ORIGINAL RESEARCH

How Hospitalists Spend Their Time:

Insights on Efficiency and Safety

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We thank Patricia Georgas for shadowing the hospitalists and collecting the data in this study.

BACKGROUND: Despite the dramatic growth of hospitalists, no studies have evaluated the type and frequency of activities that hospitalists perform. To evaluate the types and frequency of activities that hospitalists perform during routine work, we conducted a time-motion study of hospitalist physicians at our institution.

DESIGN: A research assistant shadowed hospitalist physicians for 3- to 5-hour periods. Observation periods were distributed in order to sample all parts of a typical day of a hospitalist, including both admitting and nonadmitting periods. Activities were recorded on a standardized data collection form in 1-minute intervals. Incoming pages were recorded as well.

RESULTS: Ten hospitalists were shadowed by a single research assistant for a total of 4467 minutes. Hospitalists spent 18% of their time on direct patient care, 69% on indirect patient care, 4% on personal activities, and 3% each on professional development, education, and travel. Communication accounted for 24% of the total minutes. Multitasking, performing more than one activity at the same time, was done 21% of the time. Hospitalists received an average of 3.4 $\pm$ 1.5 pages per hour.

CONCLUSIONS: Hospitalists spent most of their time on indirect patient care activities and relatively little time on direct patient care. Hospitalists spent a large amount of time on communication, underscoring the need for hospitalists to have outstanding communication skills and systems that support efficient communication. Multitasking and paging interruptions were common. The inherent distraction caused by interruptions and multitasking is a potential contributor to medical error and warrants further study. ***Journal of Hospital Medicine*** **2006;1:88–93.**

KEYWORDS: time-motion study, hospitalist, physician time, health care delivery, communication, medical errors

The hospitalist model of care has experienced dramatic growth. In 2003 it was estimated that there were 8000 US hospitalists, a number projected to ultimately reach more than 19 000.[1,2] This rapid growth has largely been driven by improvements in clinical efficiency as a result of hospitalist programs. There is a substantial body of evidence showing that hospitalists reduce length of stay and inpatient costs.[3] Despite the rapid growth and proven benefit to clinical efficiency, no studies have evaluated the type and frequency of activities that hospitalists perform during routine work. Although the use of hospitalists improves clinical efficiency for the hospital, relatively little is known about how the hospital can improve efficiency for the hospitalist.

Our institution greatly expanded our hospitalist program in June 2003 to create a "resident-uncovered" hospitalist service. The impetus for this change was the need to comply with newly

DOI 10.1002/jhm.88
Published online in Wiley InterScience (www.interscience.wiley.com).

revised Accreditation Council for Graduate Medicine Education (ACGME) program requirements regarding resident duty hours. Many teaching hospitals have implemented similar resident-uncovered hospitalist services.[4] Inefficiencies in their work activities quickly became apparent to our hospitalists. Furthermore, our hospitalists believed that they frequently performed simultaneous activities and that they were excessively interrupted by pages.

To evaluate the type and frequency of activities that the hospitalists performed during routine work, we performed a time-motion study of hospitalist physicians on the resident-uncovered hospitalist service. Our goal was to identify areas for systems improvements and activities that were better suited for nonphysician providers and to quantify the time spent multitasking and the frequency of paging interruptions.

METHODS

Northwestern Memorial Hospital (NMH) is a 753-bed hospital in Chicago, Illinois. NMH is the primary teaching hospital affiliated with the Feinberg School of Medicine of Northwestern University. There are 2 general medicine services at NMH: a traditional resident-covered ward service and the resident-uncovered hospitalist service. Patients are admitted to one of these 2 services on the basis of, in order of importance, capacity of the services, preference of the outpatient physician, and potential educational value of the admission. Patients admitted to the hospitalist service are preferentially given beds on specific wards intended for hospitalist service patients. Fourth-year medical students are frequently paired with hospitalists during their medicine subinternship.

The resident-uncovered hospitalist service comprises 5 daytime hospitalists on duty at a time. The hospitalists are on service for 7 consecutive days, usually followed by 7 consecutive days off. Hospitalists pick up new patients from the night float hospitalist each morning. Daytime admitting duties rotate on a daily basis. One hospitalist accepts new admissions each morning from 7:00 AM until noon. Two hospitalists accept admissions from noon until 5:00 PM. One hospitalist accepts admissions from 5:00 PM until 9:00 PM. One hospitalist is free from accepting new admissions each day. All daytime hospitalists begin the workday at 7:00 AM and leave when their duties are completed for the day. One night float hospitalist is on duty each night of the week. The night float hospitalist performs admissions and all cross cover activities from 7:00 PM until 7:00 AM.

TABLE 1
Definitions of Hospitalist Activities

- Direct patient care
  - Taking initial history and physical exam
  - Seeing patient in follow-up visit
  - Going over discharge instructions
  - Family meetings
- Indirect patient care
  - Reviewing test results and medical records
  - Documentation
    - Documenting history and physical, daily notes, filling out discharge instructions, writing out prescriptions
  - Communication
    - Taking report from night float, taking admission report, face-to-face discussion, initiating and returning pages
  - Orders
  - Writing/inputting orders, calling radiology
- Professional development
  - Going to conferences, grand rounds, etc
  - Reading articles, textbooks, online references
- Education
  - Teaching during work rounds
  - Didactic sessions with subintern
- Travel
  - Walking, taking elevator, etc
- Personal
  - Lunch, washroom break, etc.

We first conducted a pilot study to help identify specific activities that our hospitalists routinely perform. Broad categories and subcategories of activities were created based on the results of our pilot study, and a published time-motion study performed on emergency medicine physicians[5] (Table 1). Once activities were defined and codes established, our research assistant unobtrusively shadowed hospitalist physicians for periods lasting 3-5 hours. The observation periods were distributed in order to sample all activities that a daytime hospitalist would perform throughout a typical week. Observation periods included 2 morning admitting periods, 4 morning nonadmitting periods, 4 afternoon admitting periods, 4 afternoon nonadmitting periods, and 2 admitting periods from 5:00 PM to 9:00 PM. Activities were recorded on a standardized data collection form in 1-minute intervals. When multiple activities were performed at the same time, all activities were recorded in the same 1-minute interval. Incoming pages were recorded as well. To minimize the possibility that observation would affect hospitalist behavior, the research assistant was instructed not to initiate conversation with the hospitalists.

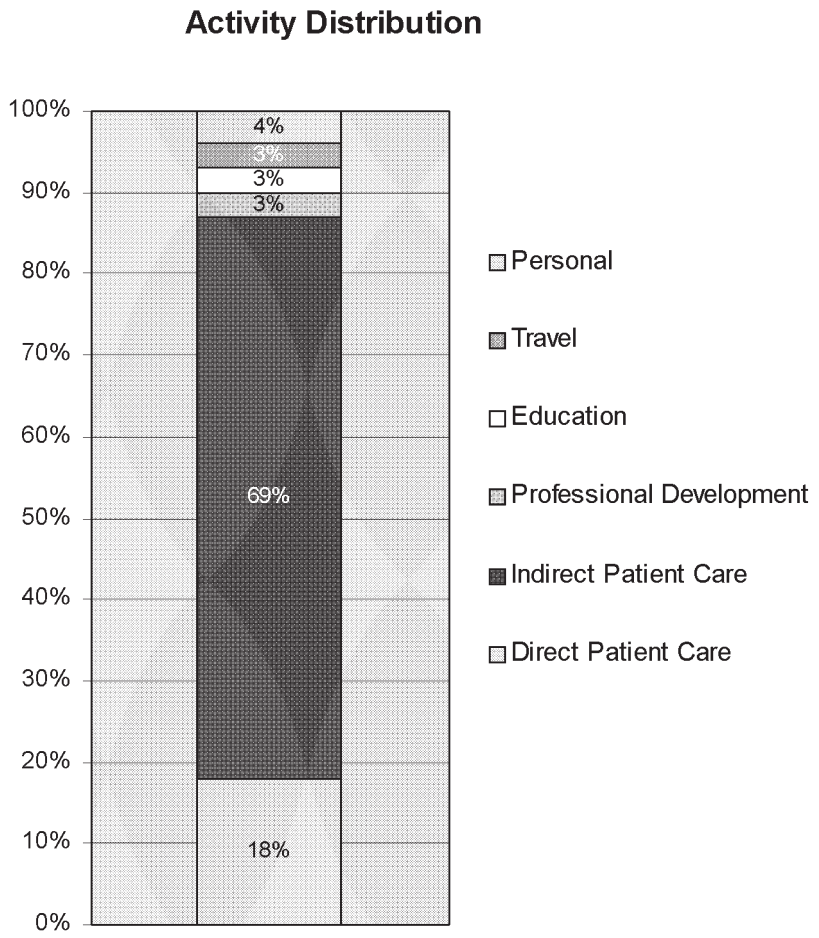

FIGURE 1. Percentile breakdown of hospitalist activities (n = 5557 minutes).

The data collection forms were manually abstracted and minutes tallied for each category and subcategory, for which summary statistics were converted to percentage of total minutes.

RESULTS

Ten hospitalists were shadowed by a single research assistant for a total of 4467 minutes. Seven hospitalists were male and 3 were female. The hospitalists were a mean age of 31 ± 1.6 years of age and had been practicing as a hospitalist for a mean of 2.1 ± 1.0 years. The hospitalists saw an average of 9.4 ± 4.0 patients on the days they were shadowed by the research assistant. Because simultaneous activities were recorded, a total of 5557 minutes of activities were recorded.

The distribution of total minutes recorded in each activity category is shown in Figure 1. Hospitalists spent 18% of their time doing direct patient care, 69% on indirect patient care, 4% on personal activities, and 3% each on professional development, education, and travel.

Of the time hospitalists directly cared for patients, 18% was spent obtaining histories and performing physical examinations on new patients, 53% seeing patients in follow-up visits, 16% going over discharge instructions, and 13% in family meetings (Figure 2). Of the time hospitalists spent doing indirect patient care, 37% was taken up by documentation, 21% by reviewing results, 7% by orders, and 35% by communication (Figure 2).

As just explained, communication accounted for 35% of indirect patient care activities; it also accounted for 24% of the total activity minutes. The time spent by hospitalists on communication was further broken down as 23% paging other physicians, 31% returning pages, 34% in face-to-face communication, 5% taking report on new admis-

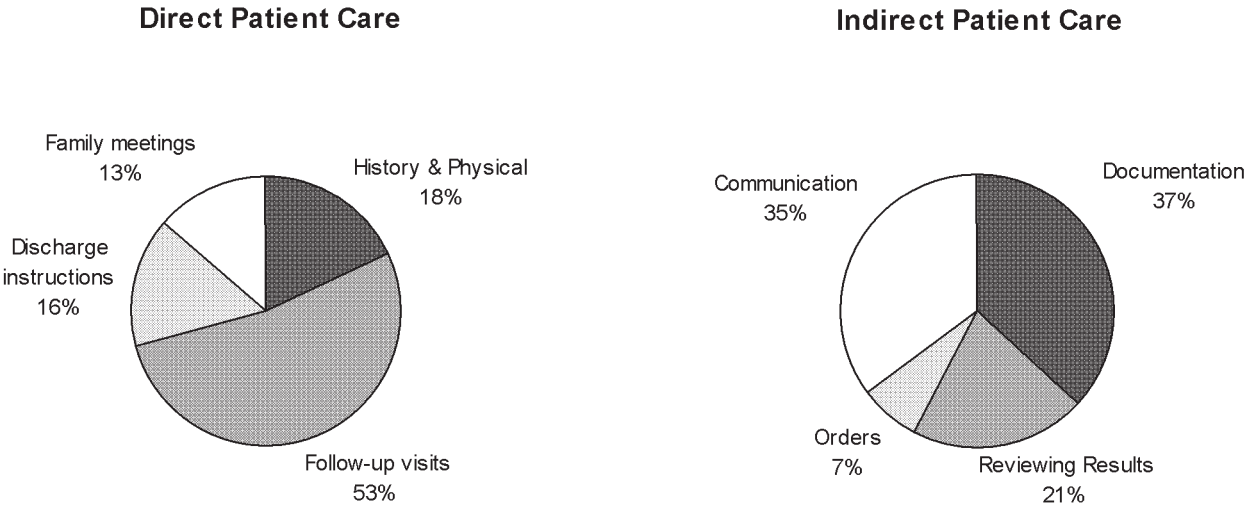

FIGURE 2. Percentile breakdown of direct patient care activities (n = 1008 minutes) and indirect patient care activities (n = 3818 minutes).

sions, 4% on sign-out to the night float hospitalist, and 3% receiving sign-out from the night float hospitalist.

Multitasking, performing more than 1 activity at the same time, was done 21% of the time. Hospitalists received an average of 3.4 ± 1.5 pages per hour, and 7% of total activity time was spent returning pages. Other forms of interruption were not evaluated.

DISCUSSION

Our study had several important findings. First, hospitalists spent most of their time on indirect patient care activities and relatively little time on direct patient care. Time-motion studies of nonhospitalist physicians have reported similar findings.[5,6] A considerable amount of hospitalist time was spent on documentation. This finding also has been reported in studies of nonhospitalist physicians.[5,7]

A unique finding in our study was the large amount of time, 24% of total minutes, spent on communication. A study of emergency medicine physicians by Hollingsworth found that 13% of their time was spent on communication activities.[5] The large amount of time spent on communication in our study underscores the need for hospitalists to have outstanding communication skills and systems that support efficient communication. Hospitalists spent 6% of their total time paging other physicians and 7% returning pages. Improvements in the efficiency of paging communication could greatly reduce the amount of time communicating by page. Our paging system provides unidirectional alphanumeric paging. In an effort to improve the efficiency of paging, we have asked nurses and consultants to include "FYI" and "callback" in the text of the page so it is clear whether the person who has paged the hospitalist needs to be called back. This simple solution to help reduce the number of unnecessary callbacks has previously been proposed by others.[8]

Another part of solving this problem is adopting the use of 2-way pagers instead of alphanumeric pagers. Two-way paging can increase the efficiency of communication even further. For example, a nurse sends a hospitalist a page that asks if the previous diet orders for a patient just returned from a procedure can be resumed. This hospitalist is on another floor in another patient's room. Rather than spending time leaving the other patient's room, finding a phone, calling the floor, waiting for an answer, and then waiting on hold, the hospitalist simply texts a 1-word answer, "Yes," in the 2-way paging system. In addition to the time occupied by paging activities, hospitalists spent a large amount of time in face-to-face communication (8% of total activity time). On the one hand, having hospitalists discuss patient care with consultants and nurses in person on an ongoing basis throughout the day may improve clinical efficiency. On the other hand, the constant potential for interruption may be problematic. Similarly, 2-way paging could facilitate communication to such a degree that it could actually increase the frequency of interruptions.

Research on improvements in communications systems, interventions to improve communication skills, and team-based care is warranted in order to evaluate the impact on hospitalist workflow.

An important finding in our study was that multitasking and paging interruptions were common. Although this may come as no surprise to practicing hospitalists, the distraction caused by interruptions and multitasking is an important potential cause of medical errors.[9–11] A thorough examination of the types of activities performed simultaneously and whether they contributed to medical error was beyond the scope of our study. Some activities, such as documenting a note on a patient while reviewing the patient's lab results, are concordant (ie, conducted for the same patient) and therefore may be unlikely to contribute to medical error. Other combinations of activities, such as returning a page about one patient while documenting a note on a different patient or having face-to-face communication about one patient while entering an order on another patient, are discordant. Discordant activities may contribute to medical error. Further research of the effect of hospitalist multitasking and interruption on medical error is warranted and should be conducted within the framework of concordant versus discordant activities.

We had hoped to find activities that could be performed by non-physician providers. No high impact activities were discovered that would be better suited for a non-physician provider in this study. Clerical tasks, such as calling for radiology orders or obtaining medical records, amounted to a small percentage of hospitalist time (less than 1% combined). We did identify several activities in which automation or process improvement would be helpful. Hospitalists spent 5% of time on the combined activity of documenting discharge instructions and writing out prescriptions. Our institution is in the process of implementing an electronic medical record and computerized physician order entry. We are currently working on an automated process to generate printed discharge instructions and prescriptions. This has the potential not only to improve efficiency, but also to eliminate medication errors, as care is transitioned to the outpatient setting.

Our study had several limitations. First, our findings reflect the experience at one institution. Hospitalist practices vary widely in their staffing and scheduling models as well as in their organizational support. The amount of time that hospitalists spend on activities may differ between practices and between individual hospitalists in the same practice. Another limitation to our study pertains to the workflow of our hospitalists and the locations of their patients. As discussed earlier, patients were assigned to a hospitalist according to time of admission, not location of admission. Because of this, the hospitalists were caring for patients on as many as 5 wards. Although travel time amounted to only 3% of total minutes, it is possible that communication time could have been reduced if patients were distributed to hospitalists on the basis of patient location rather than time of admission of patient. For example, physicians and nurses might spend less time communicating in person compared to communicating via unidirectional paging, which frequently requires waiting for a callback. Finally, our study only observed activities performed by the daytime hospitalists at our hospital. The distribution and types of activities performed by nighttime hospitalists may be somewhat different.

Our study may serve as a model for hospitalist time-motion studies in other settings. Our findings are of particular importance to resident-uncovered hospitalist programs in academic hospitals, a setting in which operational inefficiencies may be abundant as house staff members have been poorly positioned in the hospital organization to lobby for process change. We hope that our study is a precursor to research evaluating modifications to the environments and systems in which hospitalists work. Such modifications have the potential to improve productivity and work conditions and promote career satisfaction.

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Received 7 September 2005; revision received 22 January 2006; accepted 6 February 2006.

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