ORIGINAL ARTICLE

The search for the perfect handover

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Abstract

Objective: Multiple forces in today's hospital environment have increased the frequency of transitions of care for patients. This increase has resulted in the need to establish effective and structured handover processes.

Methods: Our institution established a multi-disciplinary Handover Taskforce with the goal of creating a practical and HIPAA-compliant hand-off tool utilizing computer technology. The Taskforce had representation from residents, attending physicians, nursing, pharmacy, informatics, risk management and patient safety. The Taskforce work was guided by two concepts. First, streamline the process by avoiding redundant input into clinical information systems. Second, create an effective tool that could be used by all members of the healthcare team.

Results: We describe the process by which this project was successfully executed, resulting in a HIPAA-compliant custom web application utilizing Microsoft SharePoint ®.

Conclusions: Challenges encountered in the process, as well as applicability to other institutions, are addressed in the article.

Key words

Communication, Computerized, Safety, Handover, Handoff, Transition

1 Introduction

Conditions tend to fall apart at the witching hour for house officers.

As evidence, I submit the infamous 3:30 a.m. page: "Doctor, the patient in room 8202 is having trouble breathing".

Enacting a scene from television, the physician responds, "Get an ABG, EKG, and stat chest x-ray. I'm on my way". Cue the dramatic background music. A hurried house officer races down the stairs to save the day. There is, however, one critical moment missing from this television drama – the doctor's quick review of the written handover.

The written handover is a tool to ensure continuity, quality of care, and patient safety. In-house physicians, be they residents, hospitalists, or house doctors, are limited by shift constraints. Transitions of care between managing physicians occur with increasing frequency in the inpatient arena. Accurate and efficient information transfer is critical.

Years ago, as a resident, I responded to a page similar to the script above. I arrived on a telemetry unit, in front of a corner room, with much commotion. The patient was an elderly man, with a laundry list of diagnoses. I looked at my handover for more information – patient name, date of birth, medical record number. It was the right patient. The reason for admission and a few medical conditions were scribbled on the paper. The code status was nowhere to be found. The patient was unresponsive, so that potential data source was not an option.

"Does this patient have an advanced directive?" I asked the nurse caring for the patient. The nurse shook her head no. I ran to our (pre-electronic medical record [EMR]) chart rack and did not see the familiar orange sheet indicating an advanced directive. Another skipped heartbeat and I was back at the bedside, while the unit clerk paged the attending. After fifteen minutes of stabilizing the patient, obtaining labs, EKG, and CXR, the attending physician called back to confirm that the patient had a DNR status.

Later that morning, I brought this issue to our chief medical resident. Recapping the night's events, I protested that I had been given a bad handover. He responded by absolving the patient's primary intern of wrongdoing, stating that it was my fault for accepting a bad handover.

Over the subsequent few years, as our residency program undertook to instruct residents on proper endorsement of patients, I became increasingly immersed in the dilemma of optimizing the handover process. Our efforts included didactics, individualized cards or stickers, and modeling by senior residents. None of the interventions met my criteria of "best-practice".

The Accreditation Council for Graduate Medical Education (ACGME) has implemented duty hour regulations that have increased the number of transitions of care for patients [1]. This is just one of many forces moving towards physician discontinuity in the inpatient arena. The ACGME and multiple other regulatory bodies acknowledge the need to establish effective, structured transitions of care. This process, termed handover or handoff, is prone to error without standardization and adequate education of practitioners regarding effective communication and transfer of information.

In 2007, the Joint Commission on Accreditation of Healthcare Organizations instituted a national patient safety goal to standardize handover communications within institutions [2]. Solutions, when proposed, have tended to focus on either physician or nursing handovers. It is rare for efforts to be coordinated across disciplines [3-6].

Within our 440-bed community-teaching hospital with multiple residency programs, policies were in place related to safe transitions of care. However, a standardized and unified protocol for handover communications did not exist. Each residency program utilized its own unique handover process. None of these processes were in any way connected to handovers done by non-physicians, such as nurses or pharmacists.

2 Methods

Recognizing lack of standardization in this area, a "Handover Task Force" was formed with the goal of creating a practical tool that utilized state-of-the-art information technology, would be relevant to all disciplines, and would also be fully HIPAA-compliant. Task Force membership included physicians working with residency programs and private practitioners, as well as leadership from the disciplines of nursing, pharmacy, informatics, risk management, and patient safety.

Task Force members realized the need to align multiple stakeholders in generating and implementing the anticipated changes. Consequently, the Task Force requested that a broadly representative group of hospital leaders participate in an onsite mini-retreat where a "handover simulation workshop" occurred. Participants gained an improved understanding of problems inherent in the current handover processes (lacking standardization) as well as the advantages of a

multidisciplinary tool. The result, an increased sense of ownership in the change process, was clearly evident for all conference attendees.

Task Force meetings initially focused on a critical appraisal of the medical literature as well as a review of existing electronic handover systems [7-10]. Two design principles were identified as crucial for success. The first was to create a system that would maintain simplicity in the handover process and avoid the need for redundant input into the EMR. The second was to create a system that would meet the differing needs of various healthcare team members. These two requirements were felt to be essential to provide end-users with sufficient value to guarantee their acceptance.

As a teaching hospital, our institution relies on resident physicians to provide a substantial portion of daily patient care. Young residents also have a comfort level with technology that established practitioners often lack. The Task Force decided to take advantage of these facts in its quest to stimulate creative thinking about a new handover system. The Task Force sponsored a competition among residents of various specialties to design a system that would meet the identified goals. Resident teams were created and given a six-week timeline. Teams were provided with support from the Information Systems (IS) department, including access to Microsoft SharePoint, a password-protected web-application platform. Microsoft SharePoint met HIPAA requirements and upholds regulations outlined by the 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act [11, 12]. Solutions generated by the resident teams were evaluated on the basis of originality, ease of use, HIPAA compliance, feasibility of implementation, applicability to other disciplines, and resident satisfaction. Each member of the winning team received an I-Pod touch®.

3 Results

The winning system was developed by the Internal Medicine resident team. Despite success in the internal competition, the system had some deficiencies; a major one being lack of automation. To address this, and to generate other enhancements, an outside consultant was retained to refine the winning system. The final result was a semi-automated solution housed in SharePoint.

The new system transformed a process that had been delivered verbally and recorded on paper to an entirely digital process. The old process utilized multiple, isolated copies of a patient's clinical data while the new version enabled a single digital record of the same patient-specific data to be viewed simultaneously by all handover participants. Edit capability by members of the handover team produced a chronological record without risk of transcription error. An application to enable integration with the existing EMR ensured complete accuracy of patient demographics (name, DOB, MRN, room and bed number). A final feature was having a self-teaching module embedded within the system to educate novices in the appropriate steps to generate a concise, informative patient handover document.

The challenge remained for the automated system to win the speed record of the quick generation of paper handover notes. We strove to make the digital application as streamlined and user-friendly as possible. We utilized technological solutions that dramatically enhanced the speed of our application. Generating checkboxes for commonly used entries (*e.g.* "Asthma", "Cancer", "Depression") allowed the users to minimize keystrokes. Character limits were enforced in text areas, requiring documenters to generate succinct entries. The system was sufficiently refined such that clinicians could eventually use a tablet or smart phone and find the application to be as convenient as paper and pen.

A final challenge involved safe storage of patient data. By moving paper-based data into the digital realm, where permanence is the norm, we heightened concerns of compliance and risk management stakeholders. Heretofore "informal" communication had now become potentially discoverable. To address this, we decided to irrevocably delete all handover data from the patient database 48 hours after discharge.

4 Discussion

Internal Medicine residents rapidly adopted the new handover tool and it became the norm across all general medical floor teams. Other residents, including family medicine and obstetrics and gynecology, were less enthusiastic. Despite the initial attempt by the Task Force to engage all stakeholders in the project, individual departments responded with the sense that it was a "solution in search of a problem". They felt that the "old" systems were perfectly adequate for their own handover needs. Additional input was solicited from individual members of these departments; several enhancements to the existing model were made in response. A second, eight-week trial was undertaken involving physicians in all departments in collaboration with nursing and pharmacy. Post-trial surveys continued to indicate that users felt the tool to be too complicated and cumbersome and that it required extra work than was needed for their internal communication. A hospital-wide decision to mandate use of the new tool was postponed until additional refinements could be completed.

Challenges notwithstanding, the Internal Medicine teams continue to utilize the electronic tool in their daily handovers and sign-out rounds. Several nursing units within the hospital, notably the hematology-oncology floor, have also come to rely on the tool for transfer of information at change of shift sign-outs. While we acknowledge there is still work to be done in terms of perfecting this electronic system, we are unaware of other instances where physicians and nurses are providing handover information to colleagues with a shared platform.

The original intent was to focus on shift handover between resident physicians, nurses, and pharmacists. The goal was not to create a transition tool between levels of care. Although we allowed for user entry of medications, medication reconciliation was not an objective of the tool. If one wanted to extrapolate from shift handover to transitions between levels of care, more complete and integrated medication reconciliation processes would need to be developed with IS support. Further steps could be taken to meet Meaningful Use interoperability standards, outlined by the Office of the National Coordinator, to share electronic handover information beyond our institution to other levels of care [13].

We believe there are several powerful lessons to be shared from our development process. Regardless of whether a hospital has residents or is a non-teaching institution, there is a universal need for complete and effective patient handovers. The process that we undertook, whereby an internal task force or ad-hoc committee was charged with development of a tool, allowed for local patient care issues to be addressed. The activities of problem identification and concept generation resulted in a significant increase in cohesiveness, confidence, and autonomy among both physicians and non-physicians who engaged in the activity. A multidisciplinary perspective about the imperatives of accurate transfer of patient information was evident. In essence, we undertook a Plan-Do-Study-Act cycle and continue, at the current time, to repeat that ongoing quality improvement work.

We were particularly struck by the issues of data storage that our risk management department emphasized. Once again, the changed realities of data collection and retrieval in the digital age were highlighted. Physicians were challenged to realize the potential long-term impact of recording "informal" communications. Only when the electronic tool had been sketched out did this reality become the subject of intense scrutiny and internal debate.

The multiplicities of electronic records that currently exist within hospitals guarantee that an "EMR-specific" handover tool is a likely future business venture for vendors. Smaller institutions may be quick to purchase such a "ready-made" product, but local needs and customs are not always well-served by such a solution. We believe that undertaking a process similar to ours is a worthwhile activity even in the event that an outside product is eventually purchased. Only by undergoing such an exercise can caregivers within a unique hospital setting be prepared to assist vendors in customizing the purchased product to the unique challenges of their institution.

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