

The Secret Life of Medical Records: A Study of Medical Records and the People Who Manage Them

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A study of the practices surrounding paper medical records captured key aspects of the work necessary to support this crucial element of health care. It uncovered work that was invisible to the nurses and physicians who use the records. This invisible work comprises tasks necessary to find and deliver the records as well as those necessary to ensure that the records are accurate and up to date. This study was undertaken because medical records are undergoing a transition from paper to digital systems, which will impact the practices of users of these systems at all levels, including clerical and medical staff. This is an area of particular interest to our organization as we look to provide technologies and services that enable seamless integration of paper and digital worlds. New technologies and practices will need to be developed to accomplish what is now being done invisibly.

INTRODUCTION

Medical records capture a clinical perspective on the history of our health. A medical record is a critical component in the continuity of care enabling physicians, nurses and specialists (called providers) to treat a patient with knowledge of the history and current state of a patient's health. At present, although most medical records in physicians' offices are paper, there is a growing momentum towards transitioning to electronic medical records (EMR).

This study was undertaken because our organization is focused on research that enables seamless integration of paper and digital worlds. The examination of the largely paper-based world of medical records is of particular interest because much of this world is undergoing or considering the transition to digital systems. Studying healthcare environments affords us the opportunity to observe the issues this transition poses and to explore the development of technology and services solutions that can support this transition and subsequent work practices.

Previous studies (Heath et al, 2002) explored interactions between patients and healthcare providers. Heath and Luff (1996) found that medical practitioners continued to use paper records along with a newly introduced EMR. Other studies (Clarke et al, 2001) have examined the use of an EMR in medical exams and issues an EMR poses in physician-patient interactions (Ventres et al, 2005). Workflow changes required by physicians using an EMR have also been discussed (Puffer et al, 2007). Martin et al (2005) studied the issues involved in the integration and implementation of an EMR system in a large hospital. Fitzpatrick (2000) studied the implications of the use of paper records for EMR systems from the point of view of the providers.

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While there have been several studies looking at the use of medical records in the exam room, there has been relatively little exploration of the life of a medical record and the work it takes to manage them outside the exam room. There are entire departments devoted to keeping track of and maintaining the records. How do they organize records? How does a record arrive at the exam room for the appropriate physician and patient? What happens to records after the exam? How are records updated with new information? On the surface, this work looks rather unremarkable, almost invisible in the day to day patient-physician interactions. Upon closer review, we observed that the records have a secret life that takes place beneath the notice of those who rely on and use the information in the records. We will discuss our observations about this work and some of the implications this has for those who perform this work as well as for the technologies that support this work now and in the future.

DESCRIPTION OF STUDY AND METHODOLOGY

The study was conducted with six health care facilities in 2007, representing medical practices in a range of settings, including: multi-practice clinics in urban, rural and small city settings, a pediatrics practice in a suburban setting, an internal medicine practice in an urban setting, and a large urban hospital. A multi-practice clinic in a rural setting was our primary field site. This was fortunate as the site was in the process of evaluating various EMR options for potential purchase. The other sites provided additional perspectives on the records practices across a variety of environments. The sites were found primarily through personal contacts and through participation in a local health information technology conference. The sites were in various stages of considering or adopting EMR systems. All the sites expressed concerns about migrating from primarily paper-based records to electronic records.

The primary fieldwork consisted of open-ended interviews and observations of medical records staff as they performed records management activities. We also conducted interviews of physicians, IT staff and management to get an overall sense of the issues associated with paper medical records and directions regarding the future of medical records in their facilities.

Our team consisted of ethnographers and technologists. In our experience, including technologists in fieldwork enriches our results and streamlines the transfer of findings to those exploring technology solutions. Our field interactions were videotaped. The videotapes were transcribed and used as the basis to create representations of the work. The representations were shared with the research team to promote exploration of potential technology solutions that could be brought to bear on records management. We also took the representations back to the sites we studied in order to share, verify and update our findings. In addition, we used these feedback sessions with participants as an opportunity to explore and prioritize areas for further technology development.

FINDINGS

Our findings focus on the secret life of the medical records: their life and travels beyond the exam room. We describe the charts and their use to provide the context for the roles and tasks of those who manage the records and the challenges they face. We found implications for technology that transcends the paper records in the invisible work that supports them.



Figure 1 Paper-based patient charts.

multi-colored numbers or letters make it easy to see when the charts are misplaced, because the visual regularity imposed by the numeric or alphabetical order is disrupted by the misplaced chart. Most of the charts were on the chart shelves, though they could be found in many locations throughout the clinic, such as a doctor's office, the front desk, the medical records department waiting, or the correspondence clerk's office.

Each practice that we observed organized the content of their charts differently. For example, one location kept the documents loose in the manila folder with the most recent information in the front, whereas most attached the documents to folder either attaching them to the left and right covers of the chart with brads or attaching all the documents in the center of the covers. Charts with attached documents had tabs separating the content. For example, in one site there were sections for patient history, progress notes, lab reports, x-rays and correspondence. The particular labels on the tabs differed somewhat between practices.

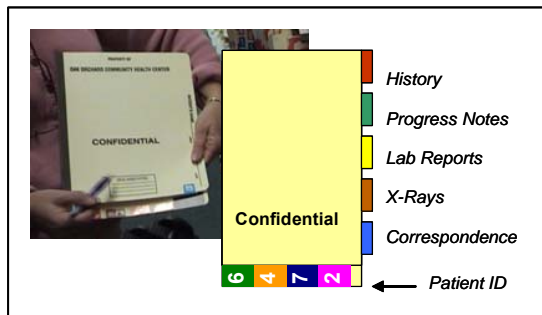


Figure 2 Patient Chart is organized by tabs along the side. Color coded labels along the bottom identify the patient.

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Uses of Medical Charts

We observed two categories of chart use: use in the patient exam and use in decisions outside the exam. Different work practices support these uses.

Exams may be either scheduled or unscheduled. Unscheduled visits are usually sick visits, where the patient calls the same day for an appointment due to illness. When the patient arrives for an exam, the front desk produces an encounter form that contains the patient's personal information (address, phone number, date of birth), a check list of various services or treatments that may be provided (e.g., physicals, fracture care, injections) and a place for the diagnosis. When the provider is ready, the patient is escorted, along with the medical record and an encounter form, to the exam room. The provider reviews the medical record and examines the patient. When the patient leaves, the encounter form is sent to be processed for billing. The provider adds progress notes to the medical record and returns it to the medical records department. The provider may write the notes themselves or may dictate them for later transcription. Scheduled exams differ from unscheduled exams in that the charts are pulled and prepared the day before the visit; unscheduled exams require an ad hoc chart pull.

The activities that do not involve a patient exam include analyzing lab results, replying to correspondence, refilling prescriptions, and replying to phone calls. Analyzing lab results and replying to correspondence take place on a slower schedule than prescription refills and replying to phone calls. Prescriptions are filled within 48 hours and phone calls are returned as soon as possible. Lab results may return days after they are requested and correspondence often arrive in the mail, so they are less urgent. A physician may request that a lab reply by phone if he or she needs results urgently, but then these would be treated as phone calls.

Roles and Responsibilities of those who Manage/Maintain Records

Behind the scenes, the medical records staff manages, maintains, updates and moves the records to where they need to be. They are responsible for ensuring record integrity so the records are accurate, up-to-date, and accessible.

The staff spends most of their effort on two kinds of activities: locating/moving the charts and transferring information into the charts. They have established workflows and processes to make sure that all incoming information is reviewed and if necessary, signed off

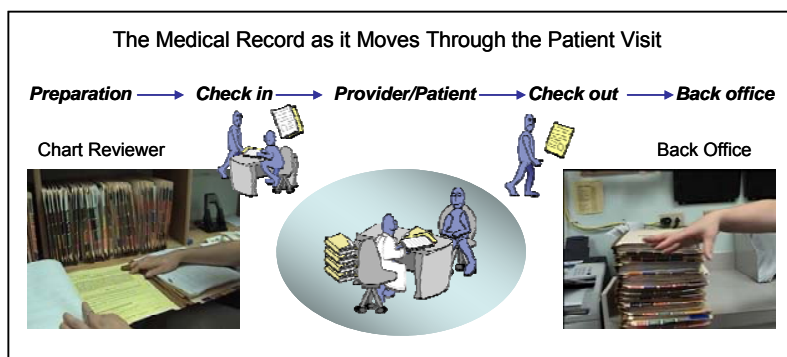


Figure 3 The medical record as it moves through the patient visit: the Chart Reviewer prepares the chart for use by the provider in the exam room. During/after the exam the provider adds progress notes and the chart is moved onto the back office for any follow-up, e.g., referrals, transcription and re-filing.

by physicians, and integrated with the medical record. They receive all the charts as they leave the exam rooms, check and then re-file them. They also pull and prepare charts for the next day's appointments.

Our primary site described records management responsibilities in terms of four key roles: chart reviewer, runner, sorter and mail processor. These roles were not unique to this site as we saw similar work being done at the other sites. Any member of the staff may take on any of the roles during the course of the day in order to meet the changing demands of the day's workload.

Chart Reviewer. The chart reviewer pulls the all charts for the next day's scheduled appointments and checks the charts to make sure all the required documentation and paper for the doctor's progress notes are available. If any of the required documents need to be updated, a notation is made in the computerized Practice Management System (PMS) so the receptionist at the front desk can obtain the updates when the patient checks in for their appointment. The chart reviewer worked primarily in an office at a desk with a computer that could access the PMS, giving her access to the schedule.

Runner. The runner pulls the charts for ad hoc use and delivers the charts to the place they will be needed. The runner looks up the chart number in the patient index in the PMS and then prepares an out-guide (a plastic folder that indicates the reason the chart was pulled). If the chart is on the shelves, the chart is removed and replaced by the out-guide and the chart is then delivered. If the chart is not on the shelves, the information in the out-guide is used to determine where the chart was taken. The runner works throughout the clinic.

Sorter. The sorter reviews the charts when they return to the medical records department, updates the information in the charts and returns them to the shelves. Any items that are clipped to the front of the folder are checked to see that they have been

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processed and then are inserted in the chart. The sorter checks the rest of the chart to make sure that everything is in order. The sorter works standing at a table where the runner leaves the returned charts.

Mail Processor. The mail processor manages the incoming correspondence, pulling the charts and attaching the correspondence so the providers can deal with the correspondence in the context of the chart. The mail processor determines whether the correspondence required the chart, sending it only if needed. The provider could request the chart if it was not sent. The mail processor also works in an office at a desk, but she collects the mail from various locations, some of which were outside the clinic.

The staff in the records department takes primary responsibility for particular roles at any one time, but there is considerable overlap and sharing of information in order to get the work done. There is constant interaction between the medical records staff as they address incoming calls, locate records and divide the incoming workload. There is also ongoing interaction with members of medical and office staff as the records department is centrally located between the front reception area and the nursing stations and exam rooms. Even with the centrality of medical records, much of the department's work is invisible. This invisibility became evident when we presented our findings to the management team at one of our field sites. The team has representatives from each of the departments in the clinic, including operations, records management, IT and clinical (physicians). They were surprised by the complexity and difficulty of the medical records staff's work.

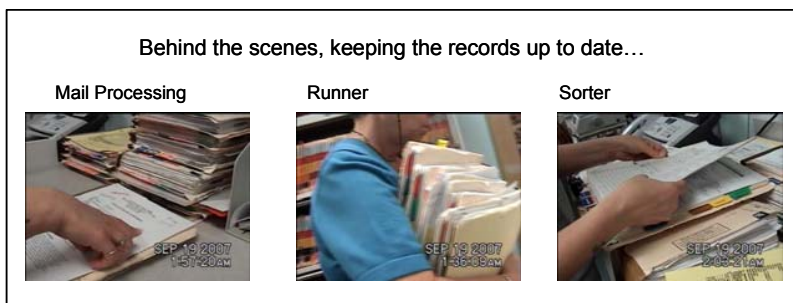


Figure 4 Behind the scenes the records department keeps the records moving and up to date. The mail processor collects all incoming mail and forwards it onto the appropriate provider, attaching the appropriate patient chart if needed. The runner pulls/delivers charts based on requests (from other departments, phone messages). The sorter adds new information to patient charts and re-files the charts.

Features and Challenges of the Work

Although on the surface, the work of the medical records staff looks mundane--a clerical job of processing folders and filing records--the work is quite physically and

cognitively challenging. Following are some of the features and challenges we observed in the course of the study.

Managing the paper: Sellen and Harper (2002) describe several limitations of paper documents. These limitations include: paper must be used locally, it occupies physical space, it requires physical delivery and cannot easily be shared, paper cannot easily be altered or incorporated into another document, it cannot easily be copied, and it cannot display variable or moving images. Paper records can only be used in one place at a time, so there is potential conflict when a chart is needed for multiple tasks. In the constant activity of the clinic, the charts can also be misplaced, and occasionally even lost. Their physicality means that they consume space and in large practices they may consume significant space. The very nature of the records as paper documents limits the options for how the work of the records department can be accomplished.

Locating and moving records: Because paper records exist in only one place at a time, a record must be located and moved to the place it is needed before it can be used. Finding records requires effort. For example, the runner may discover that a chart is already in use when he or she needs to pull and deliver it. The runner must search for that chart. Searching for a chart requires that the runner know the typical workflow, and likely bottlenecks in the workflow, for a chart given any starting place in the clinic. The runner calculates the time that has passed since the chart was removed (as indicated by the out-guide left in its place) and the likely route of the chart during that time.

Moving the charts is also difficult. As might be anticipated from the title of the job, the runner covers a lot of territory through the clinic, searching for and delivering charts. In addition, some of the files are quite thick, which makes pulling charts, delivering them throughout the clinic, and re-filing them on shelves physically demanding.

At times, entire charts or segments of a chart need to be transferred to other locations. When a patient transfers to another practice, the entire chart needs to be copied and mailed to the new location. There are also occasions when part of a chart needs to be shared with another provider. In this case, the required sections of the chart must be extracted, copied and re-inserted into the chart. The copied documents are sent to the other provider, where they then need to be incorporated into a potentially very different records system.

Decision Making: Finding the chart, though challenging, is not as difficult as determining what to do with the chart once it is found. If a search was initiated because the chart is needed in two places at once, the runner must determine where the chart should go based on her judgment of the relative importance of the tasks that require the chart. Similar judgments must be made when determining whether or not to include a chart along with a piece of correspondence for review by the physicians. These decisions can be clinically relevant. The willingness to delegate these decisions to clerical staff indicates that the providers have confidence in the medical records staff.

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Managing Interruptions: Another challenging aspect of this work is managing the interruptions. Phone calls, prescription refill requests and unscheduled appointments come in throughout the day interrupting the current tasks. Members of the records department must be able to stop one task, take care of the interrupting task, and then return to the original task. The interrupting task may itself be interrupted requiring the staff to keep several tasks in mind at the same time. As Rouncefield et al. (1994) point out, such interruptions are common in office work significantly affecting the idealized version of the described processes. Indeed, in our observations, it was often difficult to see the described process through the interruptions.

Coordination and communication: The records department is a bustling center of information flow into and out of the clinic. Managing the information is a critical aspect of providing quality patient care. Key to their success is the ability to respond to the myriad requests and inquiries for information while maintaining an underlying sense of order to the maintenance and upkeep of the records. Although there are formal procedures established for the main roles and activities in the department, it is the ongoing interactions and coordination of activities among the team that enable the work to be accomplished. Everyone is tuned into the overall status of what needs to be done, while maintaining a focus on their individual activities.

Electronic Medical Records

EMR systems address many of the limitations of paper based systems, ideally enabling sharing of medical information within and among healthcare providers and patients. One would think that the secret life of paper records would have little currency with the adoption of an EMR system, but we found that many of the invisible tasks continue to be needed.

At present, most medical records in U.S. physicians' offices are paper records. Hing et al. (2007) report that only 29.2% of 2117 survey respondents had any EMR system and only 12.4% had fully implemented an EMR system (i.e. no part was paper). An earlier study found that EMR use was higher in hospital Emergency Departments (31%) and Outpatient Departments (29%) than in physician practices (17%) (Burt and Hing 2005), but penetration was low in all areas.

Adopting an EMR system is an enormous undertaking. The current records in a practice (potentially thousands of charts) need to be transformed into a digital format that map into the file structure of the EMR. The work practices of the clinicians as well as the operational staff who interact with the EMR have to change in significant ways. Because of the potentially disruptive nature of such a transition, hospitals, clinics and private practices are in various stages of considering and/or managing a move to an EMR.

As mentioned earlier, the impact of an EMR on physician practices has been extensively studied. The implications for the work of those who manage the records are not as well understood. There seem to be two phases of EMR adoption that will place different demands on the staff. First, the transition phase is when the EMR is initially installed and all

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or part of the existing paper records need to be captured in the EMR. During this phase, the medical records staff continues to maintain the paper records as well as take on new responsibilities that involve transferring data in the paper records into the EMR. The transfer of data could involve a combination of tasks that include manual data entry and scanning the content of the charts in the EMR repository.

Manual data entry requires typing information from the paper record into the EMR. Although time consuming, capturing discrete data is important because it allows the generation of automatic reports, e.g., notifying the provider of patient drug allergies. The EMR cannot recognize the nature of the data if it is hidden in a scanned form, or worse, still in the paper chart on the shelf. Scanning the data requires significant effort due to the large number of pages in the chart and the need to organize and link the documents to the appropriate record/location in the EMR. Records not yet digitized still need to be updated, which means the continued maintenance of both electronic and paper systems.

A second phase of EMR adoption, the use and maintenance phase, starts once the transition phase is complete. Eventually, there should no longer be paper charts to manage. With no paper records to maintain, the tasks of the staff should evolve to support electronic documents and continued integration of documents, e.g., correspondence, that comes into the office in paper form.

We had the opportunity to observe one clinic during the transition to an EMR for their dental records. They used a combination of approaches. They maintained the paper records until a patient scheduled an appointment. At that time, they pulled the paper record and scanned the regulatory documents such as privacy policy acknowledgement. Next, they scanned the dental x-rays for inclusion in the record, if they were up to date. Finally, they sent the chart to the dentistry department where a dental assistant manually entered the data on old procedures into the EMR. They kept the paper chart on the shelf in case the dentist needed to look at old progress notes, but the dentist entered new notes into the EMR system. Each time they performed one of these tasks, they noted on the paper chart that it was complete.

The chart reviewer continued to review the electronic charts in the same way she had with the paper records. That is, she accessed and opened the electronic record to check that the forms were up to date. Any required updates were noted in the PMS. The chart reviewer indicated that initially, scanning the old charts increased her workload significantly. However, this was reduced as more charts were added to the EMR system, thus requiring less scanning. The use of the EMR did not eliminate the need for any of the chart reviewer tasks; it required they now be done online. As the clinic migrates to an EMR system for the medical records, we anticipate that many of the tasks for the other roles will still be required, but will take place online.

Implications for future medical records practices and future technology

The invisible work supporting paper records suggests opportunities for the development of technologies and services that can facilitate the transition to and subsequent use of an EMR.

Although not the focus of our study, previous researchers have highlighted the issues an EMR system poses for providers. Throughout our study, we heard comments by providers about the impacts on physician-patient interactions as well as the costs associated with transitioning to an EMR. Development of EMR interfaces that comprehend and support provider practices and interactions with patients as well as the operational work of clinics and hospitals would be a significant advancement for the adoption of EMR systems and the potential benefits they bring to the quality of healthcare.

From the perspective of medical records management, there are several opportunities for technologies and services to support the paper to digital transition. The initial transition of a medical practice's collection of paper records to a digital format can significantly impact records management practices. Responsibilities of the staff could expand to include scanning and integrating record content into the EMR. There are opportunities for smart document technologies, such as automatic forms recognition and data extraction to capture data from paper records and insert it in appropriate places into the EMR. There are also opportunities for new services focused on the design and implementation of streamlined workflows. Handwritten portions of a record will have to be captured as images or translated / transcribed by people. The state of these technologies and importance of accuracy in the EMR would still require human intervention to prepare records for scanning and to ensure record integrity and quality assurance after they have been digitized. Any proposed changes in workflow should be grounded in an understanding of the complexity and effort required to manage the records now, emphasizing those activities that will continue during and following a transition to an EMR system. The invisibility of some of this work makes real the possibility that it will be overlooked.

Once the records are digitized, the role of the medical records staff could change again, with less time required for scanning. The workflows associated with electronic records management will evolve to incorporate processes to review electronic data and when necessary, update, correct and approve the data. We anticipate that although this work will evolve in many ways, it is likely to remain invisible to the patients and medical staffs. The medical staff will be evolving their own practices with regard to the use of newly digitized records. Evolving practices should not remain invisible to the EMR vendor community. The successful deployment and adoption of EMR systems ultimately rests on the professional and support staffs who make the new systems work, or not, in their particular environments. Although EMR vendors recognize the importance of supporting workflows, the work we observed consisted of more than a series of workflows. It is a complex set of interactions and activities often interrupt driven, where roles and responsibilities dynamically change to accommodate the work to be done. A productive EMR system will need to comprehend

and support this work. The realization of benefits of well designed EMR systems by the medical community can result in improvements in the quality and costs of healthcare.

CONCLUSIONS

The study of medical records practices revealed a range of activities that are necessary in the management of paper-based records. Much of this work is essentially invisible to the providers (and patients) who rely on the records department to ensure that the records, critical components in quality healthcare, are accurate and available. As healthcare providers consider the transition to electronic record systems, it will be important to evaluate how essential practices will be supported, eliminated or transformed by new systems.

Taking an ethnographic approach proved invaluable to our research team as the findings from the study are being used to help shape, within the framework of our business and organization's goals, the concepts and technologies we think will address some of the issues we observed in the field. Without the detailed analysis of the value of these invisible tasks, their importance would become apparent only when the introduction of a new process or technology failed to supply that value. We have not yet had the opportunity to study a site as they complete the transition to an EMR system. This is something we would like to do in the near future. We are also planning on taking the preliminary concepts and prototypes that have been inspired by the people we observed, back into the field so we can obtain their feedback.

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