

Teaching Medical Students in Community-Based Practices: A National Survey of Generalist Physicians

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BACKGROUND. This study was undertaken to determine the extent of medical student teaching by community-based generalists, differences between teachers and nonteachers, and physicians' perceptions and attitudes about teaching.

METHODS. Two questionnaires were mailed to a random sample of 4974 generalist physicians in community-based practice in the United States including family physicians, general internists, and general pediatricians. The first survey instrument was a postcard with two questions; the second was a 4-page questionnaire sent to postcard responders. These mailings were supplemented by a telephone survey of nonresponders.

RESULTS. Forty-two percent responded to the postcard, and, of those, 47% responded to the questionnaire. Adjusted by the results of a telephone survey of postcard nonresponders, 30% of family physicians and general pediatricians and 20% of general internists taught medical students in their offices. The average teaching physician worked with three students per year for approximately 10 days each. Family physicians and general internists who had community-based educational experiences while in medical school were more likely to be teachers. Teachers were somewhat younger than nonteachers (year of medical school graduation 1977 vs 1973), but there were few other differences. Controlling for specialty, teachers did not differ from nonteachers in patient-care volume or payer mix of the practice. Teachers noted a 30-minute (median) lengthening of their workday when a student was present, and 30% saw fewer patients per day when a student was in the practice. Only 9% of the teachers reported being paid for their teaching. More than 90% of both nonteachers and teachers believed that students should receive part of their education in community-based practices.

CONCLUSIONS. Depending on specialty, 20% to 30% of community-based generalists teach medical students. Although teachers perceive that teaching lengthens their work day and may decrease productivity, the great majority of both teachers and nonteachers believe that community-based education is important.

KEY WORDS. Primary health care; education, medical; private practice; physician's offices; physician's role. (*J Fam Pract* 1997; 45: 487-494)

In the late 19th century, medical education did not always involve direct contact with patients. A variety of forces from both inside and outside the profession,¹ including the leadership of physicians such as William Osler^{2,3} and the 1910 report by Abraham Flexner,⁴ prompted a dramatic shift from auditorium lectures to teaching at the patient's bedside.¹ Today, at the end of the 20th century, events inside and outside the academ-

ic medical centers have prompted a shift that may prove just as momentous. Response to the high costs of medical care and the need for more generalist physicians has moved much of medical care and medical education to outpatient settings.^{5,9} This movement is supported by four national initiatives. One is the Interdisciplinary Generalist Curriculum Project funded by the Health Resources and Services Administration.¹⁰ The other three are funded by the Robert Wood Johnson Foundation, the Pew Charitable Trusts, and the W. K. Kellogg Foundation.¹¹

As a shift to ambulatory primary care settings occurs, however, many schools find their own outpatient clinics inadequate to meet teaching demands, prompting many schools to recruit community-based physicians to participate in the teaching of medical students.¹²⁻¹⁶ These family physicians, general internists, and general pediatricians are not

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salaried faculty, and work in practice settings where medical student teaching is not a primary goal.

Much is being learned about the effect of medical student teaching on community-based physicians, particularly the effects on time spent at work and on patient-care productivity.¹⁷⁻²⁴ However, little is known about the prevalence of teaching activity among nonacademic physicians. According to data collected from medical schools in the Liaison Committee on Medical Education Annual Questionnaire, 1995 to 1996, more than 135,000 clinicians serve as volunteer faculty at US medical schools,²⁵ but the number of generalist physicians in office-based practices who teach medical students, and the extent of their involvement, are not known. We therefore conducted a two-stage survey of generalists in the United States to determine the extent of medical-student teaching by community-based physicians and the physicians' perceptions and attitudes about teaching.

METHODS

Using the list of physicians in the United States maintained by the American Medical Association (AMA), a sample of 4974 physicians was randomly selected. The sampling frame included allopathic and osteopathic physicians who were not in academic or governmental practice. We chose to study family physicians, general internists, and general pediatricians, following the definition of "generalist physicians" used by the Council on Graduate Medical Education⁶ and the US federal government.²⁶ Each of the three disciplines was equally represented in the sample chosen.

We conducted the study in two stages. To maximize the response rate and to allow us to estimate the magnitude of nonresponse bias in the longer second-stage questionnaire, the first-stage questionnaire was very brief. We mailed a postcard that asked two questions: (1) "Do you teach medical students in your practice?" with answer options "yes," "no," and "I did, but not any more"; and (2) "Do you plan to teach medical students in the future?" with answer options "yes" and "no." We mailed the postcard twice, once in July 1995 and then again to nonresponders in October 1995.

To measure the amount of bias due to postcard nonresponse, we attempted to complete the postcard survey by telephone with a systematic sample

of 1139 nonresponders, obtaining data from 353. Although we were unaware of it until after data collection, only approximately half of the addresses in the AMA Physician Masterfile are current office addresses, most of the others are home addresses (personal communication, Karen H. Andrews, AMA Division of Survey and Data Resources, October 10, 1996). Of the 1139 postcard nonresponders we attempted to survey by telephone, only about half of the telephone numbers (approximately 570) would have been office numbers. Because we called during regular working hours, we took that number as the denominator in calculations related to the telephone survey. To avoid overestimating the prevalence of teaching, we assumed that those of the 570 whom we were unable to contact were not teachers.

In the second stage we used a 4-page mailed questionnaire. In constructing the questionnaire we used several sources, including responses to open-ended questions in our previous study,¹⁷ one focus group with academic family physicians, two focus groups with private physicians who teach medical students for the University of Missouri, telephone conversations with persons at other medical schools who work with community-based preceptors, and many informal conversations with preceptors in Missouri. Questions about compensation and perquisites provided by medical schools for community-based physicians were taken in part from Langlois's study.²⁷ The early drafts of the questionnaire were critiqued by academic family physicians. The penultimate draft was pilot tested by 30 family physicians in community practice in Missouri. We formatted the questionnaire so that physicians who did not teach medical students completed only the first 2 pages. In pilot testing, the entire questionnaire required less than 9 minutes to complete.

The questionnaire was mailed to all postcard responders ($n = 2135$) in January 1996, with a second mailing to questionnaire nonresponders in March 1996. To assess bias due to questionnaire nonresponse, we systematically selected 434 physicians who had not responded to those two mailings. With a revised cover letter stressing the importance of their responses and including a handwritten note, two more mailings were made to this sample of nonresponders in May and July 1996. Of the 434, 72 (17%) responded to the first of these subgroup mailings and 44 (10%) to the second (fourth questionnaire mailing overall).

We recognized that our decision not to mail the questionnaire to postcard nonresponders could create a substantial selection bias, but we reasoned that a physician who did not respond to a two-question postcard would be very unlikely to respond to a longer questionnaire. To test this assumption, in January 1996, we systematically selected 51 postcard nonresponders, for whom we had 23 current office phone numbers. With information from published specialty directories and telephone operators, we were able to find current telephone numbers for another 17, for a total of 40. We faxed the questionnaire to these 40 and obtained usable data from only one.

The data were analyzed using the Statistical Package for the Social Sciences.²⁸ Because many variables were not normally distributed, we used nonparametric Mann-Whitney *U* tests to assess group differences. To compare groups adjusted for other variables, we used multivariate analysis of variance and logistic regression.

RESULTS

STAGE 1: POSTCARD SURVEY

We mailed postcards to 4974 physicians to determine their involvement in office-based teaching; 2135 cards were returned, 2074 with complete data (41.7%). Responders consisted of 722 family physicians (a 43.8% response rate), 594 general internists (36.1%), and 819 general pediatricians (49.5%). Most (94.8%) were allopathic physicians; 5.2% were osteopaths, compared with 4.7% of all active US physicians in 1990.⁶

Before adjustment for nonresponse bias, 47.4% of postcard responders reported being actively involved in office-based teaching of medical students and planning to continue. Fewer general internists were involved in teaching than family physicians or general pediatricians. Relatively few physicians (about 10%) have been teaching and plan not to continue, and more (19%) are not teaching currently but plan to teach in the future. About 22% have not been involved in teaching and

have no plans to start teaching. Adjusting for nonresponse bias by the telephone survey results, approximately 30% of family physicians and general pediatricians and about 20% of general internists in community-based practice currently teach medical students in their offices (Table 1).

STAGE 2: QUESTIONNAIRE

From the 2135 postcard responders, we received a total of 995 questionnaires (46.6%), 86 of which were from physicians who had entered a full-time academic practice or had retired. Among the remaining 909, response rates to individual questions varied, with every respondent providing information on sex, and all but two respondents supplying their year of medical school graduation. Of the 904 who identified a specialty, there were 317 family physicians, 201 general internists, and 386 general pediatricians. Of the 892 who answered the questionnaire item, 434 (48.7%) had taught medical students in their nonacademic practice in the previous 12 months. That pro-

TABLE 1

Level of Teaching Involvement of Responders to Postcard Mailings, by Specialty

Teaching Involvement	%Family Physicians (n = 722)	%General Internists (n = 594)	%General Pediatricians (n = 819)
Unadjusted for nonresponse bias			
Teach now, and plan to in the future	52.2†	37.4‡	47.3§
Used to teach, but plan not to in the future	9.7	11.8	10.1
Don't teach now, but plan to in the future	16.9	20.5	19.5
Don't teach now, and don't plan to	18.8	27.1	20.0
Missing data	2.4	3.2	3.1
Adjusted for nonresponse bias			
Teach now, and plan to in the future	29.5	19.5	31.8

†95% confidence interval [CI] = 48.6 to 55.9.

‡95% CI = 33.5 to 41.3.

§95% CI = 43.8 to 50.7.

TABLE 2

Proportions of Patient Visits for Gynecological or Obstetrical Care, By Specialty, Sex, Teachers vs Nonteachers

	Among Teachers	Among Nonteachers	P value
Family Physicians	13.3	10.7	$P = .001$
General Internists	6.4	3.0	$P = .004$
General Pediatricians	2.9	1.2	$P = <.001$
Women physicians	11.7	8.3	$P = <.001$
Men physicians	6.8	3.1	$P = <.001$

portion was not significantly different from postcard responders overall (47.4% were active teachers), suggesting that questionnaire nonresponse is not a major source of bias. An additional 75 (8.4%) had taught students somewhere other than in their own practice, such as at a medical school. But because this report concerns office-based teaching, the label "teachers" applies only to those who taught a student in their office.

To further assess questionnaire nonresponse bias, we compared early and late responders using two dividing points. First, we used the median time for questionnaire return (4 weeks after the first mailing). Second, because those who responded to the third and fourth mailings were part of a systematic sample

TABLE 3

Perceived Effects on Physician Productivity of Adding a Preclinical or Clinical Student to the Practice

	Preclinical Student	Clinical Student
Contact time per student in days (median)	8	12
Physician's perception of time at work		
Perceived decrease, %	2	2
No change, %	39	42
Perceived increase, %	59	56
Physician's perception of change in time at work		
More minutes per day, mean (median)	25.8 (30)	23.9 (30)
Physician's perception of change in volume of patients seen per day		
Perceived a decrease, %	30	32.4
Perceived an increase, %	0.4	2.7

of 434 who responded to special efforts, we also compared these 116 (of the 434) with earlier responders. Using either dividing point, we found no difference between early and late questionnaire responders in the proportion who had taught medical students in their office in the past year. Early responders were more likely to have taught residents in their practice in the past 12 months (30% for early vs 24% for late responders, $P = .025$ by χ^2 , using the median as the dividing point), but early and late responders were not significantly different on any other variable we examined.

On most variables, questionnaire responders' characteristics were similar to national data compiled by the AMA.^{29,30} Solo practitioners were underrepresented, 25% of our responders compared with about 40% of generalists nationally.³⁰ Female pediatricians were also underrepresented (31.6% of pediatricians among our questionnaire responders vs 39.8% nationally), but other proportions were similar to national data.

COMPARING TEACHERS AND NONTACHERS

General pediatricians and family physicians were more likely to teach than were general internists (Table 1). Osteopathic physicians were more likely to be currently involved in teaching (65.2%, 95% confidence interval, 56.4% to 74.0%) than were allopathic physicians (47.1%). Male and female physicians were equally likely to teach, with no difference by sex in any of the logistic regression analyses we conducted comparing teachers and nonteachers.

Controlling for specialty, teaching physicians on average had graduated 4 years later than nonteachers (1977 vs 1973, $P < .001$). Family physicians and general internists who had spent time with a private practice physician during their medical school education were significantly more likely to teach medical students themselves. Among family physicians, for example, 38% of those who had no experience in a private practice during medical school were now active teachers. In contrast,

among physicians who did have such an experience, 65% were now active teachers. Among pediatricians, we did not find this association. In a logistic regression analysis, specialty, exposure to private practice during medical school, and year of graduation were independently and significantly associated with teaching.

In all three specialties, physicians who taught medical students saw more patients for obstetrical and gynecological examinations than nonteachers did (Table 2). The differences among both women and men physicians were statistically significant. Controlling for year of graduation did not change this association.

Three factors distinguished teachers from nonteachers, though only in bivariate analyses. Solo practitioners were less likely to be active in teaching (30% compared with 53% of physicians in group practice, $P < .001$ by χ^2); the number of physicians in the practice did not otherwise make a difference. Physicians whose practices were closer to a medical school were more likely to teach ($P = .002$ by Mann-Whitney U); 51% of questionnaire responders who practiced within 25 miles of a medical school taught students compared with 44% of those farther away. And teachers estimated that 7.2% of their patients were uninsured compared with nonteachers' estimate of 6.2% ($P = .03$ by Mann-Whitney U); physicians' estimates of the payer mix of their patient population were otherwise similar. None of these three variables was associated with teaching once we controlled for physician specialty. Measures of practice volume (office visits per week, hospital visits per week, and hours worked per week) showed no association with teaching, with or without adjustment for specialty.

Although twice as many teachers as nonteachers had received training in how to teach medical students, the proportions were small: 36.8% of teachers compared with 18.2% of nonteachers. Of the physicians who reported some teacher training, 79% had received 2 days or less.

PERCEPTIONS OF THE WORK OF TEACHING

Of the 892 responders to these questionnaire items, 266 had taught preclinical students and 406 had taught clinical students, including 192 who had taught students at both levels. Most physicians (74% of teachers) worked with students from one

medical school. The median number of medical students each physician taught in 1995 was 3 for internists who taught, 4 for pediatricians, and 2 for family physicians.

As shown in Table 3, students worked with physicians for about 10 days. Approximately 60% of physicians perceived a lengthening of their work day when a student was present, with a median increase in time at work of 30 minutes. Few physicians perceived an increase in the number of patients they saw per day when a student was added to the practice (2.7% of physicians with students in their clinical years of education), but about 30% of physicians perceived a decrease in patient-care productivity. Comparing working with a third-year student to working with a fourth-year student, teachers perceived the same effect on time at work; but 36.9% of physicians perceived a decrease in the number of patients seen per day when a third-year student was in the practice compared with 25.5% with a fourth-year student ($P = .01$ by χ^2). With a third-year student, 0.9% of physicians perceived an increase in the number of patients seen per day, compared with 5.1% of physicians with a fourth-year student.

Among the teachers, most reported that completing the evaluation form on the student was either not required (14.6% of physicians reporting) or took less than 10 minutes (50.7%). Only 4.6% reported that it took more than half an hour.

Compensation for the teaching efforts of community physicians was limited. Most teachers received either none (42.3%) or one (27.8%) of the items we asked about. The two most commonly reported were continuing medical education credit (by 28.5% of teaching physicians) and recognition plaques (by 21.4%). Only 9.0% of the teachers received financial compensation. This ranged from a few hundred dollars per student to \$2,750 per student (reported by one physician who worked with 8 students for 6 weeks each per year). In comparison, only 6.5% of teachers reported that the medical student received a stipend during the community-based portion of his or her education. Comparing teachers who were paid with those who were not, there were no significant differences in the number of students taught in the past year, the number of days each student spent with the physician, or the physician's perceptions of the effect of the stu-

dent on time spent at work or patient-care productivity.

ATTITUDES ABOUT OFFICE-BASED TEACHING

The questionnaire included 12 items to assess the attitudes of both teachers and nonteachers concerning office-based teaching of medical students (Figure). Nonteachers believed almost as strongly as teachers that medical students should receive part of their education outside academic medical centers. More than 90% of nonteachers and teachers agreed or strongly agreed with the statement, "Medical students should receive part of their education at primary care offices that are not part of an academic medical center."

DISCUSSION

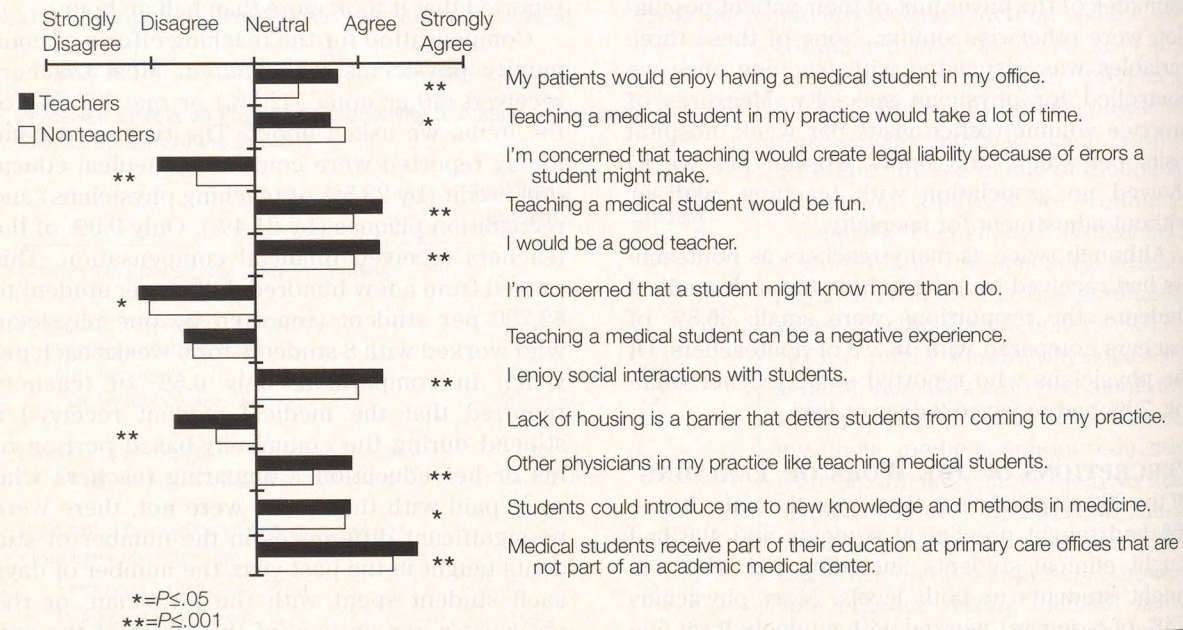
Many generalist physicians in nonacademic practice are involved in teaching medical students. Adjusted for nonresponse bias using conservative assumptions, 30% of family physicians and general pediatricians and 20% of general internists in community-based practices are involved in office-based teaching of medical students. According to an AMA report on

physician characteristics and distribution,² in 1994 the United States had approximately 42,000 office-based family physicians, 52,000 general internists, and 28,000 general pediatricians. Extrapolating from our findings, more than 31,000 community-based generalists are involved in teaching medical students in their practices. In comparison, the number of entering medical students in 1995 was approximately 17,000, and US medical schools in 1995 to 1996 had about 3000 full-time clinical faculty members in family medicine, 20,700 in internal medicine, and 9,500 in pediatrics, a total of 33,200 (including subspecialists in internal medicine and pediatrics).²⁵ Overall, the number of community-based generalists appears to be adequate to meet the need.

The average teaching physician, however, is working with only a few students. Based on the medians, each community-based generalist worked with three medical students per year for about 10 days each. The time commitment and, for many physicians, the loss of patient-care productivity are substantial. As medical education continues to move toward community settings, we believe it must evolve toward an educational experience guided by a standard curriculum with high-quality of instruction and greater interrater reliability of evaluation

FIGURE

Attitude Items: Teachers vs Nonteachers



across sites. To accomplish this, academic medical centers need to recruit and retain community-based teaching physicians who would be willing to work with more students per year. Making these changes would require considerably more commitment from teaching physicians than they currently give, which will require, in turn, more support from academic medical centers. Only 9% of community-based teaching physicians currently receive any financial remuneration for their work with medical students, even though about 30% noted a decrease in the number of patients seen per day when a student was present. Considering that the average physician spends an additional 30 minutes at work each day when teaching, compensating these physicians \$50 per extra hour at work for their teaching would cost approximately \$20 million. That figure does not include the loss of patient-care revenue noted by 30% of teachers.

Changes in the financing and structure of health care are pressuring physicians to increase productivity,³¹ an issue we hypothesized would apply more to physicians with a greater proportion of patients covered by capitated insurance plans. Given previous findings of a decrease in patient-care productivity with a medical student present,^{17,18} we expected to find that such physicians would be less likely to teach, but found no difference between teachers and nonteachers in the payer mix of their patients after we controlled for specialty.

It had been our informal impression that physicians who see a large number of women for gynecologic care are sometimes reluctant to host a medical student. In this study, however, we found the opposite effect in all three specialties and for male and female physicians considered separately and together. Teaching medical students was associated with a higher volume of obstetric-gynecologic care.

Physicians who had received part of their medical school education in a community setting were more likely to teach medical students in their own practice. A likely explanation for this association is self-selection; persons who enjoy learning in a community setting (outside the academic medical center) also enjoy teaching there. The finding is also consistent, however, with a causal relationship between medical school experience in a community setting and choosing to teach in one's practice.

The study is limited by the response rates. In the

two-question postcard survey, only 2074 (41.7%) responded. From among those, only 909 (43.8%) returned a usable questionnaire. We assessed the effects of response bias in four ways. First, we telephoned postcard nonresponders and adjusted our estimates of the prevalence of teaching in nonacademic practice accordingly. Second, postcard responders who returned the questionnaire did not differ from postcard responders who did not, at least in their responses to the basic questions of teaching involvement. Third, there were few differences between early and late responders to the 4-page questionnaire. Fourth, we found several significant differences between our responders and national data, notably underrepresentation of solo practice physicians, and have presented those differences so that the limits of generalizability of our findings are clearer.

The pressures facing community-based teaching physicians are substantial. In spite of their belief in community-based clinical education, some community preceptors are warning that they may be forced to stop their teaching activity unless funding is provided.³² As Woolliscroft and Schwenk¹⁴ pointed out, there are tangible barriers to community-based ambulatory medical education, including decreased physician productivity, uncertainties about patient acceptance, and difficulty recruiting and retaining physician-teachers while avoiding instructor burnout. Bentley et al¹⁵ have advocated supporting ambulatory teaching "from the core funds of the medical school that are normally earmarked for education," and Kassirer³¹ stated, "As resident and student education moves to ambulatory sites, federal funds should move with it." At least one large health maintenance organization plans to start reimbursing physicians more when they teach medical students.³⁵ On the other hand, Greenberg⁷ and Lesky and Hershman³³ recommended that volunteer faculty be trained to teach more efficiently, the latter noting that "it is unlikely that institutions can fully reimburse the time a busy practitioner devotes to teaching." Scherger and Fowkes³⁴ cite situations in which having medical students provide clinical service can save the physician-teacher time. The debate is likely to continue.

The challenges are great, but so are the resources. Not only do 20% to 30% of community-based generalists currently teach medical students, but others are also willing to join the effort. Shifting a portion of

medical student education to community-based sites raises issues for both community physicians and leaders in academic medicine, including whether they should be paid for their teaching efforts. While data do not make policy decisions, the findings of this study may help guide policy development by describing the scope of teaching activity and by giving voice to the perspectives of a national sample of community-based physicians, many of whom are active teachers of medical students.

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