A Time–Motion Study of the Activities of Attending Physicians in an Internal Medicine and Internal Medicine–Pediatrics Resident Continuity Clinic

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ABSTRACT

Purpose. To describe the activities of attending physicians in a residency-based continuity clinic and to examine factors that affect their teaching of, supervision of, and interaction with residents.

Method. Six full-time board-certified faculty members (three internal medicine, three internal medicine–pediatrics) in an urban residency program participated in a descriptive observational time–motion study. The attending faculty were directly observed by “shadow” technique for 30 half-day sessions from April 1994 through September 1994. Each activity was measured by a trained research assistant using a digital stopwatch. The observed activities were assigned to one of 16 subcategories.

Results. 6,389 minutes of activities were observed. Activities were distributed among four general categories: direct contact with residents (43.1%), clinic operations (33.7%), personal and/or professional activities (18.0%), and miscellaneous time (5.2%). Attending physicians spent the most time in direct contact with residents when the patient-to-attending ratio was 10–14:1.

Discussion. The activities of the clinic’s attending physicians were quite varied. Less than half of their time in the clinic was spent in contact with residents. This contact time may be significantly increased by changes to clinic policies, such as optimizing the patient-to-faculty ratio and increasing administrative support for the clinic. These findings can be used as a reference point for studies of attending physicians’ activities since the federally mandated rules changes regarding their responsibilities for supervising residents.


Medical education has undergone some fundamental changes over the past two decades and is quite likely to change even more significantly in the next few years. The trend toward outpatient care in practice has changed the emphasis in medical education from the inpatient setting to the outpatient setting. Residency continuity clinics have become an essential element of all primary care specialty training programs. Despite their widespread use, surprisingly little is known about the specific activities of residents and faculty in resident continuity clinics. The results of a few studies in which residents’ experiences were documented with time–motion studies indicate that the residents’ experiences in continuity clinics were very similar to their experiences in inpatient settings. Residents spent about 30% of their time directly interacting with patients and less than 5% of their time discussing the patients with the attending staff. The remainder of their time was spent on indirect patient care activities, socializing, reading or preparing for conferences, and waiting or in transition. Although scientific assessments of the quality of the outpatient educational experiences in the resident continuity clinics have not been made, it would appear that the quantity of time residents spend with the attending staff is quite small. In a study by Xakellis and Gjerde, a majority (53%) of the activities of a clinic’s attending physicians were found to be unrelated to teaching. In the same study,
residents reported interruptions of their learning time and postponements of important discussions of patients’ problems. Residents’ dissatisfaction correlated with their perceptions of waiting times, interruptions, and the inaccessibility of their attending physicians. In order to develop a better understanding of the educational experience for residents in our continuity clinic and our residents’ contact with attending physicians, we conducted a time-motion study to describe the attending physicians’ educational and non-educational activities and to identify factors that affected their teaching, supervision, and interactions with the residents.

METHOD

The participants in our study were six full-time board-certified faculty members of Wayne State University School of Medicine. Three of the faculty were trained in primary care medicine and three were trained in internal medicine–pediatrics. All of the faculty members had had at least three years of teaching experience since their graduation from residency.

We conducted our study in the primary care internal medicine and pediatrics clinic in an urban university–based resident ambulatory practice with a volume of 15,000 patient visits per year (30% pediatric, 4% adolescent, 66% adult). It serves as the continuity of three clinic sessions and a consensus among the faculty and staff. These 16 variables were grouped into four broad categories: residency (direct contact with residents), clinic operations, personal and/or professional, and miscellaneous (see List 1). The attendings were encouraged to narrate their activities, which allowed the shadower to categorize those activities that seemed ambiguous. The total numbers of faculty, residents, and patients were counted for each session. The variables were coded and entered into a database and analyzed by a standard software package using descriptive statistics and analysis of variance.

RESULTS

A total of 6,389 minutes of attending physicians’ activities were observed. The mean time per session was three hours and 33 minutes (range one hour, 41 minutes, to five hours, nine minutes). A mean of 5.4 residents (range two to ten) were supervised by one attending physician (range one to three). A mean total of 17.2 patients per session were seen in the clinic (range six to 36). The distribution of the attending physicians’ activities is shown in Figure 1.

Residency. Direct contact with residents amounted to 43.1% of the time attending physicians spent in the clinic. The activities involved were supervising residents (26.2%), educational evaluation and research not associated with a patient in the clinic at that moment (5.7%), direct contact with a resident’s patient (4.7%), socializing with residents (3.8%), and discussing residency program issues (2.7%).

Clinic operations. The attending physicians spent 33.7% of their time on clinic operations. These activities were answering phone calls, messages, and pages (10.6%); direct contact with a patient as the primary provider without a resident present (6.5%); administration (6.2%); reviewing medical records (3.5%); reviewing lab results (3.5%); performing triage on walk-in patients (1.3%); reviewing prescription refill requests (1.1%); and speaking with phar-
List 1

<table>
<thead>
<tr>
<th>Definitions of Subcategories Used in a 1994 Time-Motion Study to Describe Attending Physicians’ Activities in a Resident Continuity Clinic</th>
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<tbody>
<tr>
<td><strong>Clinic operations</strong></td>
</tr>
<tr>
<td><strong>Administration.</strong> Interaction with clerks, assistants, and medical record clerks about clinical professional activities and/or patient-flow issues. This also includes activities that ensure that patients are seen in a timely fashion, such as locating patients or finding a resident to examine the patient.</td>
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<tr>
<td><strong>Direct patient contact as the primary provider.</strong> Examining the patient alone, including walk-ins, patients who do not have a scheduled appointment, private patients of the attending physician, and patients assigned to a resident who was not working in the clinic that day.</td>
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<tr>
<td><strong>Drug representatives.</strong> Meeting with pharmaceutical representatives to discuss new medications or to sign for samples.</td>
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<tr>
<td><strong>Lab results.</strong> Reviewing lab reports and obtaining lab results from the computer.</td>
</tr>
<tr>
<td><strong>Medical records.</strong> Reviewing and signing the residents’ charts.</td>
</tr>
<tr>
<td><strong>Phone calls or messages.</strong> Receiving incoming calls, making calls to patients, prescribing refills over the phone, making personal calls, answering pages, consulting, and making calls to the office.</td>
</tr>
<tr>
<td><strong>Prescription refills.</strong> Prescribing refills for walk-in patients or those that have been called in to a medical assistant.</td>
</tr>
<tr>
<td><strong>Triage.</strong> Talking to any patient or family outside the examining room to determine how clinical services should be delivered prior to the patient’s being seen. This also includes reading blood pressure and tuberculin skin test results.</td>
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<tr>
<td><strong>Residency</strong></td>
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<td><strong>Direct patient contact as the supervisor.</strong> Examining the patient with others (residents and students).</td>
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<tr>
<td><strong>Education.</strong> Instructing residents, nurses, and students about non-patient topics, such as presenting didactics, old case histories, slides, and clinical guidelines. This may also involve discussions of patients who are not presently in the clinic.</td>
</tr>
<tr>
<td><strong>Resident issues.</strong> Discussions between the attending and resident regarding any non-medical, non-social, and non-educational subject. This might include vacation requests, complaints, conflicts, and clinic dates.</td>
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<tr>
<td><strong>Social time.</strong> Socializing with residents.</td>
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<tr>
<td><strong>Supervision.</strong> The supervision of residents, students, and nurses. This includes listening to and supervising case presentations; teaching about those patients; and reviewing the labs, slides, and x-ray films.</td>
</tr>
<tr>
<td><strong>Personal and/or professional activities.</strong> These include completing charts, consulting with colleagues, completing evaluations, interviewing residency candidates, preparing lectures, opening mail, reading professional articles, and working on research projects.</td>
</tr>
<tr>
<td><strong>Personal time.</strong> Solitary activities, such as coffee time, food breaks, restroom breaks, and non-medical reading.</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
</tr>
<tr>
<td>The unaccounted for and/or idle time that was determined by subtracting the sum of the timed activities from the total time of observation.</td>
</tr>
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maceutical company representatives (1.0%).

**Personal and/or professional activities.** The attending physicians’ personal and/or professional activities (18%) were professional activities not related to the resident clinic (16.3%), and personal time (1.7%).

**Miscellaneous activities.** Miscellaneous, or unaccounted for and/or idle time was determined by subtracting the sum of the timed activities from the total time of observation. These miscellaneous activities amounted to 5.2% of the attending physicians’ time. A sub-
Figure 1. Distribution of time spent on residency activities, personal and/or professional activities, clinic operations, and miscellaneous activities by six faculty members followed in a time-motion study of attending physicians at an internal medicine and internal medicine–pediatrics residency continuity clinic, 1994.

Figure 2. Variations in the time spent on residency activities, personal and/or professional activities, clinic operations, and miscellaneous activities among six attending physicians followed in a time-motion study of the activities of attending physicians at an internal medicine and internal medicine–pediatrics resident continuity clinic, 1994.

A substantial portion of the miscellaneous activities were interruptions, which occurred on an average of once every 13 minutes.

The supervising physicians spent a mean of 5.2 minutes per patient discussing the case with the resident. He or she examined a mean of three patients per session; treating one patient (range none to four) as the primary provider for walk-in patients and two patients (range none to eight) as the supervisor of a resident. In one third of the observed sessions, no attending physician examined the residents’ patients. When the attending physician did go in to see a resident’s patient, he or she spent a mean of five minutes with each patient. Overall the attending spent a mean of 6.1 minutes per case supervising residents. When the attending physician saw patients as the primary provider during the session, a mean of 12.6 minutes was spent with each patient.

When the time the attending physician spent in contact with residents was compared with the resident-to-faculty ratio there was no significant difference across a range of ratios from 1:1 to 5:1. However, when contact time with residents was compared with the ratio of total number of patients seen in the clinic during the session per attending physician, a ratio of ten to 14 patients per attending physician yielded the highest percentage of an attending physician’s time spent in contact with residents ($p = 0.008$).
While there was no statistically significant difference among the individual faculty members with respect to the amounts of time they spent in direct contact with residents ($p = 0.089$) or in personal and/or professional activities ($p = 0.10$), there was a statistically significant difference in the percentages of time they spent on clinic operations ($p = 0.044$). See Figure 2.

**DISCUSSION**

Our study's results show that the activities of the attending physicians in our clinic were quite varied and that less than half of their time in the clinic was spent in contact with residents. These findings are consistent with those of previous studies; Xakellis and Gjerde showed that slightly less than half of the activities of the attending physicians in their study were related to teaching, and Malone et al. showed that senior medical residents spent 4.4% of their time reviewing cases with the attending physicians. When the mean time the attending physicians spent supervising residents in our study (26.2%) is divided by the mean resident-to-faculty ratio in our clinic (3.0), the result is that the attending physicians spent an average of 8.7% of their time in clinic supervising each resident. Since the total time the attending physicians spent in the clinic is similar to the total time the residents spent in the clinic, our results are consistent with those of Malone et al.'s study.

No single activity accounted for the majority of the time the attending physicians were not spending in contact with the residents. Instead, many activities occupying small amounts of time accounted for this time. In addition, the relatively small amount of time spent with residents was frequently interrupted, requiring the attending physician to collect his or her thoughts, and possibly causing the loss of important information or the necessity for repeating information. Further, Knudson et al. found that three fourths of the time spent supervising a resident was spent presenting the case and gathering information to ensure good patient care. Faculty are left with limited opportunities for teaching.

Although there was no statistically significant difference in the amounts of time individual faculty spent with residents, our findings do suggest that the faculty used a variety of practice styles. The attending physician with the most resident contact spent 64% more time with residents than did the attending physician with the least contact with residents. This trend may be explained by variations in the levels of supervision the residents required and the day of the clinic, since each attending physician in our study tended to supervise the same group of residents on the same day of the week.

From the results of this study we can suggest some changes that might increase the amounts of time attending physicians spend with residents and that, as a result, could improve the quality of education and residents' satisfaction. Freeing the attending physician from the responsibility for the details of clinic operations is accomplished in many private practices by hiring experienced nurses and receptionists who can perform triage on walk-in patients, handle more complex phone calls, and take care of basic administrative issues in the clinic. Studies of medical residents have shown that they too spend large portions of their time performing non-physician tasks, and that the reduction of these tasks may improve the residents' ability to participate in educational activities. In addition, establishing specific guidelines for medical assistants about when an attending physician should be interrupted may reduce the number of interruptions. Scheduling pre-clinic conferences for residents for each session may also significantly increase the educational activity that occurs. Establishing and reinforcing residents' education as a priority over other professional activities during clinic might also increase residents' contact with the attending physician.

Recently, much attention has been paid to the resident-to-faculty ratio in continuity clinics. Our results showed no significant difference in the total amounts of time attending physicians spent in contact with residents as a group across a range of resident-to-attending ratios from 1:1 to 5:1. However, these ratios represent decreasing amounts of time spent with each resident as the total number of residents in clinic increased. An interesting finding was that in our clinic a patient-to-attending physician ratio of about 10–14:1 yielded the maximum amount of time the attending physician spent in contact with the residents as a group. One possible explanation for this is that when the patient-to-faculty ratio was low there were few patients to discuss and the attending physician had time to perform other professional and personal tasks, filling the void. When the ratio was high there were more clinic-operation tasks to do. In addition, residents were busier and less free to see walk-in patients. As a result, the attending physician would see the walk-in patients as the primary provider. When the attending physicians saw patients as primary providers, they did so half as efficiently as they did when they were supervising a resident who was seeing the patient (12 minutes per patient versus six minutes).

A number of limitations of this study should be noted. This study represents the practice in a single urban residency program. Although our findings appear consistent with those of other studies, there may be significant variation between institutions in the management of their resident continuity clinics. The apparently small amount of time the attending physicians spent teaching may merely reflect the increasing independence of the residents. Studies by Williamson et al. and Malone et al. show
senior residents rely progressively less on attending physicians.\textsuperscript{5,25} We cannot
determine from our data whether clinic
operations and other personal or profes-
sional activities were performed in place
of education or simply filled the void
left when the educational activity was
completed. It is likely that both oc-
curred.

Since the data were collected by a
single observer, assessment of inter-rater
reliability was not at issue. However, we
addressed the reliability of the study in
other ways. First, a predetermined
checklist containing the research vari-
ables was developed during a pilot
study, preventing the observer from
having to invent or create variables as
the study proceeded. Second, the study
was based on pilot work (n = 3 sessions)
that allowed the observer to identify
and correct any problems associated
with coding practices. Third, the poten-
tial for changes in the behaviors of the
attending physicians in the presence of
the observer (a Hawthorne effect) was
discussed with the participants prior to
the pilot work. The participants re-
sponded that they were already too busy
to add activities to their clinic time that
they would not normally do. Fourth,
the observer had had a year of experi-
ce with the time±motion study method prior to this study. Finally, the
trained observer was not a physician
and did not have any preconceived
ideas of how an attending physician
should spend his or her time during
clinic.

This study demonstrates the range of
activities attending physicians perform
as clinic supervisors and the relatively
small amount of time they spend teach-
ing residents. This information may be
useful given the recent nationwide ef-
efforts of budget decisions for medical
education. With reduced funding from
government sources, residency programs
will become more dependent on the
clinical incomes of their teaching fac-
ulty and the viability of their resident
clinics. This will increase the need for
more patients to be seen more effi-
ciently in the clinics, potentially shift-
ing the focus away from residents’ edu-
cation and toward patient services and
the earnings drawn from them. Recent
clarification of Medicare reimbursement
regulations for physicians at teaching
hospitals will also require attendings to
examine more patients in the role of a
supervisor and to spend more time
charting than they did at the time of
this study. Our study data can serve as
a benchmark for activities prior to these
changes. Given these changes, efforts
should be made to maximize resident
clinics’ efficiency while preserving or
improving the educational experience
for residents. Further studies done after
these changes have been in effect will
be useful in assessing the impact of
these changes on medical education in
this country.

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