Abstract

As health information management (HIM) shifts from paper-based medical records to electronic medical documentation, HIM professionals must appropriately manage their resources to produce higher results for their organization’s operational and financial indicators. This case study highlights the experience of the HIM department in a small Florida community hospital in analyzing existing productivity standards and developing new standards with the purpose of improving the document imaging process. The research produced new productivity standards that more accurately represent the time HIM technicians spend performing their everyday tasks. The data collected during this period indicate that the average HIM technician was prepping 844 images an hour, scanning 601 images an hour, and indexing 482 images an hour. While a trend in productivity cannot be identified because different types of data were collected, the department’s standards are now based on more consistently measurable output. The data collected during this study were used to manage the continuously changing workflow processes; improve the staff’s knowledge, skills, and abilities; and identify potential areas of process improvement.

Keywords: productivity; document imaging; process improvement; electronic medical records; calculating benchmarks

Introduction

Since the enactment of the Health Information Technology for Economic and Clinical Health (HITECH) Act on February 17, 2009, the United States has experienced a rapid acceleration in the development and implementation of electronic health records (EHRs). The sudden growth of electronic systems has led to an incomplete transition from paper medical records to electronic systems, causing a rise of hybrid records consisting of the EHR, paper records, and scanned images. The paper portion of a hybrid record comes at a high cost for healthcare organizations, with an average 1,500-bed hospital producing more than 96 million sheets of paper annually, resulting in costs of up to $3.8 million a year. These costs can be attributed to the large amounts of paper purchased for the hospital to print paper medical records and to supply fax machines. As maintaining a hybrid environment can be difficult and expensive, HIM professionals are increasingly challenged with heavy workloads, complex workflows, and added documentation requirements. Balancing the complexities and the confusion of health information technology initiatives, especially the EHR, requires HIM managers to be change agents while seeking higher levels of productivity and quality from employees. Ensuring the efficiency and effectiveness of the document management process provides healthcare organizations with an opportunity to improve on
performance measures including continuity of care, length of stay, patient satisfaction, coding quality, and billing denials.

**Background**

Continuity of patient care following discharge from an inpatient stay relies on the availability of complete medical records, especially for providers not familiar with the patient. The Joint Commission has provided guidance for the entire healthcare team on successful transitions of care, including the importance of interpersonal communication, EHRs, and paper records. Timely document management processes are a vital part of continuity of care. The process begins when paper documentation is generated on the nursing units and is completed when the scanned image has been quality checked for accuracy by the HIM department. Defining each step in the document imaging process is crucial to ensuring standardization and clear lines of communication among members of the HIM team. By studying each step of the process, HIM professionals can better understand the hybrid environment in their organization and work toward implementing process improvements that will provide a smooth transition to a fully electronic record system.

Productivity standards and turnaround times provide needed tools for the healthcare manager. To ensure completion of post discharge document processing in a timely manner, Bhat and colleagues applied Lean Six Sigma techniques to turnaround time for discharged-patient records. With new efficiencies introduced and waste eliminated, they were able to decrease paper record processing time from 19 to 8 minutes with assembly, analysis, coding, and filing of the record completed and backlogs eliminated. While this set of medical record processes is not equivalent to EHR processes in the United States, it does provide some basis for comparison and comment. As in the processes noted by Bhat and colleagues, conducting timed observations to determine exactly how much time is spent on different work types provides a baseline for performance improvements.

Existing HIM research has focused on transcription and coding productivity or the effects of productivity on quality, leaving a knowledge gap in information on measuring productivity in the document imaging process. When developing productivity standards, management must consider the specialized skill set of HIM technicians and other employees, factoring in learning curves. Establishing industry benchmarks for HIM document imaging functions has proven difficult because of factors that can affect the process, such as fluctuations in workflow, documentation practices, turnaround time requirements, and equipment. In addition to the core responsibilities of the document imaging process, HIM technicians usually have other responsibilities that vary by
facility. Examples of other tasks include answering phone calls and emails and attending to other urgent requests, such as faxing documentation to nursing units and locating documentation for coders. As there is limited published guidance or research on establishing benchmarks, facilities should seek to develop specific productivity measures that have been tailored to account for their organization size, technology, staffing, and designated record set (DRS).

When looking at organizational financial and operational indicators driven by HIM data, such as staffing, reimbursement, length of stay, and compliance, managers need accurate productivity data to make strategic decisions about the future of the organization.18, 19 As each phase in the document imaging process is reviewed, management should ask: Why are we performing this task? Is there a more efficient or effective approach to completing this task? What are the consequences of removing this task? How does this task affect the department or organization? Therefore, the purpose of this case study was to revise the existing productivity standards established during the original implementation of the EHR in 2015 so that new productivity benchmarks would reflect the current practices that have evolved as a result of technology and workflow changes occurring in the HIM industry.

**Methods**

This case study looks at a 210-bed public acute care community hospital. As the hospital transitioned to a hybrid EHR system, the workflow of the HIM department changed significantly. A hybrid structure requires the HIM staff to be skilled in both paper documentation and use of the EHR software, and processes had to be adjusted to accommodate health information in both media. The HIM department faced challenges such as navigating the new EHR, prepping and scanning the remaining paper documentation, creating forms for information not captured in the EHR, and adding barcodes and patient labels to expedite the indexing process. Also, the organization evaluated its DRS to determine what documentation would remain in the DRS and the legal health record, and what documentation should be converted into the EHR versus remain paper based.

**Defining Process Measures**

At this hospital, the HIM document imaging team consisted of three technicians who were cross-trained in all steps of the process. Breaking down each step in the process allows management to identify variables that could be causing bottlenecks. The processes used in this case study are defined as follows (see Figure 1):

- **Chart retrieval.** Unit nurse secretaries assemble charts each night after patient discharge if the documentation has not been picked up concurrently while the patient is in house. The following morning, HIM staff pick up the charts from each nursing unit. This step includes chart checks to ensure that all documentation from each patient is received in the HIM department. The chart check process is completed by comparing a list of discharged patients to the charts
that have been sent down from the nursing floors to confirm that no patient chart has been misplaced.

- **Chart preparation.** Disassembling the chart involves preparing the chart to be scanned. It encompasses removing staples, grouping similar documents together, rearranging documents in chronological order, taping down monitor strips, verifying that all documents belong to the identified patient, adding patient labels, and discarding documentation that is not part of the DRS.

- Documents are scanned to produce an electronic version of the documentation. Because of the low volume of paper at the hospital, individual desk scanners are used instead of industrial scanners. During this portion of the document imaging process, the HIM technicians will also apply electronic deficiency indicators to documentation needing signatures.

- This step involves assigning the correct document type and patient name to each sheet, which will allow the documentation to be identifiable in the EHR. During chart preparation, technicians ensure that each sheet of documentation has a barcode to allow the EHR to automatically apply the patient name and document work type.

- **Quality check.** The quality check includes reviewing the scanned documentation and determining if the images are the best possible quality before they are transferred into the EHR.

- **Incident reports.** This step involves reporting errors in documentation that have the potential to affect patient safety and require a full investigation from risk management. Examples could include lost documentation or documentation sent from the nursing floor with incorrect patient identifiers. Incident reports can be recorded at any point in the document imaging process.

- **Miscellaneous time.** This category includes nonproductive time spent working on tasks that are not directly related to the document imaging process, such as attending meetings or answering phone calls from other departments.

**Determining Current Time Production**

Although steps in the process are defined, variables in a work day can determine exactly what which tasks a technician will perform on any given day. For this reason, time studies will never provide an exact measurement of how much time should be spent on each task. Instead, the time study will provide management with estimates and a general understanding of how time is distributed throughout the process.

Units of work measured in the time study include the following:

- Number of minutes for chart pickup
- Number of inches of documentation prepped
- Number of images scanned
- Number of images indexed
- Number of inches of documentation quality checked
Number of incident reports entered

Miscellaneous (nonproductive) time in minutes

Time studies were performed to collect data three times between August 2017 and August 2018. The initial time study was used to calculate benchmarks, and the following two studies tracked trends over time and measured changes in productivity. Over the course of one year, the hospital experienced one upgrade to the EHR and significant workflow changes in the HIM department.

The worksheet that HIM technicians used to enter their data, showing an example of results from the final time study, can be found in Figure 2.

In addition, current productivity reports for this study were obtained from pre-designed or “canned” productivity reports created by the vendor and generated in the EHR. The EHR utilized used at the hospital included reports that measured productivity for two functions: scanning and indexing. The reports provide productivity data by user, including the number of images scanned or indexed, and the length of time to perform the functions.

**Developing Benchmarks (Calculating Productivity Expectations)**

After time studies were performed, the process of establishing benchmarks began with calculation of the average amount of time each technician takes to complete tasks. Labor productivity was calculated using the following formula:

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\text{Labor productivity} = \frac{\text{Total work produced}}{\text{Total time to complete work}}
\]

In this formula, labor productivity indicates the amount of time taken to complete the work produced. Benchmarks were established by dividing the amount of work produced in the department (i.e., chart retrieval or scanning) by the time it took the technicians to complete the tasks. \(^{20}\)

The original productivity standards that previously existed in the HIM department were measured by inches, not images, so it is not possible to provide a direct comparison between the two sets of productivity benchmarks.

**Establishing Hours Worked**

Determining the number of hours that employees are required to be productive is necessary to ensure accuracy and accountability. Each technician was responsible for 7.5 hours of work daily or 37.5 hours weekly to account for paid and unpaid breaks. Paid time off requires hours to be adjusted on a weekly basis. Time spent on miscellaneous tasks is logged as well.

**Creating a Productivity Log**

Maintaining a productivity log provides a mechanism for technicians and managers to track efficiency trends over time (see Figure 3). Using spreadsheet or database software such as Microsoft
Excel or Access, technicians can enter their work produced daily. This includes the amount of miscellaneous “trash” documents (documents not prepped and scanned) to ensure that the technicians receive proper credit for their time.

**Implementing New Benchmarks**

After the new productivity benchmarks were established, the process of implementation involved transitioning from the previously established standards to the newly created standards. Because the last set of time studies concluded in August 2018, the implementation date was set for October 2018 to allow time for employee education and to coincide with the start of the new fiscal year. In the time between August and October, management trained the HIM technicians on the new benchmarks, explaining the reasons for the revisions to the existing standards, the methodology used to arrive at the new standards, and expectations for performance according to the new standards. Starting in September 2018, the new standards were implemented on a trial basis to identify any potential variances, and in October 2018, the new productivity standards went live.

**Results**

Commencing with the EHR implementation in 2015, HIM technicians measured the total inches of chart documentation picked up each morning. Documentation produced over the past four years shifted from 20-inch batches to batches of less than 1 inch, making it difficult to obtain an accurate measurement. Another prevalent method of measuring productivity is by weight; however, the light amount of documentation picked up in each round made it difficult to attain an accurate weight on the scale. Although the units of work are different for the original and the revised productivity standards, the data from the original benchmarks are included in Figure 4 to allow for further analysis.

The new benchmarks, based on the results of the productivity studies, are shown in Figure 5. The time studies indicated that, on average, a technician scanned 600 images in 60 minutes, indicating that the benchmark for scanning should be 600 images in one hour, or 10 images per minute. Figure 6 shows one technician’s productivity compared with the newly established benchmark for image scanning. On average, the data indicate that the technician was able to exceed the benchmark on most days.

Spreadsheets are used to compare technicians’ results to the benchmarks to determine if the technicians are sufficiently productive according to current productivity standards. These spreadsheets also allow for data analysis by specific measures including type of task, individual technicians, or time period.
Discussion

Changes in technology and organizational workflow processes such as electronic forms and order sets, signature pads, and desktop faxing resulted in a gradual reduction in the amount of paper generated and placed into the charts. Smaller paper charts led the HIM department to consider alternate measurement methods. With implementation of a system based on the number of sheets (or images), potential error caused by human measurement is limited, as the EHR measures the number of images scanned and indexed, and the number of images prepped is measured in the quality check process.

Ultimately, because of the various changes mentioned in this article, HIM leadership made an organizational decision in summer 2017 to change the timing of the document imaging process and chart analysis from post discharge to concurrent (while patients are still in house) to improve continuity of care and optimize resources. HIM technicians now visit the nursing unit multiple times a day instead of doing a single early-morning pickup. This allows the HIM department to begin the document imaging process immediately upon the patient’s admission, resulting in quicker analysis and record completion.

While significant workflow changes occurred within the HIM department and the organization, these changes had a positive effect on productivity. Using technology to reduce the amount of paper and reorganizing the flow of work into the department decreased the volume of work needing to be completed and made the work more manageable for staff, thereby decreasing daily employee burnout.

Using the productivity log to investigate trends in the HIM workflow allowed management to identify potential process improvements that would remove bottlenecks delaying the progression of document imaging in the department. Designing the productivity tracker to identify trends in aggregate data from all the technicians, as well as in data from individual technicians, allowed for comparisons of individual technician performance based on the organization's needs. For example, in this hospital, the tracker identified poor productivity in one otherwise high-performing technician, which allowed management to pinpoint certain processes where the employee need retraining. Analysis revealed that the low productivity was not directly connected to performance but to secondary factors including the technician’s scanner and chart pickup route. Additionally, the tracker trended an increasing amount of miscellaneous “trash” documents being picked up from the floors, which directly correlated to increased amounts of time spent on prepping. Identifying this trend presented an opportunity to provide nursing staff with education on documentation.

Although the methods used for measuring productivity in this case study were designed to account for several variables, the use of self-reported data is a limitation. Numbers reported by different members of the HIM team may be over- or understated. However, comparison of the benchmarks to
information from AHIMA shows that the department is in the range of industry standards. To verify the accuracy and consistency of reported numbers, organizations should regularly review and update their HIM document imaging processes and productivity expectations.

The researchers identified two potential areas for future investigation. First, re-creation of this study in a larger hospital or multihospital system would assist in validating the productivity rates. However, as noted, internal processes, equipment, and other factors vary greatly in different facilities, making comparisons difficult. A second area to consider is the document imaging productivity data created by the EHR, which may provide the HIM industry with information regarding which EHR software has more efficient scanning and indexing functions.

**Conclusion**

Determining standardized industrywide HIM productivity measures for operational tasks is nearly impossible because of the variables that can fluctuate among hospitals. For this reason, it is crucial that HIM departments work toward developing their own organization-specific productivity measures to ensure they are accounting for all variables that could affect the document imaging process. Overall, the process of designing an accurate productivity system at a small community hospital can present unique challenges. Although EHR-generated reports are useful to compare to the time studies for a well-rounded picture, one must also account for potential inaccuracies. The report may not include images that were rescanned for quality, or it may not account for technical issues with the scanners. An accurate and complete medical record includes high-quality images of all scanned documents, and continuity of care relies on availability of the information. In this manner, efficiency in the HIM department translates into efficiency in patient care.

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**Notes**

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