

## Adverse Effects of Faculty Practice on Diagnostic Content of Residents' Outpatient Experience

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*The outpatient experience of two cohorts of family medicine residents was compared. Those who worked at a site with an existing faculty practice had fewer pregnancy-related patient encounters and proportionately more encounters for acute self-limited care compared with residents at a site without a faculty practice ( $P < .001$ ). More important, the faculty-associated residents also cared for fewer patients with a variety of chronic diseases and saw them less frequently. These findings suggest that a coexistent faculty practice may have adverse effects on outpatient training in primary care.*

Faculty practice is usually viewed as a valuable component of academic departments and training programs. It provides role models for students and residents, income to departments, and self-esteem and experience for faculty themselves. Less attention has been given to the possibility that an active faculty practice might have a negative effect on the clinical experience of residents practicing at the same site.

Family medicine residents believed that they were seeing a different patient population than the faculty at one of two rural practice sites. They perceived they were caring for fewer elderly and chronically ill individuals and for more young people with self-limited medical problems or routine physical examinations. They also felt that residents at another site without an associated faculty practice experienced a more varied diagnostic mix of clinical encounters. If real, such differences might have significant educational implications.

Faculty, who generally are perceived as more experienced and who have greater practice longevity than residents, may well be expected to attract and retain a different patient population. For example, faculty physicians might appeal more to patients requiring frequent and long-term care.

A study was therefore conducted to assess the effect of faculty practice on resident experience. Two hypotheses

were formulated. First, it was postulated that the coexistence of faculty and resident practices would result in the residents caring for fewer elderly patients, fewer patients with chronic illness, and fewer pregnant women than faculty physicians. Second, it was expected that if the supervising faculty did not have an active, coexistent practice, residents would encounter a greater proportion of such patients than residents in the first setting, thus enhancing their educational experience.

### METHODS

Columbia, Missouri, is the site of the Department of Family and Community Medicine at the University of Missouri. Residents are trained at the university hospital and care for patients at the affiliated family practice center. Second- and third-year residents are also assigned to one of two rural practice sites.

This retrospective cohort study compares patient encounters of two groups of residents and one group of faculty physicians practicing at two different rural training sites. Because these comparisons could not be made on a randomly assigned basis, it is important to characterize the communities and practices to minimize the chance that differences would be related solely to population differences.

### The Communities

Each practice is located in the county seat of a rural central Missouri county. Fulton is a town of 11,000 and is the

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county seat of Callaway County. In 1984 Callaway County contained 32,790 residents, 50.6 percent of whom were female.<sup>1</sup> Fulton is 25 miles east of Columbia. Fayette, with a population of 3,000, is the county seat of Howard County. In 1984, 9,780 people lived in Howard County; 51.8 percent were female.<sup>1</sup> Fayette is approximately 30 miles west of Columbia.

### The Practices

The Fulton practice, established in 1974, was staffed primarily by residents, with attending physician supervision. Only a small percentage of patients were seen exclusively by faculty and, during the study period, no faculty members lived or located their primary practices in that community. Second- and third-year residents spent one full day (two clinic sessions) each week at the Fulton practice for two years, and for a total of three months they saw patients there on a daily basis, when they also had responsibility for the hospitalized patients. During the two-year study period (July 1, 1983, to June 30, 1985), 22 residents practiced in Fulton.

The Fayette practice was begun in 1981 by three faculty physicians who lived in the town. Two of them were in their early 30s and one was in his 50s. During the second year of its existence, residents were introduced into the practice. Twelve second- and third-year residents practiced an amount of time in Fayette similar to that practiced by the cohort of residents in Fulton. Each faculty physician in Fayette spent approximately five half-days a week in office practice, covering four different days of the week.

### Database

Each time a patient was seen in either practice, physician-generated diagnoses were recorded on the billing encounter form and entered into a computerized database, which included the patient's name, sex, birth date, and primary provider seen for that visit. Faculty instructed residents on the use of these forms, promoting consistency in recording. Patient profiles were generated for each practice and for individual providers. Three profiles of physician-patient encounters were accumulated for the two-year study period: Fayette faculty, Fayette residents, and Fulton residents.

### Diagnosis Categories

The 50 most common ICD-9-CM<sup>2</sup> diagnoses for each of the three practice profiles accounted for 76 percent of all physician encounters. The two physician investigators independently classified these diagnoses into five exclusive categories: health maintenance, acute self-limited disease, acute serious disease, chronic disease, and pregnancy re-

lated. Two diagnoses were excluded from the data sets—"sign, symptom, ill-defined condition" and "medical/surgical procedure without diagnosis"—because they could not be assigned to a category. Ninety-six percent of the diagnoses were classified into the same categories; the remaining diagnoses were mutually agreed upon and classified.

The distribution of the five diagnosis categories was compared for each of the three study groups, expressed as the proportion of the groups' practice accounted for by each category. Because chronic illness was thought to be a particularly important variable, mean numbers of patients and visits for chronic disease were compared for the two resident study groups. The specific chronic diseases examined included arthritis (ICD-9 codes 229, 231, 234, 246, 288), asthma/chronic lung disease (143, 144), diabetes (50), heart disease (110, 111, 112, 118), and hypertension (119, 122).

Chi-square statistics were used to compare differences in proportions and *t* tests to compare differences in means.

## RESULTS

### Age Distribution

The age distributions of Callaway and Howard Counties are displayed in Figure 1. Howard, the site of the Fayette practice, had more elderly residents, with 19.4 percent of the population aged 65 years or older.

The age distribution of all patient encounters for both practices during the study period are displayed in Figure 2. In both sites there was a greater proportion of visits for children aged under 5 years than their proportion of the population, as would be expected, and a lesser proportion of visits for school-aged children. Impressive is the much greater proportion of visits from elderly people in the Fayette practice: 18.9 percent compared with 5.1 percent in Fulton.

Most of the older patients in Fayette were seen by the faculty physicians, with the residents caring for a greater proportion of patients in the 15- to 34-year age group, whereas a greater proportion of the practice experience of the Fulton residents was made up of middle-aged adults (aged 35 to 54 years) (Figure 3).

### Diagnosis Categories

In Figure 4 the distribution of diagnosis categories is expressed as a percentage of the practice profile. Compared with their faculty colleagues, residents at the Fayette practice saw a higher proportion of patients for health maintenance and acute self-limited problems and proportionately fewer patients for chronic disease problems and preg-

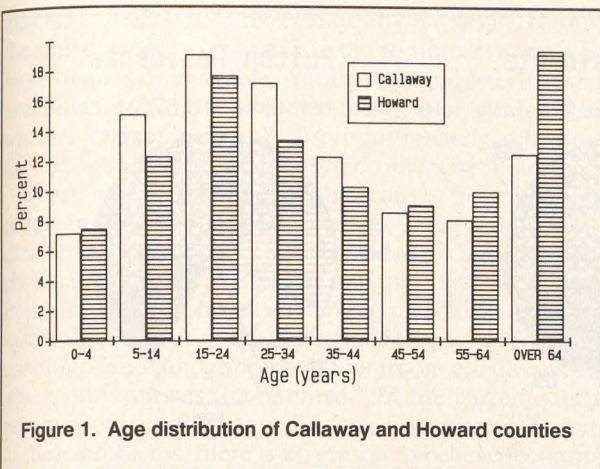


Figure 1. Age distribution of Callaway and Howard counties

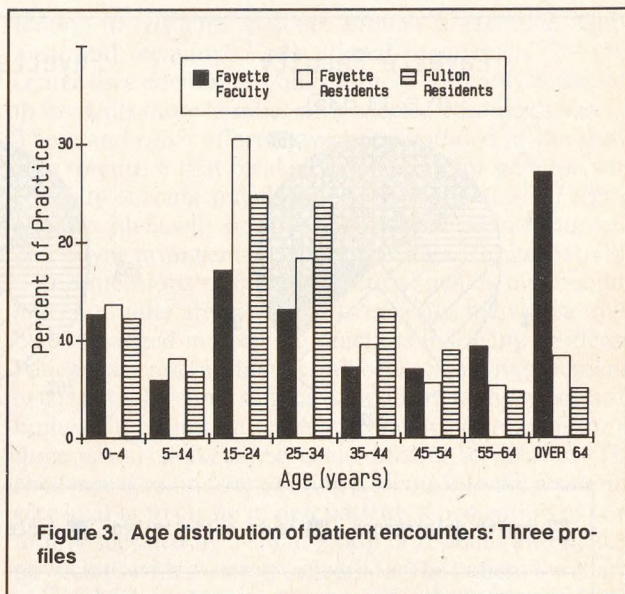


Figure 3. Age distribution of patient encounters: Three profiles

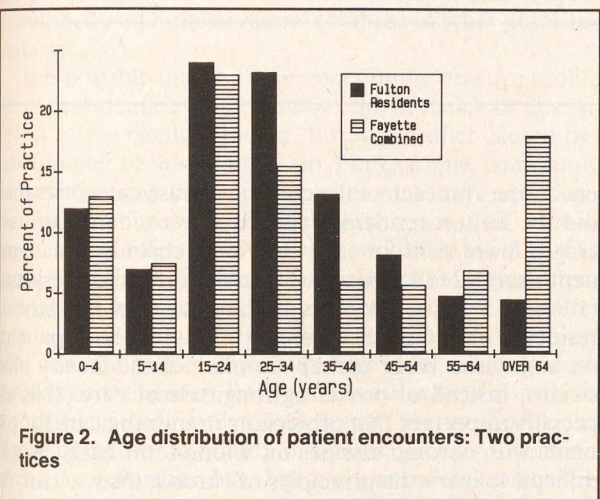


Figure 2. Age distribution of patient encounters: Two practices

### Chronic Disease Visits

The mean number of different patients seen for each of five chronic disease categories expressed as patients seen per resident per year are compared for each resident group in Table 1. Also reported are the mean number of visits made to each resident by these patients. Fulton residents had more patient visits in each of the chronic disease categories and in the total number of chronic disease visits (at which one or more of those diagnoses was coded). In most categories of chronic disease (diabetes, heart disease, hypertension, and total chronic diseases), the Fulton residents also were exposed to more individual patients per year. This analysis of all visits for chronic disease care confirms the findings of the previous analyses of the top 50 diagnoses; that is, Fulton residents (not associated with faculty practice) had more outpatient experience in chronic disease care than did the Fayette residents.

### DISCUSSION

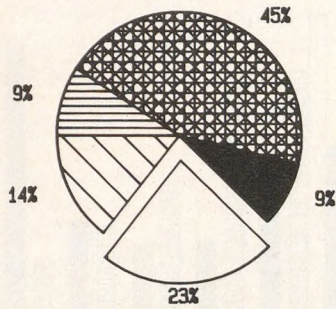
Both of the original hypotheses were found to be true. First, there is little doubt that the diagnostic profile of the residents practicing alongside faculty physicians differed from that of the faculty. Faculty practices contained a higher proportion of older patients and diagnoses were more often of chronic disease and for pregnancy-related care. Second, even though the residents from Fulton were serving a younger population, they had a greater percentage of chronic disease encounters. A greater share of

nancy-related medical care. A slightly higher proportion of the visits to residents was made up of acute-serious problems. Each of these differences is highly statistically significant (for each  $2 \times 2$  chi-square,  $P < .001$ ). For each diagnosis category, the practice profile of the Fulton residents falls between the two Fayette groups.

Comparing the Fayette residents with the Fulton residents, a greater proportion of the faculty-associated group had visits for acute self-limited encounters (chi-square = 86,  $P < .001$ ); a lower proportion of their practice was made up of pregnancy-related visits (chi-square = 19,  $P < .001$ ) and chronic disease visits (chi-square = 150,  $P < .001$ ). The differences in the proportions of health maintenance visits and acute-serious visits were not statistically significant.

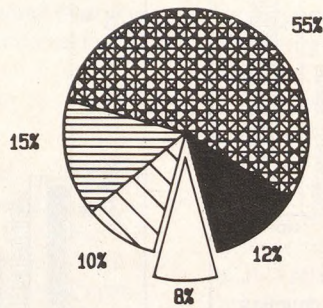
## Fayette Faculty

(n = 11,835)



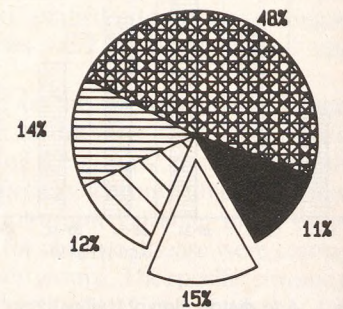
## Fayette Residents

(n = 6,524)



## Fulton Residents

(n = 13,673)



Health maintenance    Acute self-limited    Acute serious    Chronic    Pregnancy

Figure 4. Distribution of diagnosis categories

TABLE 1. COMPARISON OF RESIDENT PRACTICES: NUMBERS OF PATIENTS AND VISITS FOR CHRONIC DISEASES

Chronic Disease	Mean Number of Different Patients Per Resident Per Year		Mean Number of Visits Per Resident Per Year	
	Fayette	Fulton	Fayette	Fulton
Arthritis	9.3	9.9	11.3*	17.5
Asthma/chronic lung disease	3.9	4.7	4.7*	8.7
Diabetes	2.2***	5.6	3.4***	14.0
Heart disease	4.1**	6.3	6.8***	14.3
Hypertension	10.1***	15.1	17.3***	29.3
Totals for chronic diseases	26.8*	32.4	41.0***	68.6

\*  $P < .05$ \*\*  $P < .01$ \*\*\*  $P < .001$ 

their outpatient visits related to conditions of pregnancy and a smaller portion of their practice comprised patients with acute self-limited problems.

When the absolute numbers of specific chronic disease encounters were examined, this difference in the experience of the two groups of residents was confirmed. The Fayette (faculty-associated) residents experienced fewer

encounters for each of the chronic disease categories than did the Fulton residents. The Fayette residents also averaged fewer visits for each individual chronic disease patient seen (1.2 to 1.5 per year) than did the Fulton residents (1.8 to 2.5 per year). This finding suggests the Fayette residents may have been seeing many of these patients on an interim basis, perhaps in place of the faculty physicians, instead of providing longitudinal care. It is especially important that physicians in training care for patients with chronic diseases on a long-term basis, as it is difficult to learn the principles of chronic disease care on the basis of episodic visits only.

A number of alternative explanations are possible to account for these differences. First, the faculty may have been less willing to "give up" their older patients and those with chronic disease after the initiation phase of the practice. Trainees working alongside practitioners in the United Kingdom were also found to see fewer chronically ill and pregnant patients than their trainers. The authors of this report suggested that trainers were less willing to allocate such patients to trainees.<sup>3</sup>

Second, patient or staff preferences may be important. Perhaps pregnant and chronically ill patients requested a faculty physician. A previous study on ambulatory medical care indicated that the patient's age tended to be highly correlated with age of the physician.<sup>4</sup> Patients may have been attracted to the faculty, perceiving them as more expert or permanent than their junior colleagues. Older patients, those with chronic illness, and pregnant women

may have intentionally selected faculty physicians because they filled a more visible role in the community and were more frequently available. Another possibility is that staff assigning new patients assumed these patient preferences, whether real or not, and disproportionately scheduled certain patients with residents and others with faculty.

There are numerous potential causes for misclassification in morbidity data recording. These data may be underestimated or inaccurately coded,<sup>5,6</sup> influenced by physician or practice variables,<sup>7</sup> and may not be consistent from physician to physician.<sup>8</sup> Also, morbidity data may inflate the number of diagnoses made for an uncommon condition and underrepresent common conditions for which only one visit is required.<sup>9</sup> In the current study, accuracy of recording or coding was not assessed. In spite of these problems, there is no reason to believe recording was performed differently in the two practice sites, thereby accounting for the findings. With regard to generalizability, the diagnostic content of the two practices (Fayette combined and Fulton) resembles those of other published data sets.<sup>9-11</sup>

It is possible that the differences in the practice profiles of the residents were not due to the presence or absence of an active faculty practice, but were rather caused by a confounder of this relationship. For example, community or practice population differences may have accounted for the variation in the residents' experience. The observed population differences, however, would point in the opposite direction of these findings. Despite the greater percentage of visits from elderly patients to the Fayette residents compared with Fulton residents, less of their practice was made up of chronic disease visits, making age an unlikely confounder. Both communities were also served by other private family physicians. It also is possible that some unmeasured quality in the two groups of residents created a systematic bias, but two years of experience with a large cohort of residents would reduce the potential effect of differences in the practice styles of individuals.

Other educational benefits in working alongside practicing faculty include exposure to a variety of approaches to patient care and office management. Further, in comparing the age distributions of the home counties of these two practices, it is apparent that the faculty-associated clinic attracted a greater percentage of elderly patients than the site without a faculty practice. These patients, who might have otherwise sought care elsewhere, may help train residents in the hospital setting. This aspect of the educational experience of the residents was not examined.

Continuous and comprehensive patient care delivered by primary care residents is important in gaining knowledge and skills to prepare them for independent practice. No one has determined how much experience is needed to achieve competence. Others have called for greater at-

tention to residents' practice profiles to facilitate equivalent and meaningful educational experiences.<sup>12-14</sup> One center uses encounter books to help equitably distribute to residents those families with selected chronic diseases.<sup>13</sup> These and other efforts have been initiated at the study sites to ensure that residents are caring for patients with a variety of acute and chronic health problems. "Tagging along" with faculty or caring for outpatients in exclusively block-type arrangements are unsatisfactory alternatives.

If dimensions of faculty practice such as accessibility and continuity are preferable to patients, then these must be emphasized in teaching practices involving residents. Patient care responsibilities and educational requirements external to the clinic setting, in addition to the necessarily limited duration of a resident's practice (a maximum of three years), make these goals difficult to achieve. The challenge is to transfer existing patients into the residents' case load or to create in new patients a perception of continuity supplied by a small group of resident and faculty physicians with a shared concern for the patient's welfare.

Faculty-founded practices may be the most expedient model for developing ambulatory teaching units. Unfortunately, at least in the setting examined here, the faculty-founded model led to an understandable but educationally unfavorable distribution of diagnostic content. Whether active faculty practice can be promoted with its attendant values of faculty self-esteem, role modeling, and income-generating potential without competing with the goals of resident education requires further study in settings with different organizations of faculty and resident practice. As the outpatient setting becomes the focus of medical education for not only family medicine residents but also medical students and residents in other fields,<sup>15</sup> it will become increasingly important to examine and evaluate the influence of faculty practice on the experience of trainees.

#### Acknowledgment

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