EMERGENCY PHYSICIAN TO ADMITTING PHYSICIAN HANDOVERS: AN EXPLORATORY STUDY

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Current emphasis on the number of deaths due to medical errors has pushed the patient safety issue to the forefront at many medical institutions. The Institute of Medicine's recommendation for improved coordination and collaboration between physicians, as well as the paucity of related literature, has led the authors to explore the nature of the handover between emergency department and admitting physicians.

Research was conducted at two Ohio hospitals to document the phases and issues found in emergency department (ED) handovers. The phases for ED handovers were similar to those found in shift changes in other types of industries (e.g., paper mill, air traffic control) with minor variations in the order of the phases. Three areas were identified where potential errors could occur including the spoken communication between physicians, selection of diagnostic tests based on the specific admitting physician, and the use of surrogates by the admitting physician. Physicians identified the level of trust in ED resident physicians, incomplete handovers between ED physicians at their shift change, differences in exams and treatment plans based on admitting physician, and notification of possible admission prior to receiving results for exams as potential problem areas.

The findings of this research illustrate the need for future research into physician communication. These studies have tremendous opportunity to enable the Institute of Medicine's goal of improving communication between physicians for better patient care and outcomes.

INTRODUCTION

The landmark 1999 Institute of Medicine report, "To Err is Human: Building a Safer Health System," reported that 44,000 – 98,000 yearly deaths are caused by medical care errors (Institute of Medicine, 1999), highlighting a critical problem clinicians face in the increasingly technical realm of modern healthcare. Their next report, "Crossing the Quality Chasm," outlined ten key recommendations for improving healthcare quality, with their final recommendation emphasizing collaboration and communication between physicians as critical to "ensure an appropriate exchange of information and coordination of care" (Institute of Medicine, 2001).

Physicians engage in collaboration many times throughout a patient's stay, frequently transferring patient responsibility to another physician. One commonly occurring responsibility transfer is in the emergency department (ED) when a patient is admitted to the hospital (the "handover"). This study explores the importance of the care coordination by studying the ED to admitting physician handover while uncovering aspects of this process that may lead to errors that affect patient care.

Given the importance of communication in the physician's daily activities, it is interesting to note that medical schools rarely include courses in inter-physician communication (Meyers & Miller, 1997). Additionally, the characteristics of a physician handover have seldom been studied and there are few publications available. In their research, Roughton and Severs (1996) found that doctors believe their handover practices need improvement and go on to state, "the lack of advice and guidance on the structure of the handover has impeded good practice, and a standard of professional practice needs to be set." When clinicians communicate regarding patient information, there is a strong probability that essential information is omitted or incorrect (Landucci and Gipe, 1999).

Handovers in the medical environment have many similarities to the shift changes that occur in other industries. In their paper, Durso, Crutchfield, and Harvey (submitted) reveal several general characteristics of shift changes based on their literature review that are analogous to the patient handover:

- transfer of responsibility,
- minimal co-presence,
- no division of labor,
- same environment,
- fundamental minimal skill set, and
- routineness of the transfer.

While the domain is quite different, others have studied shift changes. For example, Grusenmeyer (1995) studied the shift changes of workers in a paper mill where she found three characteristics that would also apply to the medical community:

- Communication is based on verbal exchanges.
- Communication requires representations of the current state by both the incoming and outgoing operators.
- Communication requires shared knowledge and representation of the current state.

While a shift change and a patient handover are not exactly the same, the characteristics of the task and the role of team members are comparable. Therefore, this study examines the patient handover process from the ED to admitting physician and attempts to draw similarities between that and the more traditional shift change experienced in many types of

industries every day. As stated before, while the domains (e.g., manufacturing and health care) are dissimilar, comparisons are made between the phases that Grusenmeyer initially outlined for shift changes in the paper mill and which Durso et al. refined in their review of air traffic controllers. They include:

Table 1. Shift-change Phases.

Phase	Description
End of shift	both operators begin to prepare for the transfer of responsibility
Arrival	during which the incoming operator views the environment he or she will monitor
Meeting	the exchange of information between the incoming and outgoing operator
Taking Post	where the responsibility is transfer

In addition, the order of the phases will be examined for a patient handover. Analyzing the communication of physicians will allow for possible enhancements to that communication. Likewise, by comparing different domains, one may be able to draw lessons from each that potentially could improve the methods used to handle these difficult processes as well as provide a new perspective for medical practice.

METHOD

A preliminary study was conducted in December 2001 to investigate inter-physician spoken communication during ED admission handovers. The purpose of this study was to determine if Grusenmeyer's four shift change phases are applicable to patient handovers, as well as to discover patterns and problems associated with the admission handover.

Participants

Study subjects included ED attending and resident physicians and admitting physicians composed of Internal Medicine residents and private-practice physicians. Participants' experience ranged from one year (first-year residents) to 20 years (private-practice physician). The study was conducted at two Dayton, Ohio facilities, a military hospital hosting a 12-bed emergency department (Hospital A) and a 57-bed Level 1 emergency and trauma center within a large urban teaching hospital (Hospital B). The study at this second facility was constrained to the nursing station receiving the most critical patients, either through walk-ins or emergency services.

Questionnaire

A questionnaire was developed for use during the study, reflecting Grusenmeyer's four major phases. Appropriate sections of the questionnaire were completed with both ED and admitting physicians following a handover. The questions were general in nature and not specific to the current handover; therefore, physicians could only be interviewed once for the purposes of the study. Questions included:

- "Does the ED physician prepare in any for the handover?"
- "What are the average lengths of the handover meetings?"
- "Where and how does the meeting typically take place?"

Procedure

The researcher was present in the ED for 6-8 hours at a time, across all three shifts, noting handover differences. The ED physician alerted the researcher when a handover was likely to occur after which the researcher observed the physician activities, making notes of any special events. In some cases, the researcher was able to listen to the initial (and sometimes the only) conversation between the ED and admitting physicians. Following this handover, the researcher interviewed the ED physician. Admitting physicians were interviewed when they came to the ED to perform their admission assessment.

RESULTS AND DISCUSSION

Fifteen handovers from ED to admitting physicians were studied. The demographic breakdown for the interviews is shown in Table 2.

Table 2. Breakdown of physician interviews.

	Hospital A	Hospital B
ED Residents	4	2
ED Attendings	2	1
Adm. Residents	5	2
Adm. Private Practice	0	2
Total	11	7
Grand Total	**18**	

These interviews were conducted over 9 days, constituting 70 hours of observation. While the sample size may be considered small, it is consistent with the purpose of a preliminary study, reflects the difficulty usually associated with obtaining highly skilled populations of participants, and nevertheless represents an addition to the human factors literature. Since physicians could only be interviewed once for the study, the number of handovers observed does not equal the number of interviews conducted. For example, a physician may participate in multiple handovers; however, they were only been interviewed for the first handover observed where they participated.

During the course of the study, many different types of communication patterns were observed. The most common, and arguably some of the most critical, patterns for the ED are outlined in Figure 1. Communication is handled through

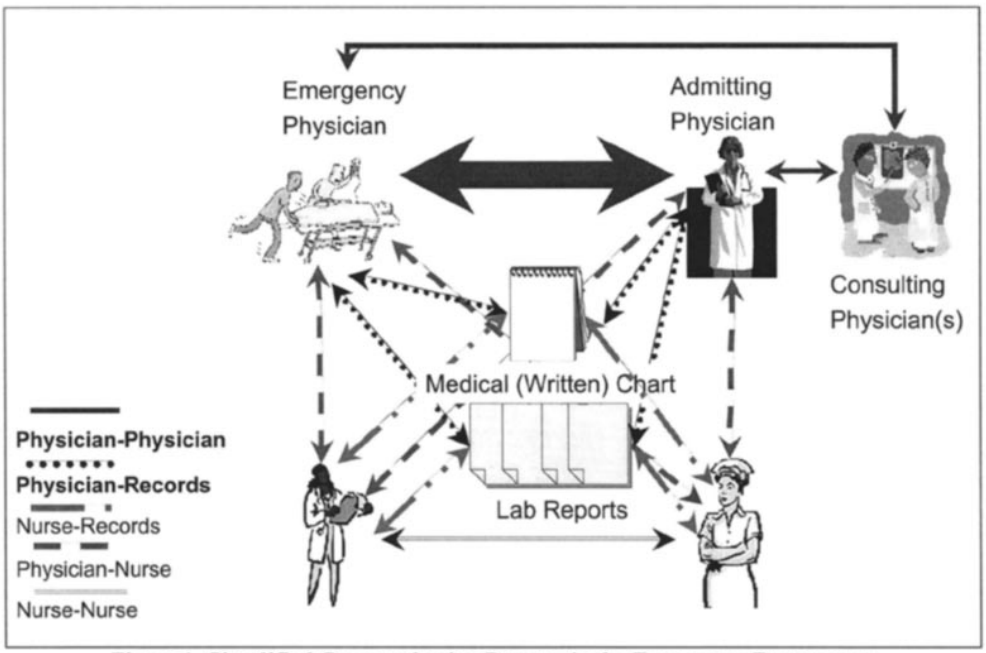

Figure 1. Simplified Communication Patterns in the Emergency Department.

spoken conversation and what Luff, Heath, and Greatbatch (1992) call conversational props (e.g., medical charts, lab reports).

While each of these elements of communication ultimately affects patient care, the focus of this study was the admission process between the ED physician and the admitting physician and any accompanying spoken communication.

In addition to the various types of communication that occur in the ED, three different components of the physician-physician conversation were identified through observations and interviews. These are listed in Table 3.

Table 3. Components of patient handover.

Component	Description
Transfer of information for making the admission decision	ED determines stability and acuity of patient; admitting physician must make decisions regarding admission and treatment
Immediate care of the patient	Responsibility of ED alone, or joint effort between physicians
Transfer of continuity of patient care	ED transfers all relevant information to the admitting physician.

This research found similar stages present in an ED admission handover as outlined by Grusenmeyer, although in slightly different order. The phases occur as: Prepare Handover, Meeting, Arrival of Admitting Physician, and Assume Responsibility. These stages are depicted in Figure 2.

The Prepare Handover stage, as performed by the ED physician, usually involves completing written notes in the patient chart and ensuring all exam results are available. This handover phase can begin upon initial patient assessment if the physician believes there is a strong possibility the patient will be admitted. The physician may order exams they believe the admitting physician will need (e.g., laboratory tests needed prior to surgery).

The Meeting stage typically takes place over the phone following a page to the on-call or private-practice admitting physician. Important facts discussed in the meeting include: reason for visit/chief complaint; pertinent medical history; history and physical findings; reason for admission; abnormal findings, laboratory and radiology results; services provided in the ED; and patient stability. The admitting physician always signals the end of the meeting, usually by stating "I'll be right down" or by asking for a nurse to deliver phone admission orders. This conversation represents the transfer of all relevant information regarding the patient. Because both hospitals in this study serve as teaching hospitals, most cases observed resulted in the admitting physician arriving in the ED a short term later because the admitting physician was an on-call physician within the hospital. However, in a setting where most admitting physicians are in private practice, this spoken conversation between the ED and Admitting physician may represent the sole spoken communication between physicians. In both cases, the physicians may or may not meet again to discuss this patient.

When in the hospital, the admitting physician always came to the ED to review the patient's chart in more detail. However, as depicted in Figure 2 (by the dashed lines), a

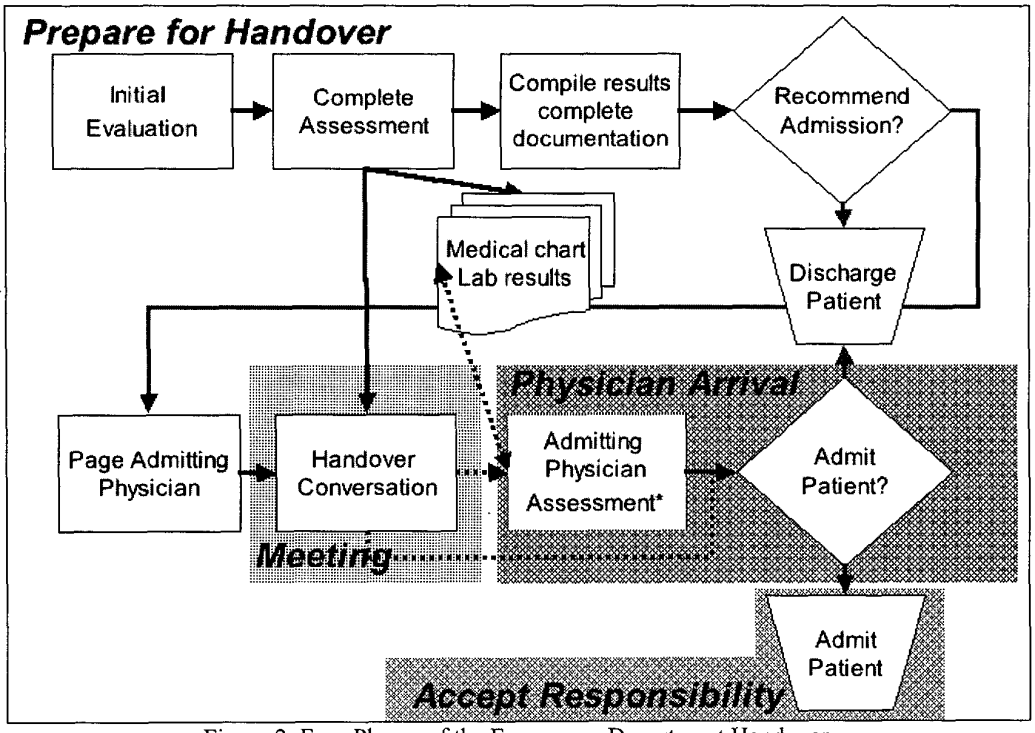

Figure 2. Four Phases of the Emergency Department Handover.

patient may be admitted without the admitting physician reviewing the medical chart or quite possibly a surrogate admit ting physician (e.g., resident) may be called upon to review the chart for the actual admitting physician. This occurs when the admitting physician is not at the hospital (e.g., in the office, home) and is common medical practice. On some occasions the admitting physician spoke with the ED physician, although typically just to confirm information or to get more details regarding a particular point or event. This phase ("arrival of admitting physician") can last as long as an hour, depending on the patient stability, complaint complexity, and the medical history.

Finally, if the admitting physician agrees with the admission recommendation, the patient will be transferred to the appropriate hospital unit, completing the Assuming Responsibility of the Patient phase. This decision may be based solely on the initial phone conversation rather than the detailed review discussed here.

Several points in the process where identified as potential opportunities for medical errors to occur. These are listed in Table 4.

Table 4. Potential opportunities for medical errors.

Spoken communication between physicians
Selection of diagnostic tests by ED physician based on the specific admitting physician
Use of a surrogate by the admitting physician

First and foremost is the spoken communication between the two physicians. Although admission practice guidelines exist for some medical conditions (e.g., pneumonia, American Thoracic Society, 1993; Reddy, Katz, Goldman, and Wachter, 2001), the physicians did not appear to use any published admission standards that were discernable to the observer. However, when we look at similar processes in other industries, such as air traffic control, we find that their handovers are very well regimented to a specific procedure. While these processes may reside in the employee's memory, the method for handing over responsibility of airspace is very controlled (Durso et al., submitted). Our study revealed no such process existed for patient handover. This may be due to our observation process, questionnaire, or knowledge of the process. However, it is equally likely that no such process is followed. Further study is required to determine the actual reason.

Likewise, ED physicians selected their lab requests and diagnostic tests based on the specific admitting physician as opposed to the initial diagnosis. Thus, it is possible that two patients received different standards of care even though they had the same initial diagnosis. The six-sigma literature that pervades the manufacturing industry would argue that a widget is a widget is a widget. Each should be handled the same in order to reduce variability in the product (Breyfogle III, Cupello, & Meadows, 2001). Reducing variability reduces potential problems with the product and ensures customer satisfaction. While the authors realize that humans are not widgets, something can be said for handling each case that is

similar equally. Even the medical industry itself has recognized this need by adopting many standards of care to ensure patient safety. However, for this critical practice of patient handovers, there does not appear to be any standard practice followed for similar types of diagnoses.

Last, while it is medical practice to have a surrogate sometimes act on the admitting physician's behalf especially in a teaching environment, it is actually possible that a patient may be admitted without any admitting physician seeing the patient until the next work day (e.g., admitting physician called in the middle of the night). Given that the ED and admitting physician differ in expertise, a patient could be misdiagnosed until the admitting sees the patient. An error such as this can affect a patient's quality of care and have economic consequences for a hospital (e.g., patient inappropriately admitted).

While these points in the admission process were seen as possible opportunities to introduce error, the physicians interviewed indicated the handover seems to work well at both facilities. They did, however, identify factors that pose problems: incomplete information transfer from one ED physician to another at shift change, unwillingness of some attending and private-practice physicians to work with residents, and calling the admitting physician before all exam results are received.

CONCLUSION

Although the hospital setting is different than those observed by Grusenmeyer and Durso et al., the shift change phases noted by Grusenmeyer have been shown to be applicable to the handover of patients from an ED physician to an admitting physician, although occurring in slightly different order. It is interesting to note the dichotomy of the feedback from some physicians who state during informal interviews that there are problems and issues with the handover process that were not supported by the results of this study. Factors that may have prevented the discovery of problems with current handovers include study depth, methods of eliciting information, lack of clinical analysis during the observations to discover lapses in the handover, and the unwillingness of physicians to discuss handover problems with a non-clinician.

Since the spoken communication between physicians may form the basis for follow-on treatment and diagnosis, the researchers believe issues inherent to it could cause harm to the patient. Future research will evaluate the detail of the spoken communication against current medical standards of care in order to isolate the opportunities for errors. By understanding where problems typically arise, new processes and procedures can be implemented to improve the coordination between physicians. This will support the Institute of Medicine's recommendation and help ensure patients receive the best quality of care possible.

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REFERENCES

American Thoracic Society (1993). Guidelines for the Initial Management of Adults with Community-acquired Pneumonia: Diagnosis, Assessment of Severity, and Initial Antimicrobial Therapy, American Thoracic Society, *American Review of Respiratory Disease*, *148*, 1418-1426.

Breyfogle III, F. W., Cupello, J. M. & Meadows, B. (2001). *Managing Six Sigma: A practical guide to understanding, assessing, and implementing the strategy that yields bottom line success*. New York: Wiley.

Durso, F., Crutchfield, J., & Harvey, C. (Submitted). ATC Position Relief Briefings: Example of the Cooperative Shift Change, *Journal of Aviation Psychology*.

Ekman, I., & Segesten, K. (1995). Deputed power of medical control: the hidden message in the ritual of oral shift reports. *Journal of Advanced Nursing*, *22*, 1006-1011.

Grusenmeyer, C. (1995). Shared functional representation in cooperative tasks – The example of shift changeover. *The International Journal of Human Factors in Manufacturing*, *5*, 163 – 176.

Hardey, M., Payne, S, & Coleman, P. (2000). "Scraps": hidden nursing information and its influence on the delivery of care. *Journal of Advanced Nursing*, *32*, 208-214.

Institute of Medicine. (1999). *To Err is Human: Building a Safer Health System*. Washington, DC: National Academy Press.

Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press.

Lamond, D. (1999). The information content of the nurse change of shift report: a comparative study. *Journal of Advanced Nursing*, *31*, 794-804.

Landucci, D., & Gipe, B. T. (1998). The art and science of the handoff. How hospitalists share data. *Cost and Quality Quarterly Journal*, *4*, 8-10.

Luff, P., Heath, C., & Greatbatch, D. (1992). Tasks-in-interaction: paper and screen based documentation in collaborative activity. In *Proceedings of Computer Supported Cooperative Work 1992* (pp. 163-170). Baltimore, MD: Association for Computing Machinery.

Meyers, K.C., & Miller, H.J. (1997). Enhancing Physician-Physician Communication Skills. *Academic Medicine*, *72*, 934.

Moenk, S., Baldering, H.-J., Schnaus, P., & Heinrichs, W. (1997). Preoperative patient assessment and data collection with a handheld computer. In *Computers in Anesthesia XVIII of the Society of Computers in Anesthesia (SCIA)* (p. 65). Lake Arrowhead, CA: Society of Computers in Anesthesia.

Payne, S, Hardey, M., & Coleman, P. (2000). Interactions between nurses during handovers of elderly care. *Journal of Advanced Nursing*, *32*, 277-285.

Reddy, J. C., Katz, P. P., Goldman, L., & Wachter, R. M. (2001). A Pneumonia Practice Guideline and a Hospitalist-Based Reorganization Lead to Equivalent Efficiency Gains, *The American Journal of Managed Care*, vol. 7, no. 12, 1142-1148.

Risser, D.T., Rice, M.M., Salisbury, M.L., Simon, R., Jay, G.D., & Berns, S.D. (1999). The Potential for Improved Teamwork to Reduce Medical Errors in the Emergency Department. *Annals of Emergency Medicine*, *34*, 373-383.

Roughton, V.J., & Severs, M.P. (1996). The junior doctor handover: current practices and future expectations. *Journal of the Royal College of Physicians of London*, 30, 213-21.