Creation and Implementation of a New Handoff System in the Electronic Medical Record at a Single Institution

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Abstract

Introduction and Objective: A handoff is the transfer of information during transitions in patient care. The objective of this study is to describe an experience in developing a standardized electronic medical record (EMR)-based handoff navigator.

Methods: Information was gathered on how handoffs were being performed within the institution. With the involvement of several individuals and groups within the institution a goal was made to design an EMR-based handoff. The first system within the EMR was created and Pilot #1 consisted of physicians in training to trial the system on daily use and then complete a survey in follow-up. Based on the findings of Pilot #1 appropriate changes were made to the system and Pilot #2 was conducted with similar individuals. At the end of Pilot #2, a survey was again conducted to assess usefulness of the tool. The final resulting “Handoff Navigator” within the EMR was implemented across the institution to caregivers.

Results: We found that nearly 100% of handoffs were being performed using paper handoffs without utilizing information already within a patient’s medical chart. Pilot #1 was with the newly created EMR-based navigator and surveys showed that 85% felt the EMR tool was faster, but only 38% preferred it. Changes were made and Pilot #2 was conducted. It was found that a majority felt it saved time and preferred the new handoff system.

Conclusion: We found that a formal handoff in an EMR that is customizable can be well accepted and adopted to improve TOC and patient safety. The final handoff system may be different for each institution but the creation process may be similar.

Keywords: Handoff, Transitions of Care, Electronic Medical Record

Introduction

A handoff or handover is defined as the transfer of information (along with authority and responsibility) during transitions in care.[1] Across the world and among different professions terminology can be quite different. For purposes of this study we have chosen to use “handoff” to describe this transfer of information. A handoff should involve two caregivers leading to dual responsibility on behalf of the off-going and oncoming provider.[2] Miscommunication between caregivers with transitions of care (TOC) plays a role in about 80% of preventable adverse events.[3]
Many organizations within countries and throughout the world including the World Health Organization (WHO) have made statements and initiated requirements regarding “Transitions of Care.”[4-7] Specific to medical education, clinical assignments must be designed to minimize the number of TOC, sponsoring institutions and programs must ensure and monitor effective, structured hand-over processes to facilitate both continuity of care and patient safety, and programs must ensure that trainees are competent in communication with other team members during this process.[7]

An electronic medical record (EMR) system has been integrated into most hospital systems around the world and has become part of daily life in taking care of patients. This is a system that is designed specifically for patient improvement with input of caregivers. It is very reasonable for caregivers to use the information to assist in taking care of patients on a daily basis. At our institution, we realized that this EMR was a pre-designed system that can be modified to fit the needs of trainees in taking care of patients and explaining these needs among one another.

The goal of this article is to describe the experience of our institution in developing a standardized handoff system that did not breech any patient confidentiality and was applicable and user-friendly across an entire institution. We will further describe how our handoff system was incorporated into our EMR system.

**Context**

This study was approved by the Institutional Review Board and met ethical approval. A subcommittee of the Graduate Medical Education (GME) Committee was created with the overall goal of educating residents in patient safety and quality matters. The initial drivers for the formation of this committee were the requirements focusing on training and handoffs between trainees within the sponsoring institution.[7] Members of this committee included GME leadership, hospital leadership, and resident representation.

At the institution there is a peer selected group of trainees that represent the larger group and this is called the Resident Council and it meets on a monthly basis at the institution. The Resident Council led a literature review and a handoff mnemonic was identified for adoption. Resident Council was asked for advice and suggestions on how to communicate the importance of handoffs and teach this mnemonic to residents.

Information was gathered from physician training programs to determine what forms of handoffs were being utilized among the surgical and medical specialities.

A working relationship was created between the subcommittee and our informatics leaders. At that time, several discussions led to creation of a handoff system within the EMR. Two pilot projects were created involving several medical and surgical subspecialties. After each pilot project was completed, surveys were distributed to those involved to better understand the implications of using the new system.
Methods

After the committee was formed the process of creating a handoff for the electronic system was the first priority. The EMR system that is used by the hospital has the unique feature of allowing specific changes to be made to improve daily work flow of the users. These changes have to be made in coordination with the system owner and approved by all parties involved. The system has in place a way for caregivers to keep their own personalized list of patients in whom they are caring for.

Figure 1A: Shows the option in the patient list to select “Sign Out Rpt” Button to enter information about signout for the highlighted patients’ chart. B: The arrow shows that there is an area in this Sign Out Report for free text information for the caregiver to complete. The top of the report includes basic demographic information about the patient.
It was decided that Pilot #1 would involve integration with the EMR to improve accuracy, efficiency, and quality of the handoff process. The creation of a button within the EMR and patient list that was labeled “Sign Out Rpt” was included and this was to indicate the location of the “Sign Out Report” for caregivers of a particular patient. Figure 1A shows this tab within a patient list and Figure 1B shows the entry field that opens once this is chosen. This allows for one patient and one signout for all caregivers. This was the format that was used by several services for Pilot #1 of the project. A post-survey was completed to determine benefits and downfalls of this system.

Based on the realizations after Pilot #1, several changes were made to the EMR based handoff system. These changes were put into place to do another trial with Pilot #2 to evaluate benefits and new discoveries. The “Sign Out Rpt” button was removed and replaced with what is called a “Sticky Note” within the EMR. As shown in Figure 2, this view again allowed caregivers to use free text format into a handoff tab within a specific patient’s chart. This allowed the handoff to be organized by each medical specialty taking care of the patient. It could be formatted to include several of the data points that are in the patients chart such as admitting diagnosis, diet, code status, medications, and patient demographics amongst others. The organization of each handoff specific to services was a challenge so the “Handoff Navigator” was devised to serve this purpose as shown in Figure 3. This allowed for caregivers to immediately access the handoff information that they needed.
were attempting to find. All of these changes were in place and used for Pilot #2 and again a post-pilot survey was completed by all of those involved.

Implementation of EMR handoff usage was based on education to all parties involved by didactic sessions to all training programs. Individuals who were given access included attending physicians, physicians in training, medical students, and any nursing assistants that were approved by the department. This created confidence that the information included was secure and protected.

As shown in Figure 3, the ability to quickly search for a specific handoff record in the “Handoff Navigator” was created to encourage easy use of the system. The system that was created was intuitive and included several advantages of using an EMR, such as including information that is already within the patient record.

**Results**

Surveys of the current state of handoffs within training programs showed that nearly 100% of medical and surgical services were using a SharePoint network drive to create paper handoff sheets. Pertinent patient information obtained from the EMR was placed into the designated handoff document. With this information the committee developed and implemented Pilot #1 of an EMR-based handoff.

Participants in the initial pilot included those from Internal Medicine, Pediatrics, Physical Medicine and Rehabilitation, and General Surgery. A post-pilot survey administered to the participants revealed that over half of the 13 respondents felt the tool was perfect or near perfect in several areas: space allotted for free-text entry (77%), auto-populated medication list (77%), and auto-populated patient information (53.9%). Moreover, 84.6% of respondents felt the EMR-based tool
was faster than their previously used tool. Yet only 38.5% of respondents preferred the new system to their old system. Analysis of the qualitative feedback revealed the need for the tool to 1) function as both a handoff and a rounding tool, 2) print the patient list on a reasonable number of pages, and 3) allow each service to maintain its own unique handoff per patient. These were the realities of the system that were used to redesign the system into what was used for Pilot #2.

Pilot #2 included trainees from Family Medicine, Neurology, Orthopedic Surgery, and Urological Surgery. Again, a post-pilot survey was administered. While printing a paper tool remained an issue, 15 of 20 respondents felt the EMR-based tool saved time, 18 of 20 (90%) preferred the new tool to their previous tool, and 19 of 20 felt the tool was easily accessible. Analysis of qualitative feedback revealed that the addition of a second text-entry box for rounding was well-received, as was the ability for each service to maintain its own unique handoff for each patient. Pilot #2 was successful in meeting the challenges that were discovered during Pilot #1.

Discussion
Several previous studies have shown that handoff intervention tools are a necessity and lead to fewer communication breakdowns and often mnemonics can foster effective communication.[8,9]

By performing the initial pilot project, many issues were brought forward. It was based on this information that we were able to work with informatics leaders to create an EMR-based handoff tool that residents were more inclined to use on a regular daily basis. Other institutions have gone through similar processes involving task forces engaging residents to evaluate handoffs. Our study is similar to others that have had task forces engaging residents but ours also consisted of other individuals including GME, informatics, and hospital leadership.[10] Other studies have also used examples of these types of handoffs for direct trainee education and found substantial improvement in the completeness of the TOC.[11]

Something that is quite unique about the overall experience was the pilot projects that were performed and how the results created the final product. A recent systematic review of the literature performed in 2013 found that 64% of handoffs are done primarily via electronic tools and only 36% of these are in EMR integrated tools.[12] After Pilot #2 we found that 90% of trainees preferred the new tool to their previously utilized system for handoffs. It is recognized that computerized physician handoff tools may improve the efficiency of physician work, reduce adverse events and increase the completeness of handoffs.[13,14]

There are limitations to this study in that all EMR systems are not the same but a similar process in creating an EMR-based handoff navigator could be used. Each institution has a unique need which is why the governing bodies do not have specific recommendations for TOC but instead have generalized requirements. Our EMR system has been very adaptable as explained earlier to make this process the most useful and user-friendly to those using the system on a regular basis.
We describe here a complex process of developing a uniform handoff process that is usable and beneficial to many different individuals of different medical and surgical specialties for varying needs. This is a process of importance as it can be used as a model for other institutions to design similar handoffs to improve care. Also of note, this type of organization and change may have applicability in other fields to improve daily processes and outcomes.

The EMR-based “Handoff Navigator” represents a work in progress at our institution in several directions. The ability granted to attending physicians to monitor trainees performing TOC is a potential advantage. This is being piloted by the internal medicine program at our institution. We anticipate that this will allow attending physicians to provide more effective feedback and assist in teaching good handoff techniques to new physician trainees. Another direction that has been discussed is granting non-physician services access to this EMR-based handoff navigator and currently the decision has been made to not allow other disciplines to view the EMR-based handoff.

**Conclusions**

A formal handoff in an EMR that is customizable per training programs can be well accepted and adopted to improve TOC and ultimately, caregiver and patient safety. We recognize that the final handoff system may be different for each institution but the process of creating this system may be similar.

**References**


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