Published in final edited form as:

J Am Pharm Assoc (2003). 2012 ; 52(6): e161–e167. doi:10.1331/JAPhA.2012.11233.

The Prescription Handoff in Community Pharmacy: a Study of its Form and Function

Michelle A. Chui, PharmD, PhD [Assistant Professor] and

the Social & Administrative Sciences Division at the University of Wisconsin – Madison, School of Pharmacy

Jamie A. Stone [Associate Researcher]

the Social & Administrative Sciences Division at the University of Wisconsin – Madison, School of Pharmacy

Abstract

Objectives—To describe and explore handoffs in community pharmacy.

Design—Descriptive, exploratory, non-experimental study

Setting—Wisconsin, August – October, 2008

Participants—Community pharmacists

Intervention—Brief, face-to-face, Semi-structured interviews

Main outcome Measure—Information on characteristics of handoffs, including the reasons for handoffs, what kind of information is shared during handoffs, and how information is shared.

Results—The overarching reasons handoffs are done in community pharmacy are because some of the necessary information is confusing, contradictory, or absent, and/or the drug product is not in stock. Handoff information typically consists of a description of the problem, the current status of the problem, what information are still needed, and future steps to resolve the problem. Handoffs can occur synchronously during a shift change or asynchronously when one pharmacist signs out at the end of the day, and another pharmacist opens the pharmacy the next morning. While synchronous handoffs are generally verbal in nature, asynchronous handoff information is primarily conveyed via paper or electronic notes on the dispensing computer system.

Conclusion—Our results suggest that handoffs do take place in community pharmacies and that the process is unstructured and variable. Future studies should fully characterize this process and explore possible strategies for improvement.

Keywords

handoff communication; community pharmacy

Corresponding author: Michelle A. Chui, PharmD, PhD, 2513 Rennebohm Hall, 777 Highland Avenue, Madison, WI 53705, T: (608) 262-0452, F: (608) 262-5262, mchui@pharmacy.wisc.edu.

The authors and/or immediate family members declare no conflicts of interest or financial interests in any product or service discussed in the manuscript.

Previous presentation: American Pharmacists Association Annual Meeting, Seattle, WI March 2011.

Introduction

Providing health care has become more complex as more providers share in the care of a patient. Patients are routinely referred from a family physician to an emergency department physician to a staff hospitalist when they are admitted to the hospital. Continuous care is provided by nurses coming on and going off their shifts. The patient information that must be conveyed during shift changes or transfers from one hospital unit to another, also called handoffs, is particularly important but is especially vulnerable to error.

Studies examining the effect of handoffs confirm an increased risk of preventable adverse events when patients are cared for by multiple providers or by providers that are unfamiliar with their care.^{1,2} Studies also have shown that handoffs are frequently done in a haphazard fashion.³⁻⁵ Reasons for handoff variability are lack of standardized training, background noise, potential for interruptions, differing expectations for amount of information conveyed, lack of ability to clarify information, and time.^{4,5} Given the frequency of these transitions in health care, and their susceptibility to lapses and errors in communication, handoffs have been identified as a key area for improvement in reducing medical errors and patient harm by the Joint Commission and the World Health Organization.⁶⁻⁸

Just as the standard of a family physician following the patient from the outpatient to the inpatient setting has given way to a team approach, so has the practice of pharmacy in the community setting shifted from an individual to a larger practice model. Community pharmacies are typically open for 10-14 hours daily, or approximately 60-90 hours per week. With the exception of a small number of 24-hour pharmacies, pharmacies close at night. Depending on the individual practice, multiple pharmacists may work in one pharmacy, with one pharmacist working a full 10-14 hour day by himself, followed by his partner pharmacist working the entire next day, or one pharmacist working the morning shift overlapping in the afternoon with a pharmacist whose shift extends into the evening.

Once characterized by continuity of care provided by a single familiar pharmacist, commonly the owner, the provision of safe and effective drug therapy today is delivered by multiple pharmacists including a growing number of part-time or floating pharmacists having a limited relationship with or knowledge of the patient. One pharmacist may accept a prescription, another may verify its accuracy, while yet another may counsel the patient. Depending on the dynamics of shift-changes and workflows, different pharmacists and technicians may be involved at each of these stages. Unresolved problems or questions regarding one or more of a patient's prescriptions that occur during one pharmacist's shift may remain unresolved by the end of the shift. Information relevant to any such pending prescription is passed on to the next pharmacist at the shift changeover. Information to be passed on includes problem elements in the prescription, e.g. patient is allergic to a medication and pharmacist needs to call the clinic for clarification, or problem awareness needed to respond to inquiries, e.g. patient comes in to pick a prescription or physician calls in with information. With varying response times to clarification requests, clarifications may be received by pharmacy staff members other than those initiating the request. In such cases, clarifications must be connected to the original prescription. At any given moment, several prescriptions for one patient can rest at different stages of dispensing.

Although many quality improvement mechanisms have been employed to reduce the risk of medication errors, no research has been done to evaluate handoffs in community pharmacy. This is in stark contrast to handoffs in other healthcare settings.

Objectives

The objectives of this study were to describe and characterize how patient and prescription information is conveyed between community pharmacists, what kind of information is shared, and the reasons information is handed off.

Methods

A qualitative approach to describing and characterizing how patient and prescription information is conveyed between community pharmacists was used. Semi-structured interviews were used for data collection. Such interviews are useful when flexibility is needed to more completely explore topics and concepts mentioned by an interviewee.⁹

Pharmacist recruitment involved solicitation of pharmacists through the Pharmacy Society of Wisconsin (PSW, the state's professional pharmacy association) Fast Facts listserv. The PSW Fast Facts is a weekly electronic newsletter distributed to members. Community pharmacists who float between different pharmacy locations, or work in a pharmacy staffed with more than two full-time pharmacists were invited to participate in the study in August 2008. A purposive sample of eight pharmacists was selected to interview.

After pharmacists contacted the researcher via email, a date and place for the interview was arranged. A letter was sent to each pharmacist thanking them for their participation and containing the interview questions. Informed consent was obtained from all pharmacists. Pharmacists were each paid \$20 for participating in the interview. This study was approved by the institution's Institutional Review Board.

Working Definition of a Handoff in Community Pharmacy

Our working definition of a handoff is “the process of conveying necessary information in order to transfer primary responsibility for providing safe and effective drug therapy to a patient from one community pharmacist to another community pharmacist.”¹⁰ Examples of handoffs using this definition include pharmacist shift changes, pharmacist sign-outs at the close of the business day, and within-shift transfer of dispensing responsibilities between pharmacists. The scope of this study did not include handoffs across settings or between health care professionals or family caregivers, such as from a physician to a pharmacist.

Interviews

The interviews took place during September and October, 2008. Three of the interviews were conducted in the participant's pharmacy office during regular business hours. Five interviews were conducted offsite at a restaurant. Interviews lasted approximately 45 minutes.

At the beginning of each interview, the aims of the study were shared with the pharmacist. The researcher (MC) set the tone for a thoughtful and nonthreatening atmosphere by asking each pharmacist to describe their pharmacy setting(s). Pharmacists were asked to describe their typical interaction with other staff pharmacists, and how they communicated with each other regarding patient care issues. The questions served as an icebreaker and a chance for the pharmacists to describe their communication patterns broadly. Next, pharmacists were asked to provide their own definition of a handoff in the community pharmacy setting, followed by a description of a good handoff and a bad handoff. Because little is known about handoffs in the community pharmacy, we used the critical incident technique. This technique broadens knowledge of poorly understood areas using an individual's observation of their own behavior or of others.¹¹ Specific questions about characteristics of handoffs, including the benefits and hazards were asked. Lastly, questions about the quality of

handoffs that pharmacists give and receive were explored. Pharmacists were encouraged to respond to all issues raised by the researcher, but were informed that they did not have to respond if s/he did not feel comfortable with the question(s). To avoid biased responses, the researcher was careful to ask neutral questions and not present personal views on an issue. Each interview was audio recorded using a digital recorder.

Thematic Analysis

After the eight interviews were conducted, the audio tapes of each interview were professionally transcribed into a Microsoft Word file.¹² The interview text was read several times by the pharmacist researcher (MC) who conducted the interviews and was joined by an industrial engineer researcher (JS) skilled in conducting thematic analysis, but was not involved in the study planning or research design. The text was analyzed in a descriptive and interpretive manner. The text was read line by line (by JS), who grouped participant statements using NVivo9 software.¹³ Statements referring to a particular theme were further explored and compared by both researchers (MC, JS). Once the initial analysis was conducted, interpretations were discussed and consensus was reached on classification of statements into themes after deliberation relating to interpretation of the statements and consistency. Interviews were analyzed as a whole and responses at any time in the interview were classified into themes. No additional interviews were conducted after the eighth interview as no new information was obtained.

Results

Eight interviews with eight pharmacists were completed with two float pharmacists (one at a grocery store pharmacy, one at a chain pharmacy), four staff pharmacists (one at an outpatient pharmacy, two at chain pharmacies, and one at an independent pharmacy), and two pharmacy managers (one at a chain pharmacy and one at an outpatient pharmacy). One pharmacist worked in a 24-hour chain pharmacy. Our analysis resulted in themes describing the characteristics of a handoff, as well as others relating to the benefits and hazards associated with handoffs, the quality of handoffs, and the outcomes related to those factors. The results provided in this article describe the characteristics of handoffs by examining why handoffs are done, what kind of information is shared during handoffs, and how information is shared.

The following sections describe these aspects of handoffs in detail and the themes that were identified within each, both with research interpretation and verbatim examples of pharmacists' comments where appropriate.

Why Handoffs are done

The overarching reasons handoffs are done in community pharmacies are because some of the necessary information is confusing, contradictory, or absent, and/or the drug product is not in stock. Ultimately then, the pharmacist is unable to completely and safely dispense a prescription until more information is obtained or until the product is in stock. For instance, pharmacists may need to call a physician to clarify a potential drug-drug interaction or an incorrect dosing. In this case, the pharmacist must wait until the physician calls him back before filling the prescription. The pharmacist may leave for the day before the physician returns the phone call, therefore necessitating a handoff to the incoming pharmacist.

Information pending from an insurance company also may result in a handoff of information from an outgoing to an incoming pharmacist. Refill authorizations, prior authorizations, and formulary and vacation overrides are examples of situations in which pharmacists require a code from the insurance company to adjudicate a prescription and are often associated with

a delay to get needed information. Refill authorizations require authorization from the patient's physician while prior authorizations require coordination with both the patient's insurance company and the patient's physician. Several pharmacists noted that handing off information about insurance problems is common because they frequently do not get a call back from the insurance company before their shift ends. In cases where a medication or product is not in stock, the information that the medication could not be dispensed, along with whether it has been or needs to be ordered, is relayed to the next pharmacist.

The next section will detail what kind of information is transferred during a handoff.

What Kind of Information Is Handed Off

When completing handoffs, pharmacists discussed the types of information that are shared when handing off information.

All pharmacists interviewed reported that two items should always be included when handing off information – a description of the problem being handed off, e.g. medication dose seems inappropriate, and the current status of the problem, e.g. I'm waiting for a call back from the clinic. By necessity, detailed information about the drug (e.g. name, dose) in question is also key information that is part of the handoff and was specifically cited by one of the pharmacists. Almost all of the pharmacists reported that it is important to indicate what information is still needed and what the future steps are needed to resolve the problem.

“Probably the most important (step) is sharing information about an incomplete prescription, like, is it missing a dose, are the directions confusing, is there a drug interaction, something missing from the prescription”

Less prevalently, some of the pharmacists indicated that it was also important to relay who spoke to whom regarding the problem and when they were spoken to. This helped the pharmacist determine how long the problem had been ongoing and, for instance, if they should try to call the doctor's office again if a phone call had not yet been returned. One pharmacist gave an example,

“So I know if they put a call into the doctor's office if it was Wednesday morning, so when I come in on Thursday morning, I think, I can wait ‘til later morning, but then if I don't hear by early afternoon I'm calling back again.”

In addition to specific problem information, pharmacists also described other items conveyed in handoffs. One pharmacist stated that she relayed patient information as part of the handoff including name, date of birth, drug allergies, or other information important for identification of the correct patient and to make sure the drug being filled is appropriate for the patient.

One pharmacist also mentioned keeping the patient up to date on the status of the problem and including that information as part of the information given to the incoming pharmacist.

“Have we notified the patient, do they know that the-, that we're waiting on it, or are they waiting on a phone call from us? That's, that's always nice too...”

Besides the specific facts and details about problems and issues, one pharmacist also noted the helpfulness of giving the other pharmacist “the big picture” of what else had been going in the pharmacy during his shift, so the incoming pharmacist could prioritize other urgent needs that needed to be addressed when he started his shift.

“Just sharing info about things that are going to be going on that day, like we have five appointments for a flu shot and they're going to be in at this time... just like communicating stuff for the day so people are prepared...”

Synchronous and Asynchronous Handoffs

How handoffs are done can be categorized based on whether they are synchronous or asynchronous. The difference between synchronous and asynchronous handoffs is the timing of the communication. Synchronous communication occurs when information between two parties is given and received in real-time. Synchronous communication allows for clarification at the time the information is given. Asynchronous communication occurs when information is conveyed by one party and received by another party at separate times.

How Synchronous Handoffs Are Done

A hallmark characteristic of synchronous handoffs is that they are verbal in nature, with the outgoing pharmacist verbally listing all of the pending issues in the pharmacy to the incoming pharmacist. These occurred during shift changes and short pharmacist breaks in which the outgoing pharmacist would verbally relay to the incoming pharmacist what they had been working on. The handoff was done so that the incoming pharmacist could work on the issue or be able to understand information coming into the pharmacy, e.g. clinic returns phone call, about the issue.

The pharmacist employed in a 24-hour pharmacy noted how 24-hour schedules lead to special handoff circumstances not present in other stores. For instance, when a pharmacy is open 24 hours, all shift to shift handoffs can be verbal in nature because a pharmacist is always present. One pharmacist drew a contrast,

“So it's very different being able to talk to someone every time... I think we're lucky ... that we can verbally communicate every shift change”

Another interesting phenomenon that one pharmacist noted occurring was the “double handoff.” In this situation the day-shift pharmacist relays handoff information to an evening-shift pharmacist who then relays that information to the pharmacist that is arriving in the next morning. This situation tended to occur when waiting for information from a place only open normal business hours such as a doctor's office.

“So let's say I go home at night and the night pharmacist comes on, I make a point of saying can you make sure the morning pharmacist sees this to call on this in the morning, this is important ... please clarify directions or whatever the case may be”

When possible, pharmacists expressed a preference for either both verbal and written information, or verbal information over information by notes alone. Many pharmacists noted that the verbal handoff was helpful in directing the pharmacist to any nuances and the most pressing problems, while the written information helped give the pharmacist basic facts to solve the problem (the number to call, the dosage).

“I'll have what's called a “print screen,” so things from our computer system, ..., just how it looks on the screen, I'll print that out, write a quick little note on it, and then communicate that to them; hand that off to them...”

How Asynchronous Handoffs Are Done

Asynchronous handoffs were required when a pharmacy was closed in the evenings. Pharmacists described this occurring in different types of situations: when a different staff pharmacist was going to be on duty the next day or when a float pharmacist was working. One pharmacist described this type of handoff as,

“Basically a run-down of, a play-by-play of the problems they had that night, to please look at this in the morning...”

Pharmacists used several mechanisms to convey hand off information asynchronously.

Paper Mechanisms—All pharmacists reported that they used some type of paper mechanism to convey handoff information asynchronously. Sticky notes, notepads, folders, a bulletin board, and notes on prescription labels were all cited as mechanisms to leave handoff information. The choice of mechanism depended upon the complexity of the message. Sticky notes, notepads, and notes on prescription labels were typically used for pending issues that pharmacists felt could be resolved within a day.

“We hand-write notes on the prescription labels or the receipts when the patients come to pick up their prescriptions there will be a list of things like, something not covered by the insurance, this is the cash price, drug-drug interaction, “ask about allergies,” so there's a lot of notes that we just write on the receipt when people come in, so that's our main communication about a question we may have.”

Folders were used when numerous contacts with physicians, insurance companies, and patients were required to document the ongoing pending nature of a prescription such as a prior authorization. A bulletin board was used by one pharmacist to provide extensive information about specific patients, for instance ones that had a long allergy list that all the pharmacists should be aware of.

Even when a pharmacist was leaving for a short break an asynchronous handoff in the form of a note sometimes occurred even though both pharmacists were present in the pharmacy at the same time.

“If I was working and I was the only pharmacist on and this other pharmacist was coming to relieve me and I take a lunch for a half hour, I might just have the piece of paper in front of that hardcopy... write a note on it.”

Electronic Mechanisms—Many pharmacists wrote handoff notes electronically in pharmacy computer systems' free text note sections. In fact, some pharmacy corporations required this documentation.

“This particular situation where you've got a patient on two different medicines that may or may not be correct, putting notes in a patient note file. Most computer programs have a note file and that way if you question anything you can go into that note file and see if anything's been resolved from that question or if there's any other lingering things that you need to know about.”

Interestingly, pharmacists did not necessarily recognize that a patient's electronic note section facilitated handoff communication.

“I guess I never thought of that as a handoff and now that I'm thinking about it, it actually kind of is, because information that I thought was important that the patient needed to hear, that I wasn't necessarily going to give the patient, I thought it was important enough to flag it for the pharmacist that would be.”

Asynchronous verbal handoffs—Even if a pharmacist did a verbal handoff or provided a written handoff to another pharmacist at the end of their shift, pharmacists occasionally remembered something later in the evening or the next day that they had forgotten to relay to the next pharmacist. In such cases, they typically called the pharmacy and left a message about something they completely forgot to relay or an addendum to information that was partially relayed.

“Once, I did call back in the morning and leave it on the doctor's line... like, “Oh, I forgot to tell you about this.””

One pharmacist speculated that it might be helpful to routinely leave voicemails for pharmacists as a way to handoff information stating,

“It might be cool, if we could just like put it on a tape recorder or have some option on the phone where we could say this is what's going on with this prescription, just so somebody could hear it, I think might be nicer than leaving a note...where it could get lost, if we could say it on the phone... that would be pretty cool.”

Besides forgetting to relay information, pharmacists also noted other reasons why they would call another pharmacist including a note describing an issue being illegible or unclear. For some pharmacists, questioning off-duty pharmacists by phone who are not working and asking questions was regular practice while other pharmacists were hesitant to call the previous day's pharmacist for fear of bothering them or interrupting their vacation day. They stated that they would explore every other angle (call the physician, ask the technician, waiting for the patient to arrive for clarification) before calling the pharmacist.

“Did I feel bad about bothering them on their day off? Yes, definitely, um, did I feel it was appropriate? I had to get information in order to take care of a problem, because I didn't know what was going on.”

In terms of receiving phone calls while not on duty at the pharmacy, some pharmacists were very comfortable and made arrangements so this could be done, e.g. leaving her cell phone number, while others preferred that they not be called at home. One pharmacist admitted he did not always leave clear or legible notes so being called at home was a regular occurrence for him. Another pharmacist who preferred not to be called at home stated that she is always very thorough with her handoff notes so that pharmacists would not have a reason to call her at home. One pharmacist noted that it was sometimes difficult to answer questions over the phone at home since she cannot access patient information from home.

Discussion

This project set out to describe and characterize handoff communication, a process that has been extensively studied among other health care professionals and in different settings, but has previously not been studied in community pharmacies.

Similarly to other studies conducted in emergency departments and other hospital units, we found that the type of information exchanged and the format in which information is conveyed was extremely variable and could lead to a breakdown in communication. Breakdowns in communication can often result in errors, many of which are preventable. Indeed, an Australian study involving 28 hospitals reviewed the causes of adverse events and found that communication errors were the leading underlying cause.¹⁴ In 2007, the Joint Commission identified that 60% of hospital sentinel events were caused by a breakdown in communication.⁷

While the literature shows that the deficits in handoff communication in hospital settings are substantial, there is a lack of robust evidence on best handoff practices. Strategies that have been proposed include gaining consensus on a structured handoff process which may include a mnemonic, requiring a face-to-face component with two-way questions and answers,¹⁵ using an electronic or paper handoff form or template, developing targeted training for students and new trainees,⁴ establishing a pre and post handoff routine, determining a standard location for the handoff that limits interruptions, and conducting the handoff at the bedside.⁵

Because the process of care, and more specifically handoffs, in community pharmacies is different from other health care settings, it is not clear whether strategies suggested for hospital settings can be effectively employed. However, two studies have been published which tested an intervention to improve handoffs in a manner which may more directly be applied to the community pharmacy setting. One study, conducted in a respiratory acute care

unit, found that supplementing the written handoff with a telephoned verbal report decreased costs associated with readmission to the hospital.¹⁶ A second study, conducted in the emergency department, compared asynchronous voicemail handoffs to face-to-face oral handoffs. Physicians reported that the asynchronous handoff was easier, but the quality of interaction between physicians was reduced.¹⁷ These studies may shed light on opportunities to improve the handoff process in community pharmacies. However, a more comprehensive understanding of the specific work system issues associated with handoffs in community pharmacies must be undertaken prior to the implementation of such strategies.

Limitations

This study had several limitations. First, eight pharmacists from one state participated in this study. While participants were float, staff, and managing pharmacists from both chain and independent settings, the extent to which our findings can be generalized to other community pharmacies is unclear. The characteristics of handoffs experienced by other community pharmacists working in different pharmacy corporations may need to be studied. Second, pharmacists were unaware of studies regarding handoffs in other health care settings. Indeed, as the term “handoff” was foreign to some of them, many of the pharmacists were trying to describe a process that they had never seriously considered before. Information provided about handoffs was based on potentially newly formed perceptions. A significant challenge was the difficulty in defining good as well as problematic and poor handoffs. Finally, this information was not validated by direct observation.

Conclusion

The present study represents our initial effort to better understand the handoff process in community pharmacies. Our results suggest that handoffs do indeed take place in community pharmacies and that the process is unstructured and variable. As such, we envision further detailed investigations of mechanisms by which handoffs are conducted, including additional methods of data collection including surveys and direct observation. Future studies can also be conducted to identify the impact of poor handoffs on patient harm and pharmacist quality of work life. Development and testing of high quality outcome studies that focus on system factors, human performance, and effectiveness of protocols and interventions should ultimately lead to best practice recommendations.

Acknowledgments

To Leigh Maxwell for assistance with the content analysis and Edward Carbo for assistance on the literature review.

Funding: Michelle Chui is supported by a career development grant from the Clinical and Translational Science Award (CTSA) program of the National Center for Research Resources, National Institutes of Health (1UL1RR025011).

References

1. Peterson LA, Brennan TA, O'Neill AC, Cook EF, Lee TH. Does housestaff discontinuity of care increase the risk for preventable adverse events? *Annals of Internal Medicine*. 1994; 121(11):866–872. [PubMed: 7978700]
2. Zinn C. 14000 preventable deaths in Australian hospitals. *Br Med J*. Jun; 1995 310(6993):1487–1487. [PubMed: 7787586]
3. Volpp KGM, Grande D. Patient safety - Residents' suggestions for reducing errors in teaching hospitals. *N Engl J Med*. Feb; 2003 348(9):851–855. [PubMed: 12606742]

4. Solet DJ, Norvell JM, Rutan GH, Frankel RM. Lost in translation: Challenges and opportunities in physician-to-physician communication during patient handoffs. *Acad Med.* Dec; 2005 80(12):1094–1099. [PubMed: 16306279]
5. Singer JI, Dean J. Emergency physician intershift handovers - An analysis of our transitional care. *Pediatr Emerg Care.* Oct; 2006 22(10):751–754. [PubMed: 17047478]
6. Coleman EA, Berenson RA. Lost in transition: Challenges and opportunities for improving the quality of transitional care. *Annals of Internal Medicine.* Oct; 2004 141(7):533–535. [PubMed: 15466770]
7. Joint Commission on Accreditation of Healthcare Organizations. [Accessed September 16, 2011] 2010 National Patient Safety Goals (NPSGs). 2007. <http://www.jointcommission.org/patientsafety/nationalpatientsafetygoals>
8. World Health Organization. [Accessed September 16, 2011] Assuring medication accuracy at transitions in care standard operating protocol fact sheet. 2010. http://www.who.int/patientsafety/implementation/solutions/high5s/ps_medication_reconciliation_fs_2010_en.pdf
9. Kvale, S. *InterViews: an introduction to qualitative research interviewing*. Thousand Oaks: Sage Publications; 1996.
10. Patterson ES, Wears RL. Patient handoffs: standardized and reliable measurement tools remain elusive. *Jt Comm J Qual Patient Saf.* Feb; 2010 36(2):52–61. [PubMed: 20180437]
11. Gremler DD. The critical incident technique in service research. *J Serv Res.* Aug; 2004 7(1):65–89.
12. Microsoft Word [computer program]. Version 14.0.6112.50002010
13. QSR International Pty Ltd. NVivo qualitative data analysis software. 2010 Version 9.
14. Wilson RM, Runciman WB, Gibberd RW, Harrison BT, Newby L, Hamilton JD. The Quality in Australian health care study. *Med J Aust.* Nov; 1995 163(9):458–471. [PubMed: 7476634]
15. Welsh CA, Flanagan ME, Ebright P. Barriers and facilitators to nursing handoffs: Recommendations for redesign. *Nurs Outlook.* May-Jun;2010 58(3):148–154. [PubMed: 20494690]
16. Hess DR, Tokarczyk A, Malley MO, Gavaghan S, Sullivan J, Schmidt U. The Value of Adding a Verbal Report to Written Handoffs on Early Readmission Following Prolonged Respiratory Failure. *Chest.* Dec; 2010 138(6):1475–1479. [PubMed: 21138883]
17. Horwitz LI, Parwani V, Shah NR, et al. Evaluation of an Asynchronous Physician Voicemail Sign-out for Emergency Department Admissions. *Ann Emerg Med.* Sep; 2009 54(3):368–378. [PubMed: 19282064]