Case Mix in a Primary Care Teaching Practice for Two Clerkship Schedules

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Student-physicians saw patients from assigned families at primary care training sites either one or two half-days a week. These practice conditions caused a skewing of diagnoses away from seeing acute conditions. Students who saw patients two half-days a week made 21 percent fewer acute care diagnoses than were made in the practice. Those students at the clinical site one half-day a week saw 28 percent fewer acute disease diagnoses. Accordingly, there was an increase in the percentage of chronic disease and health supervision diagnoses in the case mix of these student-physicians.

This part-time scheduling of students at the training sites was related to a disruption in continuity of care for the patient. While a little less than half of acute illness care was performed by student-physicians, over two thirds of chronic disease diagnoses were made by these once-or-twice-a-week trainees. Almost nine tenths of health care supervision was accomplished within the trainees' twice-a-week schedule.

Several writers[1-3] have focused upon the need for the scope of primary care medical education to approximate the breadth of problems seen by the primary care physician in his/her office. Although Alpert and Charney[4] believed that certain goals of a primary care curriculum could be met in short-term clerkships (a few weeks duration), they and others felt that there were many advantages to a longer (several months or more) rotation.

Continuity of care is one advantage of extended patient contact and is an integral part of one definition for primary care, to "assume longitudinal responsibility for the patient regardless of presence or absence of disease."[4] Both patients[5] and providers[6] are more satisfied with a longer relationship, and continuity of care increased when the same physician followed a patient over subsequent visits.[7] This continuity of care may be demonstrated to trainees through extended patient exposure in a teaching practice,[8] but is certainly limited whenever the physician is less than full-time in the office.[9] Although continuity might remain high for preventive care, the continuity for acute illnesses would decrease because the same physicians were not always available. Similar conditions might prevail if students or residents worked part-time for several months in a primary care teaching practice.

This study examined the continuity of care provided patients and the breadth of experience provided the trainee when the physician is only in the office part time. Diagnoses were divided into three categories: (1) acute disease, (2) chronic disease, and (3) health supervision. The likelihood that a single provider would follow patients in these various categories was compared under

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Table 1. Study Design: Number of Half-Day Sessions for Medical Student Classes (1974-1976) by Time Intervals of Study

Medical Student Class	Intervals Studied: July 1974-June 1975	Intervals Studied: July 1975-June 1976
Fourth Year	1 half-day a week	2 half-days a week
(No. of students)	(10)	(18)
Third Year	2 half-days a week	2 half-days a week
(No. of students)	(14)	(20)

three working conditions: (1) one half-day per week, (2) two half-days per week, and (3) full time in the office.

Methods

At the Rockford School of Medicine, a clinical school in the University of Illinois College of Medicine, students spend one or two half-days a week in one of three health centers, located in small communities outside of Rockford.[10] Each student is taught at a health center for two and a half years and assigned particular families to treat and follow for this entire period. The period researched was July 1974 through June 1976. During the first year examined, July 1974 through June 1975, senior medical students worked at a health center one half-day a week and junior students worked two half-days a week. During the second year studied, both senior and junior students worked at a health center two half-days a week, excluding vacation time (Table 1). Students were at a health center from 40 to 44 weeks each school year.

Students at two of the three health centers saw only patients from their assigned roster of families. When a patient appeared with a problem that could not await the student's next session at the health center, a faculty member treated the patient. Faculty treated these nonscheduled patients so that each family basically could establish and maintain a patient-physician relationship with only one medical student. At the third health center, students also treated and followed a panel of families, but when a given student was not available, another student would care for the patient, rather than a faculty member. Diagnoses from this third health center were not examined in this study.

There were 37,815 patient visits and 46,202 diagnoses at the two health centers studied during the two years. Office visits to the staff nurses or laboratory personnel (for allergy injections, immunizations, laboratory tests) were excluded from this analysis. Those visits for which a provider was not listed (less than five percent) were also excluded. Although students also followed their own hospitalized patients, hospital visits were not included for either students or faculty.

Data for this study were taken from the patient encounter forms in use at the sites. All providers at the health centers filled out encounter forms, stating date of the visit, provider number, and diagnoses. These encounter forms were coded for computer tabulation using a local variant of the Royal College of General Practitioners'[11] coding system.

The diagnoses were classified into three categories, using a format similar to that described by Haggerty.[1] Acute diseases were somewhat arbitrarily defined as those which were recorded as a "new" diagnosis more than half the time at the three community health centers, 1975-1976,

Table 2. Percent Types of Diagnosis in Entire Practice and by Students, for 1974-1975 and 1975-1976

Diagnosis Type	Entire Practice*		Students			
			Third Year*		Fourth Year**	
			2 half-days per week	2 half-days per week	1 half-day per week	2 half-days per week
	(74-75)	(75-76)	(74-75)	(75-76)	(74-75)	(75-76)
Acute Disease	49.9	49.8	37.1	38.2	35.9	39.5
Chronic Disease	38.1	37.5	46.6	44.5	48.7	41.1
Health Supervision	12.1	12.6	17.3	17.3	15.4	19.4
	100.1†	99.9†	100.0	100.0	100.0	100.0
(No. of diagnoses)	19,597	26,605	6,118	8,676	2,056	5,349

*No significant differences between years for diagnosis types, at $P \geq 0.05$, using chi-square test with two degrees of freedom.
**Differences between years for diagnosis types significant at $P < 0.001$, using chi-square test with two degrees of freedom.
†Column does not total 100 percent due to rounding.

while chronic diseases were "old" or follow-up visits more than half the time. Acute conditions (averaging less than two visits per episode of illness) included most accidents, infectious diseases, and skin problems, those diagnoses that would usually be treated in one or two office visits. Chronic diagnoses included most circulatory and metabolic conditions. Psychologic conditions, prenatal care, and other situations in which the patient needed to be followed over an extended period of time were also considered chronic conditions. The disease categories were validated for high-frequency acute diagnoses, such as upper respiratory tract infections and contusions (82 percent and 78 percent "new," respectively), and chronic diseases, such as hypertension and diabetes (16 percent and 11 percent "new," respectively). Health assessments included well-baby checks, Pap smears, complete physical examinations, and other elements of preventive medicine. All diagnoses were fitted into one of these three categories: (1) acute disease, (2) chronic disease, or (3) health supervision. Statistical differences between the groups were tested with chi-square analysis.

Results

Table 2 shows the distribution of the three diagnosis types among students and in the entire practices. Acute disease diagnoses, which accounted for half of the problems in the practices, decreased to only 39.5 percent of diagnoses for the fourth-year students present at a health center two half-days a week and to 35.9 percent when the fourth-year students were at a health center only one session a week. This difference was statisti-

Table 3. Percent of Practice Diagnoses for Entire Practice and for Students During 1974-1975 and 1975-1976 with Ratio of Diagnosis Types for Students Between the Two Years

Diagnosis Types	Year	Entire Practice	Students			
			Third Year	Ratio* 1975-76 1974-75	Fourth Year	Ratio* 1975-76 1974-75
Acute Disease	1975-76	49.9	38.2	1.03	39.5	1.10
	1974-75	49.8	37.1		35.9**	
Chronic Disease	1975-76	37.5	44.5	0.99	41.1	0.86
	1974-75	38.1	45.6		48.7**	
Health Supervision	1975-76	12.6	17.3	0.96	19.4	1.21
	1974-75	12.1	17.3		15.4**	

*Ratio of diagnosis type frequency between the two years based upon proportion of care given by class of students compared with prevalence of diagnosis type in the practice that year. For example, fourth year students in acute care, f(1975-76)÷f(1974-75), with [.395÷.499]÷[.359÷.498]=1.10. This would be a 10 percent difference in diagnosis frequency between the two years.
**Students at practice site one half-day per week. Other students present two half-days per week.

cally significant ($P<0.001$). This chi-square table was partitioned out and demonstrated both significantly more acute disease care and health supervision among fourth-year students in 1975-1976 when compared with fourth-year students the previous year ($P<0.05$). The numbers of total visits varied considerably between years and classes, but this was a function of differing numbers of students (Table 1) rather than differing visits per student per session.

Differences in the diagnosis frequency between part-time student-physicians and the total practice case mix are seen in Table 3. Third-year students, present two half-days a week, saw 24 percent fewer acute disease diagnoses than were seen in the entire practice. Fourth-year students working two half-days a week saw 21 percent fewer acute diagnoses, while fourth-year students working only one half-day a week saw 28 percent fewer acute disease diagnoses than were seen in the total practice during the same months. The two-session-a-week fourth-year students made 10 percent more acute disease diagnoses than did the one-session group. Increased chronic disease diagnoses and health supervision diagnoses among the one-session group resulted from the lower prevalence of acute disease in those students' experiences.

Table 4 shows the percentage of all acute, chronic, and health supervision diagnoses seen by the students at the practice sites. The remaining diagnoses were made by the faculty physicians and represented visits which could not wait until the patient's student-physician was at the health center. A little less than half the acute disease diagnoses were seen by students, while about 70 percent of chronic diseases were able to be treated within the students' work schedules. During the second year of study, 90 percent of health supervision was provided by students. The remaining ten percent of health supervision diagnoses were most likely made during student vacations.

Table 4. Percent of Diagnosis Type Seen by Students, 1974-1976

Year	Diagnosis Types: Acute Disease	Chronic Disease	Health Supervision
July 1974-June 1975	45.3*	65.9	83.5
July 1975-June 1976	49.8	71.9	89.4

*Within each diagnosis category and year=(Diagnosis total for all students)÷(Diagnosis total for practice site) × 100.

Discussion

Any office absences distort the experience of the student and give less continuity of care to the patient. Insofar as the patient is concerned, however, a break in the continuity of care may occur any time the physician is not available, even for a few hours. The acutely ill patient may be seen in the hospital Emergency Room for treatment, be treated by the office-based physician by telephone, or, particularly in a group practice, be treated by a second physician. At the health care centers of the Rockford School of Medicine, this latter was most often the method used for handling acutely ill patients.

Insofar as the medical students were concerned, being in the office only one or two half-days a week definitely biased the types of medical problems treated. Following families in the health care center did not provide an exposure comparable to the types of problems seen in the entire practice. Although this study indicates that students saw about 30 percent fewer acute diagnoses than the practice site saw, because they were present only one or two tenths of the time the office was open, the students saw an even lower percentage of acutely ill patients on their initial visits. Many of the students' acute diagnoses were follow-up office visits made by patients with acute infections or injuries.

Some of the differences in disease prevalence between years and classes may also be a function of maturation in the entire office practice or in the students' patient panels. Both the teaching practices studied opened in 1973 and were continuing to attract new families during the years examined. The panel members assigned to the first senior students were the practice's first patients. For the first year of the study, seniors had followed an assigned family for 12 to 24 months while junior students had followed their patients up to 18 months.

During 1975-1976, the senior students would have followed their patients from 18 to 30 months and juniors would have followed families from 6 to 18 months. The small, but significantly increased proportion of acute diagnoses among seniors during 1975-1976 compared to the junior students that year cannot be easily explained, although it may have been related to seniors seeing occasional unassigned patients with acute problems.

Even when the physician-providers were in the office only one or two days a week, most well-person health supervision could be accomplished with continuity of care by one provider. Between two thirds and three fourths of chronic disease diagnoses were made by the one provider, but only half of the acute diagnoses could be made by

a single physician.

Being in the office more than two days a week would increase the continuity for both acute and chronic disease care. The increase in continuity would be greater for acute than for chronic diseases. The extent of this increased continuity for three, four, or five days a week in the office has not been determined here. Similarly, the amount of bias against acute disease treatment if a trainee followed specified families for three or more days a week in the office would be less than found in this study. Such a bias would exist if the part-time trainee were limited to seeing assigned families and spent anything less than full time at the practice site.

The likelihood that a given diagnosis would be seen by a physician present one or two days a week depends upon the advisability of the patient with a given problem to wait for an appointment.[12] Routine follow-up of hypertension or diabetes can usually be advanced or postponed by a week, to fit the schedule of a physician. Similarly, there is ample flexibility for scheduling well-person examinations. Sore throats or headaches have intermediate appointment flexibility. Patients with accidents and chest pain should not be delayed in order to fit a specific physician's schedule. Similar appointment flexibility with a bias toward chronic diagnoses would be seen in part-time satellite clinics, conducted in rural areas once or twice a week.

This study cannot address the importance of having the training situation in either undergraduate or graduate primary care programs parallel the actual practice situation. It can only reflect a decreased likelihood for following acute conditions in a panel of patients when the provider is not in the office full time. The trainee may not need to see the number of upper respiratory tract infections proportionate to those seen in the practice in order to gain competency in managing that condition. An alternative teaching strategy might be to have the trainee acquire competency in handling acute, common problems, but then have the student or resident place increased emphasis on less common problems, without regard to their frequency of occurrence in the general population. On the other hand, improved care of patients with chronic problems may derive from treating the individual (or others in the family) for the acute, common problems, since the physician may understand more about every patient with each succeeding medical visit.

Similarly, this study cannot set educational priorities in primary care training programs, although it may assist those who are concerned about the content of such programs. Where a primary care experience has an extended duration, but is intermittent, there the trainee's experience will be biased. A difference in continuity exists between even one and two sessions per week in the office, although two sessions are *not* twice as good as one (when using these measures of "goodness"). Even with this bias, continuity of care is far greater in such programs than during short-term, but more intensive, primary care clerkships.

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