World Journal of Surgical Procedures

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World J Surg Proced 2016 March 28; 6(1): 8-12
ISSN 2219-2832 (online)

MINIREVIEWS

Patient handoffs in surgery: Successes, failures and room for improvement

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Author contributions: All authors equally contributed to this paper with conception and design of the study, literature review and analysis, drafting and critical revision and editing, and final approval of the final version.

Conflict-of-interest statement: All authors claim no conflicts of interest or disclosures. This study has not been submitted or presented elsewhere.

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Received: September 28, 2015
Peer-review started: September 28, 2015
First decision: November 3, 2015
Revised: January 27, 2016
Accepted: March 14, 2016
Article in press: March 16, 2016
Published online: March 28, 2016

Abstract

Patient handoffs are transitions where communication failures may lead to errors in patient care. Face-to-face handoffs are preferred, however may not always be feasible. Different models and strategies have been described, yet there are few experimental studies. Expanding the problem, the on-call surgeon may be responsible for many patients, few or none that they admitted. Effective handoffs improve the quality of care and result in fewer errors. Herein we review different models of patient handoffs, comment on common pitfalls, and suggest areas for new research.

Key words: Patient handoff; Communication; Patient handover; Patient care; Face-to-face communication; Check out; Sign out

Core tip: Effective handoffs facilitate effective patient care. Distractions during handoffs cause errors in care, there are no outcomes data to recommend one type of handoff over another, and one type of handoff cannot satisfy all types of practice, even within the same institution.

Ballard DH, Samra NS, Griffen FD. Patient handoffs in surgery: Successes, failures and room for improvement. *World J Surg Proced* 2016; 6(1): 8-12 Available from: URL: http://www.wjgnet.com/2219-2832/full/v6/i1/8.htm DOI: http://dx.doi.org/10.5412/wjsp.v6.i1.8

INTRODUCTION

Handoffs of patient care represent transition points where poor communication may lead to errors. The on-call surgeon may be responsible for many patients, few or none of whom they admitted. Communication barriers are the most frequent cause of handoff errors and may lead to adverse patient events[1]. Previous studies have demonstrated that there is omission of essential

patient information in up to 60% of handoffs[2,3]. Academic centers have faced challenges with handoffs since the implementation of the 80-h work week with more transitions in patient care[4]. With these work-restrictions and changes in health care economics and structure, there is a tendency towards more shift work, night team models, and cross coverage, thus reducing the continuity of care with the admitting physician or team. While reduced work hours may improve lifestyle, patient management can be compromised by communication errors and patient unfamiliarity. There is a paucity of studies that focus on physician-to-physician communication for transfer of patient care compared to the wealth of literature that addresses physician to patient communication[5,6]. Herein, we review the current status, pitfalls, and problems in patient handoffs.

Handoff definition

Although the meaning of a "handoff' is considered implicit by many, no common definition exists in the literature. Efforts have been taken to standardize the definition to facilitate data collection and research, but there is still no consensus[7]. Difficulties in standardizing a definition stem from what to include and exclude. Department- and hospital-specific needs differ considerably; for example, the essential information in a pediatric ward would be very different than that of a surgical intensive care unit. Cohen *et al*[7] provide one definition, "the exchange between health professionals of information about a patient accompanying either a transfer of control over, or of responsibility for, the patient". The Joint Commission defines the handoff process as a session "in which information about patient/client/resident care is communicated in a consistent manner"[8]. For the present work, we define a handoff as an on-call surgeon assuming the temporary care of another surgeon's patient - a vulnerable process that can be compromised by communication failures or individual errors.

Standardization of handoffs

Given that communication errors are well-known consequences of handoffs, the Joint Commission recommends standardization of handoffs; however, they do not provide examples or templates[7]. Similarly, many organizations recommend a standardized approach for patient handoffs, yet fail to provide any examples or what constitutes an effective handoff; one extensive review of the handoff literature failed to find a single instance of an organization providing a template for ideal handoffs[7]. Physicians seem to be amenable to standardized handoffs. In one survey study of emergency medicine program directors, the majority (72.3% of 185) agreed that a standardized handoff system may reduce errors, but most did not have standard policies in their own institution[9]. Data that show standardizations in handoffs improve patient outcomes are lacking. Any data that demonstrated the value of standardization would likely promote implementation. Changing well-established, individualized physician or service handoff practices to a standardized institutional handoff policy may impair, rather than improve efficiency since hospitals, units, and levels of care are vastly different. Given this, the majority of research on handoffs focuses on improvement within a single unit[1]. The on-call surgeon's burdens can be tremendous, especially with cross coverage with trauma and/or acute care surgery. Any process to standardize the handoff process would presumably improve patient care, although these processes should be individualized to particular institutions.

Surgical patient susceptible to errors in handoffs

The surgical patient is uniquely vulnerable to handoff errors because of the transient nature of their care, including the preoperative, perioperative, and postoperative transitions of care. There is a paucity of experimental surgery-specific studies on handoffs - Table 1 highlights some selected surgical studies. One study of 20 patients undergoing major gastrointestinal surgeries found a degradation in the transfer of patient information as the patients went from one phase of care to another[10]. There were failures of communication along all phases of care from preoperative period to postoperative handoffs, both of which had the highest number of communication failures. Fifteen of the 20 patients in that study had minor incidents or adverse events stemming from communication failures. Such errors may sometimes be due to differences in workflow as care is passed from the surgeon to the anesthesiologist and then back again to the surgeon on the wards or intensive care unit[2,10].

Concerning surgeon-to-surgeon handoffs, one study found that 28% of 146 patient adverse incidents in surgical care were attributed to handoffs[11]. Handoffs may not accurately identify problematic patients. One study that followed the sign-out sheets of one surgical residency program found that only 42% of adverse event occurred in patients identified as problematic - patients assigned to the on call team, believing they may be subject to complications[12]. As stated, surgical patients are inherently vulnerable to errors in handoffs with a high number of transitions in the preoperative, perioperative, to postoperative care periods. In addition, night float models often task the resident or attending surgeon to bear responsibility for many patients. In these settings, problems accumulate and are prioritized. The addition of a few urgent or emergent trips to the operating room leads to more opportunities for compromises in care. Prioritizing whether a patient with sudden shortness of breath *vs* another patient in the emergency room with pneumoperitoneum from a perforated ulcer deserves the on call surgeon's attention, all the while remember to check on yet another patient's serial cardiac enzymes is an example of the difficulty of the night float system.

Duty hours in residency programs

Since the implementation of the 80-h work week in

Table 1 Selected surgical handoff studies

Ref.	Design	Methods	Results
Johner *et al*[18]	Multi-center survey	Handoff practices of acute care surgery service in six Canadian general surgery residency programs	39 of 52 surveyed responded. 60% handoffs were mostly are always conducted face to face. Vast majority involved some kind of verbal communication
Zavalkoff *et al*[25]	Single-center implementation of handoff tool	Assess if implementing fill-in-the-blank handoff tool for pediatric heart surgery patients going to intensive care unit improved communication and adverse events	31 handoffs analyzed compared to handoffs prior to sheet. Following implementation of the tool, increase in detail of useful information transfer, no significant increase in time for handoff, lower rate of adverse events but did not reach significance
Scoglietti *et al*[12]	Single-center analysis of sign-out sheets	Resident sign-out sheets, which stratified problematic *vs* non-problematic patients, were collected over a 3-mo period. Patient outcome was analyzed	More non-problematic patients had adverse events, only 42% of adverse events occurred in the problematic patients
Al-Benna *et al*[19]	Multi-center telephone questionnaire	Handoff practices and quality by queried trainee surgeons at 30 British Isles burns units	Majority of units had junior-to-junior handoffs (76.7%), senior-to-senior trainee handoff (56.7%), and more than one level of trainee present. Few handoffs sessions were pager-free of interruptions (10%) and few had formal handoff training (16.7%)
Gawande *et al*[11]	Multi-center interviews	Interview of 38 surgeons from three academic teaching hospitals to identify errors that led to patient incidents	145 incidents reported, 43% (n = 62) of which were due to communication breakdown; of these 66% (n = 41) were due to handoffs errors

2003, general surgery residency programs have been challenged with developing schedules to minimize transitions in patient care. Night teams, float systems, and cross coverage have been implemented to adhere to the duty hour restrictions. This has caused a shiftwork mentality in some programs[4]. A study of malpractice claims showed that handoff errors are more common in teaching institutions[13]. Whether these errors are from ineffective handoffs or too many patients for the on-call resident to adequately care for, the end result is a resident unfamiliar with the patients and their specific needs[14]. Addressing these concerns, an Accreditation Council for Graduate Medical Education task force has made recommendations for residency programs to provide formal instructions for patient handoffs[4]. These include: Schedule designs to minimize the number of handoffs, offer clear documentation on how the handoff process is conducted, and make available the schedules of responsible residents and attendings[15]. Twenty-two of 29 surgical residents stated they perceived that patient care has been compromised by duty hour restrictions, however with improved perception of residents' quality of life[16]. Compromises in the continuity of care, a negative view of the night float system, and decreasing resident work ethics were major factors identified for decreased quality of patient care. The Johns Hopkins surgical residency program emphasizes a 10-point system for an effective handoff. Selected aspects of this 10-point system include: (1) allot adequate time for handoffs; (2) make the process active; (3) emphasize critically ill patients; (4) identify the chief resident on-call; and (5) only have a single standardized list[17]. Whether perception or reality that the limited work week compromises patient care, work hour restrictions is the system we are given - efforts must be made to optimize handoffs to improve the continuity of patient care.

Models of handoffs

There are several different models of handoffs, including, but not limited to, face-to-face and computer-assisted handoffs. Johner *et al*[18] reported a multi-institutional survey which queried handoff practices of acute care surgery service in six Canadian general surgery residency programs. They found that 60% of handoffs were mostly, or completely, conducted face to face. Further, the vast majority involved some form of verbal communication. However, these handoffs were rarely conducted in a quiet or private setting and over 25% of the time was interrupted. Another study surveyed surgeon trainees in 30 different burn units in the British Isles and found that the majority of units had junior to junior trainee handoffs (76.7%), senior to senior trainee handoff (56.7%), and more than one level of trainee present. Few handoffs sessions were free of pager interruptions (10%) and few participants had formal handoff training (16.7%)[19]. One study, evaluating internal medicine residents in four different hospitals, concluded that face-to-face handoffs are best for effectively communicating and reducing errors. Schouten *et al*[20] conducted a retrospective review that compared 305 patients who had a face-to-face handoff compared to 500 patients who were handed over using other methods. In their study, they found no difference in adverse events or mortality between the two groups. They hypothesize that providers that did not receive a dedicated face-to-face handoff may have spent more time familiarizing themselves with patients through other means. They also challenge the importance of face-to-face handoffs in a system where electronic medical records make all data available at one's disposal. Some authors advocate the use of computer-assisted handoffs. Flanagan *et al*[21] conducted a study with 35 internal medicine resident physicians in which computerized patient data were used to generate an electronic patient handoff tool. The objectives of this preliminary study included assessment of the completeness of the tool and the need for more information by the receiving physician. Findings

included that, often times, the report did not include the assessment and plan, and, in many cases, certain data were not accurately transferred. Distractions during handoffs increase the chance that working memory will fail, leading to a higher chance of subsequent medical errors[22]. Although face-to-face handoffs are felt to improve the receiving physician's perception of quality[23], data have not proven that face-to-face handoffs are associated with better patient outcome.

Current and future handoff research

Riesenberg *et al*[1] conducted a systematic review of physician handoffs in the United States. Their search yielded 46 articles, 33 of which were published since 2005. Only 18 of these 46 articles were experimental with the remainder being anecdotal experience, reviews, *etc.* Furthermore, their review revealed that only 6 of the 18 research articles had some measure of handoff effectiveness. Their study found that communication was the most frequently identified barrier to effective handoffs. Forty-five of forty-six articles involved residents or had a medical education theme. The status, problems, and differences in community hospitals are largely not reported in the literature[2]; this represents an area for future research.

One subject the literature on handoffs has yet to explore is the use of texting in communicating patient related care. The use of texting to communicate among residents and attendings was demonstrated in a single center survey study by Shah *et al*[24]. By surveying residents and attendings, they found that the majority of both residents (66%) and attendings (62%) used texting for patient-related care. Verbal or phone conversations were used more often for urgent or emergent situations, however, text messages were the primary means of communication of day-to-day practice of routine patient care. That study did not specifically address handoffs and there are no studies that we are aware of that have done so. Texting prevalence and other uses of smartphones in handoffs and comparison to other means would be a useful contribution to the literature.

CONCLUSION

From the literature, there is much stress on the importance of effective handoffs, yet few scientific studies. Several principles are clear: (1) distractions during handoffs cause errors in care; (2) there are no outcomes data to recommend one type of handoff over another; and (3) one type of handoff cannot satisfy all types of practice, even within the same institution. Areas for future work include data-driven experimental studies that compare different techniques of handoffs and their effects on patient care.

REFERENCES

1 **Riesenberg LA**, Leitzsch J, Massucci JL, Jaeger J, Rosenfeld JC, Patow C, Padmore JS, Karpovich KP. Residents' and attending physicians' handoffs: a systematic review of the literature. *Acad Med* 2009; **84**: 1775-1787 [PMID: 19940588 DOI: 10.1097/ACM.0b013e3181bf51a6]

2 **Nagpal K**, Abboudi M, Fischler L, Schmidt T, Vats A, Manchanda C, Sevdalis N, Scheidegger D, Vincent C, Moorthy K. Evaluation of postoperative handover using a tool to assess information transfer and teamwork. *Ann Surg* 2011; **253**: 831-837 [PMID: 21475027 DOI: 10.1097/SLA.0b013e318211d849]

3 **Anwari JS**. Quality of handover to the postanaesthesia care unit nurse. *Anaesthesia* 2002; **57**: 488-493 [PMID: 12004809 DOI: 10.1046/j.0003-2409.2001.02406.x]

4 **Nasca TJ**, Day SH, Amis ES. The new recommendations on duty hours from the ACGME Task Force. *N Engl J Med* 2010; **363**: e3 [PMID: 20573917 DOI: 10.1056/NEJMsb1005800]

5 **Griffen FD**. The impact of transparency on patient safety and liability. *Bull Am Coll Surg* 2008; **93**: 19-23 [PMID: 18390226]

6 **Solet DJ**, Norvell JM, Rutan GH, Frankel RM. Lost in translation: challenges and opportunities in physician-to-physician communication during patient handoffs. *Acad Med* 2005; **80**: 1094-1099 [PMID: 16306279 DOI: 10.1097/00001888-200512000-00005]

7 **Cohen MD**, Hilligoss PB. The published literature on handoffs in hospitals: deficiencies identified in an extensive review. *Qual Saf Health Care* 2010; **19**: 493-497 [PMID: 20378628 DOI: 10.1136/qshc.2009.033480]

8 Patient safety: Essentials for health care. 5th ed. Joint Commission Resources. Oakbrook Terrace, Ill: Joint Commission Resources, 2009

9 **Sinha M**, Shriki J, Salness R, Blackburn PA. Need for standardized sign-out in the emergency department: a survey of emergency medicine residency and pediatric emergency medicine fellowship program directors. *Acad Emerg Med* 2007; **14**: 192-196 [PMID: 17192443 DOI: 10.1197/j.aem.2006.09.048]

10 **Nagpal K**, Vats A, Ahmed K, Vincent C, Moorthy K. An evaluation of information transfer through the continuum of surgical care: a feasibility study. *Ann Surg* 2010; **252**: 402-407 [PMID: 20647920 DOI: 10.1097/SLA.0b013e3181e986df]

11 **Gawande AA**, Zinner MJ, Studdert DM, Brennan TA. Analysis of errors reported by surgeons at three teaching hospitals. *Surgery* 2003; **133**: 614-621 [PMID: 12796727 DOI: 10.1067/msy.2003.169]

12 **Scoglietti VC**, Collier KT, Long EL, Bush GP, Chapman JR, Nakayama DK. After-hours complications: evaluation of the predictive accuracy of resident sign-out. *Am Surg* 2010; **76**: 682-686 [PMID: 20698370]

13 **Singh H**, Thomas EJ, Petersen LA, Studdert DM. Medical errors involving trainees: a study of closed malpractice claims from 5 insurers. *Arch Intern Med* 2007; **167**: 2030-2036 [PMID: 17954795 DOI: 10.1001/archinte.167.19.2030]

14 **Riebschleger MP**, Bohl J. New Standards for Teamwork: Discussion and Justification. In: The ACGME 2011 Duty Hour Standards: Enhancing Quality of Care, Supervision, and Resident Professional Development. Chicago, IL: Accreditation Council for Graduate Medical Education; 2011: 53-56

15 Accreditation Council for Graduate Medical Education Common Program Requirements. [accessed 2016 Jan 26]. ACGME Website. Available from: URL: http//www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/CPRs_07012015.pdf

16 **Barden CB**, Specht MC, McCarter MD, Daly JM, Fahey TJ. Effects of limited work hours on surgical training. *J Am Coll Surg* 2002; **195**: 531-538 [PMID: 12375759 DOI: 10.1016/S1072-7515(02)01242-5]

17 **Kemp CD**, Bath JM, Berger J, Bergsman A, Ellison T, Emery K, Garonzik-Wang J, Hui-Chou HG, Mayo SC, Serrano OK, Shridharani S, Zuberi K, Lipsett PA, Freischlag JA. The top 10 list for a safe and effective sign-out. *Arch Surg* 2008; **143**: 1008-1010 [PMID: 18936381 DOI: 10.1001/archsurg.143.10.1008]

18 **Johner AM**, Merchant S, Aslani N, Planting A, Ball CG, Widder S, Pagliarello G, Parry NG, Klassen D, Hameed SM. Acute general surgery in Canada: a survey of current handover practices. *Can J Surg* 2013; **56**: E24-E28 [PMID: 23706854 DOI: 10.1503/

cjs.035011]
19 **Al-Benna S**, Al-Ajam Y, Alzoubaidi D. Burns surgery handover study: trainees' assessment of current practice in the British Isles. *Burns* 2009; **35**: 509-512 [PMID: 19297101 DOI: 10.1016/j.burns.2008.11.008]
20 **Schouten WM**, Burton MC, Jones LD, Newman J, Kashiwagi DT. Association of face-to-face handoffs and outcomes of hospitalized internal medicine patients. *J Hosp Med* 2015; **10**: 137-141 [PMID: 25736613 DOI: 10.1002/jhm.2293]
21 **Flanagan ME**, Patterson ES, Frankel RM, Doebbeling BN. Evaluation of a physician informatics tool to improve patient handoffs. *J Am Med Inform Assoc* 2009; **16**: 509-515 [PMID: 19390111 DOI: 10.1197/jamia.M2892]
22 **Parker J**, Coiera E. Improving clinical communication: a view from psychology. *J Am Med Inform Assoc* 2000; **7**: 453-461 [PMID: 10984464 DOI: 10.1136/jamia.2000.0070453]
23 **Vergales J**, Addison N, Vendittelli A, Nicholson E, Carver DJ, Stemland C, Hoke T, Gangemi J. Face-to-face handoff: improving transfer to the pediatric intensive care unit after cardiac surgery. *Am J Med Qual* 2015; **30**: 119-125 [PMID: 24443318 DOI: 10.1177/1062860613518419]
24 **Shah DR**, Galante JM, Bold RJ, Canter RJ, Martinez SR. Text messaging among residents and faculty in a university general surgery residency program: prevalence, purpose, and patient care. *J Surg Educ* 2013; **70**: 826-834 [PMID: 24209663 DOI: 10.1016/j.jsurg.2012.05.003]
25 **Zavalkoff SR**, Razack SI, Lavoie J, Dancea AB. Handover after pediatric heart surgery: a simple tool improves information exchange. *Pediatr Crit Care Med* 2011; **12**: 309-313 [PMID: 20975613 DOI: 10.1097/PCC.0b013e3181fe27b6]

P- Reviewer: Barreto S, Kin T, Morioka D
S- Editor: Qiu S **L- Editor**: A **E- Editor**: Jiao XK

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