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Trauma leadership and ICU shift-handovers

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Chapter 1

General introduction

Residents entering trauma and intensive care find themselves at the sharp end of complex patient care. Their work is centered on patients with complex and high-risk conditions and involves close collaboration and coordination within a multidisciplinary team. They work under dynamic and sometimes stressful conditions, including changing team membership, unexpected events or complications, varying unit workloads and resource availability, and imbalances between time to act and time to understand.¹⁻³ Under such demanding circumstances, teams need skills and tools that will enable them to think, plan, solve problems and take actions as ‘tightly coupled units’.⁴ These skills are often referred to as ‘non-technical skills’, or ‘the cognitive, social and personal resource skills that complement technical skills and contribute to safe and efficient task performance’.⁵

Given the inherently interdisciplinary nature of work in both settings, there is a profound relationship between teamwork and clinical performance.^{1,2,6-8} For instance, marked improvements in teamwork (e.g., information exchange, leadership, decision making) have been found to positively impact teams’ efficiency, error rates and safety culture, as well as patient outcomes such as length-of-stay, re-admissions, complications and mortality.^{1,6,9} Effective team performance has also been directly tied to organizations’ resilience to unexpected events and disturbances to the system.¹⁰ In contrast, poor teamwork and communication have been identified as a main contributing factor to adverse events and calamities resulting in patient harm.^{1,6,9,11,12}

In recognition of the crucial role of teamwork in these settings, residency training programs are now formally required to include extensive non-technical skills training.¹³ Two specific skill areas that have been spearheaded for training include team leadership in acute care situations and handovers of complex patients.^{14,15} They are both considered pivotal coordinative mechanisms for team performance. They are closely tied to quality of care and patient safety, and

combine to cover both ‘action’ and ‘transition’ phases in a patient’s care trajectory. Whereas residents are closely involved in both, studies suggest that they perceive them to be difficult skills and often feel insufficiently prepared to perform them.^{14,16-18} These findings can be seen to highlight the need of targeted training that takes the practice of leadership and handovers beyond role modeling or informal feedback into deliberate practice. In fact, handovers have been prioritized in the U.S. as a ‘national patient safety goal’ and the Accreditation Council for Graduate Medical Education (ACGME) now requires that residents are provided with formal instruction and explicit supervisory guidance.¹⁵

Whereas such formal guidelines have been introduced, they have not been accompanied with specific recommendations regarding the practices that should be taught. Rather, it has been emphasized that a more detailed understanding is needed of the specific requirements faced in a particular context before ‘rushing’ into any training program.^{19,20} In our personal efforts for setting up non-technical skills training in trauma and intensive care, we indeed faced some uncertainties: the literature is not entirely clear on the exact behaviors by which to advance residents’ trauma leadership,²¹⁻²⁴ nor which practices best to teach for the ICU shift-handover.²⁵⁻²⁷ The literature provides divergent skill definitions and behavioral components, and, while studies have been conducted in a wide variety of healthcare contexts, it remains uncertain how previous results may translate to the specific requirements for trauma and critical care. In this thesis, we therefore aim to provide a more fine-grained understanding of the behavioral aspects of trauma leadership and ICU shift-handovers. In the following sections, we will outline the contexts of trauma leadership and ICU shift-handovers and the current knowledge gaps in more detail, and then provide the thesis outline.

TRAUMA LEADERSHIP

Trauma teams are composed of multiple professionals with specialized roles. They can include trauma surgeons, emergency physicians, emergency nurses, anesthesiologists, anesthetist nurses, radiologists and radiographers, and may be extended with consultants from additional specialties. They perform tightly interdependent tasks with each team member providing expert knowledge and skills. Having a designated trauma leader is an important strategy of the team for accessing and synchronizing the different types of expertise.^{3,23,28} Trauma leaders

– often a surgeon or emergency physician – hold a central position in team communication and ideally remain hands-off to allocate their cognitive resources for important ‘macro-cognitive’ team processes, such as managing attention, coordination, detecting problems and maintaining common ground.²⁹

The need of a more detailed, updated framework of trauma leadership skills

While important skill areas of the trauma leader have been identified, their identification has not always been accompanied by the identification of the component skills and the observable, measurable behaviors by which the skills can be trained or evaluated.²⁴ For instance, two skill frameworks that have been specifically designed for trauma team assessment, the T-NOTECHS³⁰ and T-TPOT,⁹ include elements of leadership but focus on skills for the entire team, rather than the trauma leader alone. They thereby miss the granularity needed to support targeted practice of a variety of leadership strategies. Other skill frameworks used in trauma care that do focus solely on leadership were mostly adaptations of the Leadership Behavior Description Questionnaire (LBDQ)²²; a questionnaire originally developed for leadership in business and management. These adaptations have been limited to the ‘initiating structure’ category from the LBDQ and thereby mostly resonate with transactional leadership styles. However, it has more recently been recognized that inclusive and empowering leadership styles may also be warranted.³¹⁻³³ It thus appears necessary to provide an updated, more detailed analysis of trauma leadership behaviors. In this thesis, we therefore aim to answer the following question: What are the key leadership skills for the trauma leader and the specific behavioral components by which they can be learned?

Supporting observations and reflections on trauma leadership performances

Another challenge in the conduct of leadership training is the actual process of observing and evaluating performances. One well-established method for practicing leadership skills is simulation-based scenario training.²⁴ In this type of training, trauma teams rehearse patient management and assessment in a simulated setting, allowing them to deliberately practice teamwork strategies. For the simulation instructor, cognitive load can run considerably high as they have to track, process and memorize the leader’s actions, while also running the

simulation. In order to support their targeted observations and debriefing of performances, the use of observation tools has been recommended.^{22,24} However, an observation tool is currently lacking that specifically targets trauma leadership. We therefore set out to develop and evaluate one.

In the design of observation tools, a close eye must be kept on its clarity and ease-of-use. Evaluations of previous observation tools suggest that they may require extensive background knowledge and rater training, and thus appear only applicable by expert raters.³⁴⁻³⁷ It has therefore been suggested that their interface should be better tailored to the clinician and the clinical setting.³⁵ As it is not yet entirely clear how this can be achieved, we aim to answer the following question: How can instructors be supported in observing and reflecting on residents' trauma leadership performances?

ICU SHIFT-HANDOVERS

In the ICU, shift-handovers are a daily event in which responsibility and authority is formally handed over from one team of physicians to the next. During handovers, the incoming and outgoing teams must establish a shared understanding of the patient cases and ensure the seamless continuation of care plans across shifts. Shift-handovers are intended as brief summaries of the 'big picture' of the patient's problems and care priorities,³⁸ and enable the communication of any important information that is not necessarily documented, such as anticipated complications or hunches.³⁹ It brings the incoming team efficiently up to speed and eases their subsequent efforts of familiarizing themselves with the details as available in the documentation. What makes ICU shift-handovers particularly challenging is the fact that patient cases are often complex (e.g., multiple interacting problems and treatments), entail large amounts of information, and that the establishment of a proper understanding of the patients' problems may take multiple shifts.⁴⁰ Shift-handovers have therefore also been mentioned as potential platforms for discussions that stimulate teams' sense-making, decision-making, and error prevention and remediation.²⁶

Residents have been observed to have difficulties with transferring understanding of complex cases to one another.^{17,25,38,41} This is partly due to difficulties in the delivery of the message (e.g., failures to synthesize large amounts of information, overestimation of the clarity of communication) and in

the reception of the message (e.g., information overload, failure to grasp the implications of information). Also, reviews of handover practice have shown that important information is not consistently included and that handovers are highly variable in terms of structure.^{17,18} As poor handover conduct has been directly linked with suboptimal care and patient harm,⁴²⁻⁴⁴ making handover communication more reliable has become a priority.

How to structure ICU shift-handovers?

One avenue for improving the reliability of handovers is the use of standardized handover schemes. These schemes generally prescribe a fixed order of steps to follow in the handover procedure, such as the key content topics to present (eg. 'situation', 'background', 'assessment', 'recommendations'), actions to perform (eg. 'read back'), or specific clinical variables to communicate.^{45,46} Standardized schemes facilitate that team members hold shared expectations regarding the 'rules' for handover interactions so that they do not need to be negotiated each time. Also, knowing when information will be provided is likely to reduce the number of interruptions during handover presentations.⁷ Various handover schemes have been developed, and some studies provide promising results with, for example, decreases in the number of dropped tasks, errors,⁴⁷ and patient information that was lost across consecutive handovers.⁷

However, there is a large variety in the content and structure of published handover schemes.^{45,46,48,49} In fact, they appear to be based on fundamentally different principles, and there is only limited evidence to favor any specific structure.⁴⁸⁻⁵⁰ This variety and lack of evidence make it uncertain what practices best to teach residents. Few studies have explored which particular structure features are helpful and why they may affect information reception.⁵¹ Such a more fundamental understanding is vital, as the use of a standardized structure may actually have unintended consequences: a number of studies found negative effects with the implementation of a structure, including increases in the number of errors and unexpected changes in subsequent care.^{7,38,52} Establishing a fundamental understanding may well start with an inductive exploration of the nature and variety in current handover practices.²⁷ We therefore adopted the following research question: What are residents' current strategies for structuring handovers, and are specific structure characteristics related to improved information processing and understanding?

The challenges of integrating teamwork in ICU shift-handovers

Another important area requiring a better understanding is the use of handovers as collaborative conversations to improve shared understanding and care plans. Widespread efforts to standardize handovers may have led to an emphasis on handovers as activities of information transfer.²⁶ However, there is a growing case for handovers in complex settings also being used as critical platforms to serve team functions such as joint sense-making, option review, detecting faulty assumptions and error correction.^{26,53-56} Nonetheless, reviews of current practice suggest that their incorporation into the handover proves challenging.^{18,39,57-59} An explanation may be that the pursuit of all these aims take time and cognitive resources, which alternately faces teams with conflicting demands. Unfortunately, the tradeoff of these functions with safety considerations has not yet been identified,⁶⁰ leaving uncertainties regarding the timing and manner with which these functions are to be served within ICU shift handovers. Little is known of the current dynamics of incorporating these functions into the handover, resulting in a challenge for both the conduct and the teaching of handovers as collaborative conversations. We therefore set out to answer the question: What are intensivists' and residents' perceptions regarding the use of handovers as multi-functional collaborative conversations, what challenges do they face for engaging in such interactions, and how may this translate to residents' training requirements?

THESIS OUTLINE

The overarching aim of this thesis is to establish a more fine-grained understanding of the behavioral aspects of two pivotal skill areas: trauma leadership and ICU shift-handovers. In addition, we aimed to identify facilitators and barriers for evaluating performances and integrating skills into practice. The motivation for these studies – in addition to gaining a better understanding – is to empirically inform the design of targeted training programs and to provide helpful resources for their conduct. We believe this work is important because without an accurate understanding of leadership and handovers, their training would run the risk of being dictated by provider preference and institutional history and culture, rather than uniform, evidence-based standards.²⁴

The four research questions presented in this introduction combine to cover the issues of skill identification, evaluation and their integration into practice. The research questions are addressed as follows:

What are the key leadership skills for the trauma leader and the specific behavioral components by which they can be learned?

In chapter 2 we address the need of a more detailed, updated framework of trauma leadership skills. We use critical incident interviews with trauma leaders and other trauma team members to focus on effective leadership performances. We identify the elements of good leadership from the interview transcripts, categorize them, and arrange them into a comprehensive skills taxonomy for trauma leadership skills. Delphi rounds are used to further confirm the elements' relevance to trauma leadership.

How can instructors be supported in observing and reflecting on residents' trauma leadership performances?

As an observation tool is currently lacking that specifically targets trauma leadership, we set out to develop and evaluate one. A specific aim is to achieve a tool that is tailored to the clinicians' vocabulary and is sufficiently easy to use. Chapter 3 describes our modification of the validated skills taxonomy from chapter 2 into a more practical tool to support observations and performance evaluations during simulation-based training. In a comprehensive, user-centered and iterative approach to testing and making modifications, we search to strike a balance between the tool's leanness and the level of detail needed to support in-depth feedback.

What are residents' current strategies for structuring handovers, and are specific structure characteristics related to improved information processing?

In chapter 4, we aim to establish a more fundamental understanding of the nature of residents' current strategies for structuring handovers and how their structure variations may affect information processing. Using videotaped, simulated handovers between residents, we will analyze the nature and sequence of the 'communicative moves' by which residents structure their handovers. We classify different types of handovers based on notable structure variations and compare

their impact on information processing based on the answers on a case-related questionnaire and the type and duration of question-answer sequences.

What are intensivists' and residents' perceptions regarding the use of handovers as multi-functional collaborative conversations?

The aim in chapter 5 is to gain a better understanding of the unique dynamics for using shift-handovers for the functions of joint sense-making, decision-making, critical reflection and learning. We interview intensivists, fellows and residents at the ICU regarding their perceptions of handover functionality and the boundaries to what must or can be achieved in handover conversations, the challenges they face, and how this may translate to residents' training requirements.

In chapter 6, we summarize our findings and how they relate to previous knowledge, and discuss the directions for future research and the practical implications.

REFERENCES

1. Manser T. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. *Acta Anaesthesiol Scand*. 2009;53(2):143-151.
2. Dietz AS, Pronovost PJ, Mendez-Tellez PA, et al. A systematic review of teamwork in the intensive care unit: What do we know about teamwork, team tasks, and improvement strategies? *J Crit Care*. 2014;29(6):908-914.
3. Faraj S, Xiao Y. Coordination in Fast-Response Organizations. *Manage Sci*. 2006;52(8):1155-1169.
4. Fiore SM, Smith-Jentsch KA, Salas E, Warner N, Letsky M. Towards an understanding of macrocognition in teams: Developing and defining complex collaborative processes and products. *Theor Issues Ergon Sci*. 2010;11(4):250-271.
5. Flin R, O'Connor P, Crichton M. *Safety at the Sharp End: A Guide to Non-Technical Skills*. Ashgate Publishing Limited; 2013.
6. Schmutz J, Manser T. Do team processes really have an effect on clinical performance? A systematic literature review. *Br J Anaesth*. 2013;110(4):529-544.
7. Foster S, Manser T. The Effects of Patient Handoff Characteristics on Subsequent Care. *Acad Med*. 2012;87(8):1105-1124.
8. Baker D.P., Gustafson S, Beaubien J.M., Salas E. BP. Medical Teamwork and Patient Safety: The Evidence-based Relation. Literature Review. *Agency Healthc Res Qual Publ*. 2005:1-56.
9. Capella J, Smith S, Philp A, et al. Teamwork training improves the clinical care of trauma patients. *J Surg Educ*. 2010;67(6):439-443.
10. Hollnagel E, Braithwaite J WR. *Resilient Health Care*. Farnham: Ashgate; 2013.
11. Pham JC, Aswani MS, Rosen M, et al. Reducing medical errors and adverse events. *Annu Rev Med*. 2012;63(1):447-463.
12. Langelaan M, Broekens MA, Bruijne MC de, et al. Monitor Zorggerelateerde Schade 2015/2016: Dossieronderzoek Bij Overleden Patiënten in Nederlandse Ziekenhuizen. 2017. www.nivel.nl.
13. Frank J, Snell L, Sherbino J. CanMEDS 2015 Physician Competency Framework. 2015. www.canmeds.royalcollege.ca/en/framework. Accessed February 10 2020.
14. Ringen AH, Hjortdahl M, Wisborg T. Norwegian trauma team leaders--training and experience: a national point prevalence study. *Scand J Trauma Resusc Emerg Med*. 2011;19(54):1-5.
15. Accreditation Council for Graduate Medical Education. Common Program Requirements, 2018. www.acgme.org/portals/0/PFassets/programrequirements/CPRresidency2019.pdf. Accessed February 10 2020.
16. Hayes CW, Rhee A, Detsky ME, Leblanc VR, Wax RS. Residents feel unprepared and unsupervised as leaders of cardiac arrest teams in teaching hospitals: a survey of internal medicine residents. *Crit Care Med*. 2007;35(7):1668-1672.
17. Cleland JA, Ross S, Miller SC, Patey R. "There is a chain of Chinese whispers ...": empirical data support the call to formally teach handover to prequalification doctors. *Qual Saf Health Care*. 2009;18(4):267-271.
18. Horwitz LI, Moin T, Krumholz HM, Wang L, Bradley EH. What are covering doctors told about their patients? Analysis of sign-out among internal medicine house staff. *Qual Saf Health Care*.

- 2009;18(4):248-255.
19. Grand JA, Pearce M, Rench TA, Chao GT, Fernandez R, Kozlowski SWJ. Going DEEP: Guidelines for building simulation-based team assessments. *BMJ Qual Saf.* 2013;22(5):436-448.
 20. Dietz AS, Pronovost PJ, Benson KN, et al. A systematic review of behavioural marker systems in healthcare: What do we know about their attributes, validity and application? *BMJ Qual Saf.* 2014;23(12):1031-1039.
 21. Larsen T, Beier-Holgersen R, Østergaard D, Dieckmann P. Training residents to lead emergency teams: A qualitative review of barriers, challenges and learning goals. *Heliyon.* 2018;4(12):e01037.
 22. Rosenman ED, Ilgen JS, Shandro JR, Harper AL, Fernandez R. A Systematic Review of Tools Used to Assess Team Leadership in Health Care Action Teams. *Acad Med.* 2015;90(10):1408-1422.
 23. Klein KJ, Ziegert JC, Knight AP, Xiao Y. Dynamic Delegation: Shared, hierarchical, and deindividualized leadership in extreme action teams. *Adm Sci Q.* 2006;51:590-621.
 24. Arora S, Menchine M, Demetriades D, et al. Leadership and Teamwork in Trauma and Resuscitation. *West J Emerg Med.* 2016;17(5):549-556.
 25. Wohlaer M V, Arora VM, Horwitz LI, Bass EJ, Mahar SE, Philibert I. The patient handoff: a comprehensive curricular blueprint for resident education to improve continuity of care. *Acad Med.* 2012;87(4):411-418.
 26. Perry SJ, Wears RL, Patterson ES. High-hanging fruit: improving transitions in health care. In: Henriksen K, Battles JB, Keyes MA, et al., editors. *Advances in patient safety: new directions and alternative approaches (vol. 3: performance and tools)*. Rockville: Agency for Healthcare Research and Quality; 2008.
 27. Hillgoss B, Moffatt-Bruce SD. The limits of checklists: handoff and narrative thinking. *BMJ Qual Saf.* 2014;23(7):528-534.
 28. Hjortdahl M, Ringen AH, Naess A-C, Wisborg T. Leadership is the essential non-technical skill in the trauma team--results of a qualitative study. *Scand J Trauma Resusc Emerg Med.* 2009;17:48.
 29. Künzle B, Kolbe M, Grote G. Ensuring patient safety through effective leadership behaviour: A literature review. *Saf Sci.* 2010;48:1-17.
 30. Steinemann S, Berg B, DiTullio A, et al. Assessing teamwork in the trauma bay: introduction of a modified "NOTECHS" scale for trauma. *Am J Surg.* 2012;203(1):69-75.
 31. Nacioglu A. As a critical behavior to improve quality and patient safety in health care: speaking up! *Saf Heal.* 2016;2(10):1-25.
 32. Nembhard IM, Edmondson AC. Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *J Organ Behav.* 2006;27(7):941-966.
 33. Edmondson AC. Speaking Up in the Operating Room: How Team Leaders Promote Learning in Interdisciplinary Action Teams. *J Manag Stud.* 2003;40:1419-1452.
 34. Jepsen RMHG, Østergaard D, Dieckmann P. Development of instruments for assessment of individuals' and teams' non-technical skills in healthcare: a critical review. *Cogn Technol Work.* 2014;17(1):63-77.
 35. Watkins SC, Roberts DA, Boulet JR, McEvoy MD, Weinger MB. Evaluation of a simpler tool to assess nontechnical skills during simulated critical events. *Simul Healthc.* 2017;12(2):69-75.

36. Graham J, Hocking G, Giles E. Anaesthesia Non-Technical Skills: Can anaesthetists be trained to reliably use this behavioural marker system in 1 day? *Br J Anaesth*. 2010;104(4):440-445.
37. Yule S, Rowley D, Flin R, et al. Experience matters: comparing novice and expert ratings of non-technical skills using the NOTSS system. *ANZ J Surg*. 2009;79(3):154-160.
38. Philibert I. Use of strategies from high-reliability organisations to the patient hand-off by resident physicians: practical implications. *Qual Saf Health Care*. 2009;18(4):261-266.
39. Manser T, Foster S, Flin R, Patey R. Team communication during patient handover from the operating room: More than facts and figures. *Hum Factors J Hum Factors Ergon Soc*. 2013;55(1):138-156.
40. Nemeth CP, Kowalsky J, Brandwijk M, Kahana M, Klock PA, Cook RI. Before I forget: How clinicians cope with uncertainty through ICU sign-outs. *Proc Hum Factors Ergon Soc Annu Meet*. 2006;50(10):939-943.
41. Chang VY, Arora VM, Lev-Ari S, D'Arcy M, Keysar B. Interns overestimate the effectiveness of their hand-off communication. *Pediatrics*. 2010;125(3):491-496.
42. Thomas MJW, Schultz TJ, Hannaford N, Runciman WB. Failures in transition: learning from incidents relating to clinical handover in acute care. *J Healthc Qual*. 2012;35:49-56.
43. 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(6):701-710.e4.
44. Horwitz LI, Moin T, Krumholz HM, Wang L, Bradley EH. Consequences of inadequate sign-out for patient care. *Arch Intern Med*. 2008;168:1755-1760.
45. Riesenber LA, Leitzsch J, Little BW. Systematic review of handoff mnemonics literature. *Am J Med Qual*. 2009;24(3):196-204.
46. Nasarwanji MF, Badir A, Gurses AP. Standardizing Handoff Communication: Content Analysis of 27 Handoff Mnemonics. *J Nurs Care Qual*. 2016;00(00):1-7.
47. Starmer AJ, Spector ND, Srivastava R, et al. Changes in medical errors after implementation of a handoff program. *N Engl J Med*. 2014;371(19):1803-1812.
48. Abraham J, Kannampallil T, Patel VL. A systematic review of the literature on the evaluation of handoff tools: implications for research and practice. *J Am Med Inform Assoc*. 2014;21(1):154-162.
49. Abraham J, Kannampallil TG, Almoosa KF, Patel B, Patel VL. Comparative evaluation of the content and structure of communication using two handoff tools: Implications for patient safety. *J Crit Care*. 2014;29(2):311.e1-311.e7.
50. Patterson E, Wears R. Patient handoffs: standardized and reliable measurement tools remain elusive. *Jt Comm J Qual Patient Saf*. 2010;36(2):52-61.
51. Dowding D. Examining the effects that manipulating information given in the change of shift report has on nurses' care planning ability. *J Adv Nurs*. 2001;33(6):836-846.
52. Manser T, Foster S. Effective handover communication: an overview of research and improvement efforts. *Best Pract Res Clin Anaesthesiol*. 2011;25(2):181-191.
53. Cohen MD, Hilligoss B, Kajdacsy-Balla Amaral AC. A handoff is not a telegram: an understanding of the patient is co-constructed. *Crit Care*. 2012;16:1-6.
54. Flemming D, Hübner U. How to improve change of shift handovers and collaborative grounding and what role does the electronic patient record system play? Results of a systematic literature review. *Int J Med Inform*. 2013;82(7):580-592.

55. Jeffcott SA, Ibrahim JE, Cameron PA. Resilience in healthcare and clinical handover. *Qual Saf Health Care*. 2009;18(4):256-260.
56. Patterson ES. Structuring flexibility: the potential good, bad and ugly in standardisation of handovers. *Qual Saf Health Care*. 2008;17(1):4-5.
57. Poot EP, de Bruijne MC, Wouters M, de Groot CJ, Wagner C. Exploring perinatal shift-to-shift handover communication and process: an observational study. *J Eval Clin Pract*. 2014;20(2):166-175.
58. Sharit J, McCane L, Thevenin DM, Barach P. Examining links between sign-out reporting during shift changeovers and patient management risks. *Risk Anal*. 2008;28(4):969-981.
59. Rayo MF, Mount-Campbell AF, O'Brien JM, et al. Interactive questioning in critical care during handovers: a transcript analysis of communication behaviours by physicians, nurses and nurse practitioners. *BMJ Qual Saf*. 2013;0:1-7.
60. Riesenber LA. Shift-to-shift handoff research: where do we go from here? *J Grad Med Educ*. 2012;4:4-8.