of family medicine house staff in the elements of a successful hand-off is especially important as these learners rotate on other inpatient medical, surgical, pediatric, obstetric, and critical care services, which may have different hand-off mechanisms (or none) in place. Some innovative family medicine residencies are incorporating best practices through formal instruction as part of resident manuals, especially for hand-offs involving temporary relief of coverage, admissions from the emergency department, transfers between inpatient units, and transfers to other care facilities.[18]

Family medicine residencies made minimal use of resident manuals as instructional tools in patient hand-offs, and few program directors indicated training residents through review of written templates. Inclusion and regular review of hand-off protocols and placement of templates in a resident manual may help FMPDs improve patient safety and facilitate learners' acquisition of core competencies.

Strengths of this survey instrument included a good response rate from a representative population of FMPDs. Limitations of the study include recall bias, data gathering from program directors rather than resident physicians actively engaged in patient hand-offs, and patient safety events were not directly measured.

Future research in the area of patient hand-offs can inform clinical practice by connecting processes to outcomes and by refining best practices through talking to those who participate in the hand-offs (physicians and patients) about the processes. Future research should clarify the extent to which formal resident education versus actual hand-off processes can affect patient safety events. This could involve assessment of how well the "validated" tools work in residency settings. Despite knowledge of best practices, implementation and consistency can be difficult, even at some of the nation's premiere teaching hospitals.[6] Further, residents are keenly aware that patient safety is compromised from poor hand-offs.[6] Program directors should consider encouraging their senior residents and faculty to direct inpatient hand-offs. We anticipate that our findings will be a reasonable platform from which to equip FMPDs and direct further investigation.

CORRESPONDING AUTHOR: Address correspondence to Dr Edwards, Texas Tech University Health Sciences Center, 3601 4th Street, MS 8143, Lubbock, TX 79430. 806-743-2775. Fax: 806-743-1421. david.s.edwards@ttuhsc.edu.

References

1. Solet DJ, Norvell JM, Rutan GH, Frankel RM. Lost in translation: challenges to physician communication during patient hand offs. Acad Med 2005;80:1094-9.
2. Horwitz LI, Krumholz HM, Green ML, Huot SJ. Transfers of patient care between house staff on internal medicine wards: a national survey. Arch Intern Med 2006;166(11):1173-7.
3. Osorio SN, Abramson E, Pfoh ER, Edwards A, Schottel H, Kaushal R. Risk factors for unexplained medication discrepancies during transitions in care. Fam Med 2014;46(8):587-96.
4. Joint Commission. Improving transitions of care: hand off communications. www.centerfortransforminghealthcare.org. Accessed December 8, 2013.
5. Arora V, Johnson J, Lovinger D, Humphrey HJ, Meltzer DO. Communication failures in patient sign-out and suggestions for improvement: a critical incident analysis. Qual Saf Health Care 2005;14(6):401-7.
6. Kitch BT, et al. Handoffs causing patient harm: a survey of medical and surgical house staff. Jt Comm J Qual Patient Saf 2008 Oct;34(10):563-70.
7. Mainous AG 3rd, Seehusen D, Shokar N. Council of Academic Family Medicine Educational Research Alliance (CERA) 2011 Residency Director Survey: background, methods, and respondent characteristics. Fam Med 2012;44:691-3.
8. Date DF, Sanfey H, Mellinger J, Dunnington G. Handoffs in general surgery residency, an observation of intern and senior residents. Am J Surgery 2013 Nov;206(5):693-7.
9. Tapia NM, Fallon SC, Brandt ML, Scott BG, Suliburk JW. Assessment and standardization of resident handoff practices: PACT project. J Surg Res 2013;184:71-77.
10. Sawatsky AP, Mikhael JR, Punatar AD, Nassar AA, Agrwal N. The effects of deliberate practice and feedback to teach standardized handoff communication on the knowledge, attitudes, and practices of first-year residents. Teach Learn Med 2013;25(4):279–284.
11. Abraham J et al. Ensuring patient safety in care transitions: an empirical evaluation of a handoff intervention tool. AMIA Annu Symp Proc 2012;2012:17-26. Epub 2012 Nov 3.
12. Starmer AJ, O'Toole JK, Rosenbluth G, et al. Development, implementation, and dissemination of the I-PASS Handoff Curriculum: a multisite educational intervention to improve patient handoffs. Acad Med 2014 Jun;89(6):876-84.
13. Conner MP, Bush AC, Brennan J. IMOUTA: a proposal for patient care handoffs. Laryngoscope 2013;123:2649-53.

14. Starmer AJ, Sectish TC, Simon DW, et al. Rates of medical errors and preventable adverse events among hospitalized children following implementation of a resident handoff bundle. JAMA 2013 Dec 4;310(21):2262-70.

15. Wayne JD, Tyagi R, Reinhardt G, et al. Simple standardized patient handoff system that increases accuracy and completeness. J Surg Educ 2008 Nov-Dec;65(6):476-85.

16. Graham KL, Marcantonio ER, Huamg GC, Yang J, Davis RB, Smith CC. Effect of a systems intervention on the quality and safety of patient handoffs in an internal medicine residency program. J Gen Intern Med 2013;28(8):986-93.

17. Bump GM, Bost JE, Buranosky R, Elnicki M. Faculty member review and feedback using a sign-out checklist: improving intern written sign-out. Acad Med 2012 Aug; 87(8):1125-31.

18. Handoff-Transition Policy. Southern Illinois University School of Medicine Quincy Family Medicine Residency Program Resident Manual. www.quincyfp.org. Accessed December 10, 2013.