

Patient Care Income and the Financing of Residency Education in Family Medicine

Jack M. Colwill, MD, and John K. Glenn, PhD
Columbia, Missouri

Graduate medical education historically has been based on the inpatient services of hospitals and has been funded largely from patient care income. Most of this income is paid by third party payers, thus spreading the costs across the population. In the last decade, changing public policy has stimulated rapid expansion of training for the primary care specialties. The financing of primary care training is affected because of the shift in emphasis toward the ambulatory arena, an area that has been a long-term hospital financial "loss leader." Educational programs in the ambulatory setting increase overhead costs. At the same time limited third party coverage for patients in the ambulatory setting increases cost awareness by patients. Thus, charges in most hospital clinics must be set at levels competitive with the community, levels that are below costs.

State support and federal training grants have been essential in initiating primary care education. There appears, however, that an unspoken expectation is involved. This expectation is that primary care education, in common with other graduate medical education, ultimately must be supported largely from patient care income.

This issue is being highlighted by recent studies of graduate medical education: one by the Association of American Medical Colleges¹ and the other by the Graduate Medical Education National Advisory Committee (GMENAC) of the United States Department of Health and Human Services.² In general, both groups are recommending that the financing of graduate medical education should continue to be based upon patient care revenues. With respect to primary care, it is significant that both studies recognize that supplemental assistance beyond patient care income will be

needed; at the same time, both fail to define the potential magnitude of that need.

This paper addresses the degree to which patient care income can be expected to finance graduate education in family medicine. Experiences at the University of Missouri-Columbia will be analyzed and will be compared with results of a national survey of family medicine residency programs. Next, a theoretical training cost and income model shall be developed in an effort to provide data on theoretical program costs as well as income potential. All of these findings will then be discussed in light of other published studies.

The Fiscal Balance for One Program

The Department of Family and Community Medicine at the University of Missouri-Columbia (UMC) has educational responsibilities for a variety of trainees including medical students, resident physicians in family medicine, faculty fellows under a Robert Wood Johnson Fellowship grant, nurse practitioner students under a Kellogg grant, and masters level health education students. To generate data for this analysis, faculty costs were allocated among these various education responsibilities. This was done independently by two departmental staff members, and the few minor differences were resolved by discussion. Other data used in this study were taken directly from accounting records, including those of the department's two practice centers: one within the University Hospital and the other in the rural community of Fulton, Missouri. A few cost items in resident physician education absorbed external to the department are estimated and included in total cost. These include professional liability insurance, space for faculty offices, and space for the family practice center within the University Hospital. These estimated costs total \$124,000.

Table 1 shows that in 1978-79 the UMC program of 30 residents accumulated identifiable costs totaling \$1,541,000. Approximately one third of

This paper is adapted from a presentation at the Plenary Session of the 13th Annual Spring Conference of the Society of Teachers of Family Medicine, Boston, Massachusetts, May 4, 1980. Dr. Colwill is Professor and Chairman, and Dr. Glenn is Associate Professor, Department of Family and Community Medicine, School of Medicine, University of Missouri-Columbia, Columbia, Missouri.

Table 1. Identifiable Program Costs, University of Missouri-Columbia Family Medicine Program: 1978-79

	Costs (\$)	Percent of Total
30 FTE* residents**	517,000	34
7.84 FTE physician faculty**	454,000	29
4.8 FTE nonphysician faculty**	105,000	7
0.3 FTE nutritionist		
0.8 FTE medical social worker		
0.6 FTE health educator		
0.5 FTE behavioral scientist		
2.6 FTE family nurse practitioners		
Academic support	55,000	4
4.0 FTE secretaries		
Faculty travel and supplies		
Operation of practice centers	334,000	18
Medical center (\$150,000)		
Rural (\$136,000)		
External costs (see text)	124,000	8
Total	1,541,000	100

*FTE—full-time equivalent
**Includes fringe benefits and malpractice insurance

Table 2. Patient Care Income, University of Missouri-Columbia Family Medicine Program: 1978-79

	Clinic Visits	Hospital Admissions	Total Billed Charges (\$)	Percent Collected	Total Collections
Medical center	14,123	461	218,752	68	149,371
Rural	9,552	375	220,031	79	173,511
Total	23,675	836	438,783*	74	\$322,882

*Excludes any hospital and ancillary service revenue that did not accrue to the training program

identifiable program costs was devoted to resident compensation (including fringe benefits), one third to faculty physicians, and the remaining one third to nonphysician faculty, academic supports, and clinic operational costs.

Table 2 shows that the program generated \$438,783 in patient charges during 1978-79. This includes charges generated by faculty physicians, nurse practitioners, and residents, but excludes charges on behalf of the hospital and its ancillary services which do not accrue to the training program. The major sources of charges were 23,675 outpatient visits at the program's two prac-

tice sites and professional fees for 836 hospitalizations for this population. Overall collections were \$322,882 (74 percent of charges). This represented only 21 percent of the identifiable program costs. Since the UMC program has reached a point of stability after eight years of expansion, one must ask a fundamental question: How atypical is the Missouri program?

In 1975 and 1976, a survey of costs and income³ was performed of family medicine residency programs across the United States by the Health Planning Resource Center at the University of Wyoming. Useful data were obtained from 80 pro-

Table 3. How Atypical Is the Missouri Program?

	Wyoming National Survey (1975-76)	University of Missouri-Columbia (1978-79)
Cost per resident year (\$)	40,782	48,833
Patient visits per resident year	701	789
Income per visit (\$)	11.75	13.64
Income per resident year (\$)	8,241	10,760
Income as percent program cost	20	22

grams, including a spectrum of urban and rural programs, university, university affiliated, and community programs (Table 3). Average costs for these programs in 1975-76 totaled \$40,782 per resident per year. By comparison, in 1978-79 the UMC program identified similar costs of \$51,333 per resident per year when an inflation factor was taken into consideration. The survey found that the average program had 701 patient visits annually per resident compared with 789 in the Missouri program. The average program experienced an 83 percent collection rate and generated \$8,241 income per resident per year. Three years later, the UMC program generated \$10,760 of patient care income per resident per year.* In summary, this national survey of 80 programs demonstrated that the average program generated only 20 percent of total program costs through family practice patient income. One is forced to conclude that the Missouri program is not atypical.

At least three alternative explanations might be used to explain why family practice residency programs seem to retrieve such a small proportion of their costs through patient care income. Perhaps program costs are too high. Perhaps patient volume is too low. Perhaps it is unrealistic to expect

*Cost based reimbursement that the hospital receives for services of resident physicians is excluded from calculations of income to the program in both the Missouri data and the Wyoming national survey. This income for services by residents provided largely on rotation in other specialties should form a basis for the hospitals' contribution to residency costs as is discussed later.

income from the family practice patient population to fund more than a portion of program costs.

A Theoretical Cost and Income Model

To examine these three hypotheses, it seemed appropriate to develop a theoretical model for family medicine residency program costs. Two sets of guidelines were considered in developing such a model. The Residency Assistance Program (RAP)—jointly sponsored by the American Academy of Family Physicians, the Society of Teachers of Family Medicine, the American Board of Family Practice, and the Family Health Foundation—has established one set of criteria.⁴ Federal requirements for eligibility for training grant funds form another set of very relevant guidelines.⁵ To illustrate, Table 4 lists recommendations and requirements for faculty staffing of family practice programs as extracted from the two sets of guidelines.

Are Program Costs Too High?

Incorporating RAP and federal guidelines, theoretical staffing patterns and other costs for the UMC residency program were established for 1978-79 (Table 5). Resident stipends, including fringe benefits, are those which were experienced. According to the guidelines, minimum faculty requirements for a program of 30 residents would be a full-time director and five full-time equivalent family physicians. The salary of one half-time equivalent physician in other specialties was added to reflect conservatively the costs of direct consultative support to the family practice centers. It was assumed that the program would have no direct costs for rotating residents on other specialty services other than resident salaries. For behavioral scientists, 1.25 full-time equivalents represented the minimum federal requirements. The conservative estimate of two other nonphysician faculty reflects direct and essential contributions to the residency by nurse practitioners, health educators, nutritionists, clinical pharmacists, and so on. In computing dollar amounts, faculty salary levels at the University of Missouri-Columbia were used.

The guidelines do not explicitly address some categories of training costs which must be funded. Academic support costs were calculated on the basis of one secretary for every four faculty members and \$1,000 per year of travel and other

Table 4. Standards for Family Medicine Residencies

Faculty	Residency Assistance Program Guidelines	Federal Training Grant Requirements
Family practice physicians	Director + 1 FTE*/6 residents	Director + 1 FTE/6 residents
Other physicians	Adequate compensation	Reasonable number
Behavioral scientists	Skill in human behavior	One-fourth FTE/6 residents
Other	Nurse, nutrition social worker	Nurse practitioner, nutritionist, social service worker

*FTE—full-time equivalent

Table 5. Theoretical Cost Model for the University of Missouri—Columbia Family Medicine Program 1978-79

	Full-time Equivalents	Costs (\$)
Residents	30.0	517,000
Physician faculty		376,000
Family physicians	6.0	
Other physicians	0.5	
Nonphysician faculty		71,000
Behavioral scientists	1.25	
Other professions	2.00	
Academic support	NA	35,000
Operation of model clinic	NA	320,000
Total		1,319,000

academic expenses per faculty member. Clinic operational costs, including staffing, clinic supplies, and other overhead, were calculated on the basis of 50 percent of projected theoretical clinic gross revenue. This estimate, while unrealistically low for a training center, is based upon the experience of private family physicians for whom office overhead typically runs 40 to 50 percent of gross charges.⁶

Total costs for this theoretical model of a residency program for 30 residents in 1978-79 are \$1,354,000, an average of \$45,133 per resident per year, or only 12 percent less than the cost actually incurred by the UMC program in that year. Rec-

ognizing that every effort has been made to keep these theoretical costs conservative—perhaps unrealistically conservative for many programs—it appears that average program costs encountered by family medicine programs are quite reasonable. Program costs are not too high if one seeks to achieve minimum RAP and federal criteria for a quality program.

Is Patient Volume Too Low?

A theoretical model of patient volume also can be built upon RAP and federal guidelines. Federal training grants require that a minimum of 25 percent of residents' time be spent in continuity practice. To increase the potential for patient income, it was elected in the theoretical model to provide 30 percent of the residents' time in the practice center with two, three, and four half-day sessions per week in the first, second, and third years of residency, respectively. Residency Assistance Program guidelines suggest that first year residents see 3 to 5 patients per session, that second year residents see 5 to 10 patients, and that third year residents see 10 to 15 patients per session. Taking the midpoint of the ranges, the model was built based upon the expectation that first, second, and third year residents would average 4, 8, and 12 patients, respectively, per session. Further, two sessions of practice per week were assumed for faculty in order to maintain their own practice skills. As computed in Table 6, this theoretical practice model would provide 45,080 clinic visits

Table 6. Theoretical Productivity Model for a Family Medicine Training Program

	Clinic Sessions per Week	Patients per Session	Number of Providers	Total Visits*
Residents				
First year	2	4	10	3,680
Second year	3	8	10	11,040
Third year	4	12	10	22,080
Faculty	2	15	6	8,280
Total				45,080

*Excludes vacations and holidays (46 weeks per year)

per year for a program with 30 residents, meaning that 1,502 visits per resident per year would occur. This should be compared with the 701 patient visits per resident per year actually reported in the Wyoming national survey of 80 programs.

Hence, one must conclude that patient volume in the majority of family medicine residencies is much below RAP guidelines. In a later section, some of the reasons for this finding will be discussed.

Are Patient Care Income Expectations Unrealistic?

Revenue for this theoretical model was calculated using charges of the University of Missouri-Columbia's two practice centers. Charges, calculated by dividing total charges for inpatient and outpatient care by total clinic visits, averaged \$18.53 per visit. (Fee schedules are maintained at levels comparable to private family physicians in the mid-Missouri region.) Assuming a theoretical collection rate of 85 percent, program collections would total \$710,032 for the 45,080 clinic visits assumed in this model. This theoretical income would average \$23,668 per resident year compared with only \$8,241 patient care income per resident year in the 1975-76 national survey. This discrepancy is due primarily to the low patient volume issue identified earlier.

However, to answer the question regarding income expectations, one must compare the theoretical \$23,668 patient care income per resident year with the theoretical \$45,133 of program costs per resident per year. Even in theory, fee structures and costs similar to those in mid-Missouri would not permit patient care income to fund much more

than one half of the cost of training. Actually, as the Wyoming national survey shows, funding 50 percent of costs from patient care income is an unrealistic expectation.

Discussion

The rule of thumb that the total cost of training a family medicine resident now exceeds \$40,000 per resident year is probably conservatively low.⁷ Considering inflation, data presented in this paper indicate that average total cost per resident year will significantly exceed \$50,000 in the 1980-81 academic year. Further, the theoretical model developed in this paper suggests that total program cost is not amenable to wholesale reduction, given the external criteria which most programs would wish to meet.

In assessing the applicability of the theoretical model to other family medicine programs in other regions, one might appropriately question the degree to which mid-Missouri salaries and fees are representative. Resident stipends at the University of Missouri-Columbia in 1978 were 6 percent below the national average.⁸ Family physician faculty salaries were at the 50th percentile of family physician faculty nationally receiving base and supplemental salary components.⁹ Fees charged both in the office and in the hospital for the two practice centers are virtually identical to average national figures for nonmetropolitan and for urban family physicians.⁶

Prior studies of primary care training have not examined total program costs, and data do not reflect the degree to which family medicine programs meet RAP and federal guidelines. The most complete report of a primary care program ana-

lyzed the incremental costs of adding a primary care internal medicine residency track to an existing internal medicine residency at Harvard.¹⁰ Their monthly cost per resident in 1975-76 for the six months of each year spent in the ambulatory setting was \$3,270. While the basis for calculating these costs is not comparable to the basis at the University of Missouri-Columbia, the figures do suggest that training costs in primary care internal medicine are of the same order of magnitude as those in family medicine. Most other reports, aside from the 1975-76 Wyoming survey of family practice residencies quoted in this paper, have emphasized the per visit or per session costs of providing the ambulatory component of training.¹¹⁻¹⁴ The typical family practice program also must find funding for educational and administrative costs to cover the full scope of residency training, including resident stipends for specialty and inpatient training, while at the same time maintaining staffing standards as reflected in Residency Assistance Program and federal staffing guidelines.

If total program cost for family medicine training is in excess of \$50,000 per trainee year, then what portion can reasonably be expected to come from the family practice patient income? The theoretical model described in this paper implies a maximum of 50 to 55 percent. However, to expect to achieve such a proportion nationally is probably unrealistic because of low patient volumes and the necessity of maintaining locally competitive fee schedules. The Wyoming family practice national survey showed the average program yielded \$8,241 per resident year, or only 20 percent of 1975-76 costs. Interpretation of the Rockford data suggests they generated \$15,450 per trainee year in 1976-77.¹⁴ Only the Harvard primary care internal medicine program has indicated that a figure as high as 75 percent of program costs is being met through patient income.¹⁰ Their costs, however, reflect only the incremental costs of adding the ambulatory component to the residency, and their income has been high in comparison with other programs as a result of a prospectively determined cost-based third party reimbursement system (personal communication with Robert Lawrence, MD, Harvard Medical School, May 1, 1981).

The theoretical model suggests that 1,500 patient visits per resident year would be needed to generate about one half of theoretical program

costs at mid-Missouri fee schedules. Few programs actually have that many visits. The 80 programs in the 1975-76 Wyoming survey averaged only 701 visits per resident year. A review of the 1980 National Residency Directory indicates that only 24 percent of 290 family practice programs reported more than 1,500 visits per resident.¹⁵ Only 45 percent of them exceeded the 835 visits per resident year necessary to achieve one third of theoretical program costs. The median in the 1980 directory is only slightly higher than the 701 visits averaged in the 1975-76 family practice national survey.

The ability of programs to increase patient visits appears to be limited. In order to obtain adequate educational opportunities for residents in multiple specialties, programs tend to be located in areas of physician surplus. Thus, programs must compete for a family practice population and tend to be at a disadvantage. For example, resident schedules make it virtually impossible to assure the degree of patient-physician continuity that many patients desire. Many patients may prefer care by a practicing physician over care by a resident under faculty supervision. Further, programs within large teaching hospitals often have difficulties making the practice center as efficient and attractive as the setting of a private physician. In addition, competition is increased whenever residency graduates settle in the local community and take their patients with them.

Programs fortunate enough to have a surplus of patients still have compromises to make in order to dramatically increase resident productivity. Increasing the number of ambulatory sessions per week can be done only at the expense of rotations in other specialties and other educational activities. The value of learning how to handle a large volume of patients must be balanced against educational time with faculty. An earlier study¹⁶ at one of the University of Missouri-Columbia sites demonstrated that residents with an increased patient load react in a predictable way. They reduce the amount of time spent with individual patients and in consultation with supervising faculty. Carried to extremes, a demand for higher resident productivity at the expense of learning opportunity is detrimental to overall training goals.

The second cause of limited income potential for family medicine residencies lies in the fact that fees must be competitive with the private sector

even though costs are greater. In most parts of the country, the self-paying patient is the predominant payment mechanism for ambulatory services. If a program must compete to maintain a minimum volume of self-paying patients for its educational program, it is unlikely to be overly aggressive in setting fees. In a few settings, training programs enjoy a patient population that has extensive pre-paid or third party coverage for ambulatory care. To illustrate the financial impact, it is interesting to compare the average collections per visit in the 1975-76 Wyoming family practice survey with the 1975-76 Harvard primary care internal medicine study. The average family practice program collected \$11.70 per patient visit vs the \$22.40 in the Harvard program, which received prospectively determined cost based reimbursement in a setting where a high proportion of patients had third party coverage.

While this theoretical model suggests that 50 to 60 percent of total program costs might come from patient income, the empirical evidence implies that only a minority of programs will be able to achieve this level of income. Because of the uncontrollable constraining factors discussed earlier that keep costs high and patient care income low, a realistic objective for most programs would be to obtain 25 to 30 percent of total program costs from income for services to the family practice patient population. Increased productivity will be required to achieve even this objective.

What then are the potential sources of funds to meet the remaining costs? For practical purposes other sources of income are limited to hospital support, state appropriations, and federal grants.

According to the 1975-76 Wyoming survey, 60 percent of residencies received subsidies from affiliated hospitals or universities as a source of recurring operating revenues. The hospital has multiple rationales for supporting the program. House staff render services for which the hospital receives cost based reimbursement. The family medicine program increases hospital utilization both through direct admission and referral. Less tangible benefits to the hospital are those associated with enhanced quality of care, potential for increased referrals from graduates who settle in the region, and community recognition that the program addresses a real societal need.

There are major disincentives for hospital support, however. The primary care training empha-

sis concentrates resident activities in the clinics, a poor income producing area. In teaching hospitals, residents in other specialties working in high income producing areas may provide services generating more revenues for the hospital. Further, competition exists among specialties for a limited number of house staff salaries. The allocation of resident positions among specialties may relate more to hospital patient care needs than to overall societal needs. All in all, it is likely that future pressures for cost containment fostered by marketplace competition increasingly will force teaching hospitals to examine residency training as a purely financial consideration rather than as a contribution to society.

Objective data are unavailable as to the hospital's "fair share" of the total cost of family medicine training, and in any event, the proportion would vary from institution to institution as a function of its cost-based reimbursement contracts. However, it does appear that hospitals cannot be expected to pay all the family medicine training costs not covered by patient fees from the family practice population.

If one assumes that an average of two thirds of program costs can be derived from the hospital and the family practice patient population, one third still remains. (This assumption is based upon 35 to 40 percent of program costs being reimbursed to the hospital on a cost basis for resident salaries, etc, and 25 to 30 percent of program costs being derived from family medicine patient income.) The only current sources of the remaining third are specific state and federal support. Since family practice residency programs recruit nationally, and graduates often enter practice outside the state in which they are trained, there is sound argument for sustaining federal support for family medicine training. The most effective mechanism is not clear. Training grants have been critically important in program development but lack the funding predictability necessary to ensure program financial stability. Capitation funding for resident education appears to be a logical next stage for federal support. Capitation would eliminate some of the jeopardy implicit in renewal of training grants for programs meeting stipulated requirements such as those already established for federal training grants. Yet, capitation also would be contingent upon the vagaries of annual federal appropriations.

Many might argue that ultimate solutions rest with third party reimbursement. This mechanism has worked well in the inpatient setting because 90 percent of the population is covered and, consequently, costs of graduate medical education are spread across the entire population. But only slightly more than one half the nation's population has insurance coverage for the ambulatory setting, and even then, individuals must pay sizable deductibles and coinsurance. Charges to ambulatory patients that reflect the combined costs of patient care and education cannot be competitive with the private sector. If charges are not competitive, programs have no chance of attracting the practice base needed for training and revenue generation. Until a higher proportion of ambulatory care is uniformly reimbursed by third parties, a modification of the Medicare and Medicaid laws could be of partial assistance. (One example is contained in Section 502 of House Bill HR 6802, a proposal which would permit Medicare and Medicaid to reimburse for the combined costs of patient care and residency training while other patients would be expected to pay only locally competitive charges.) Beyond temporary modifications, it is critically important that any major overhaul of the national health care financing system consider the special considerations inherent in providing primary care training.

Conclusions

In summary, patient care income cannot and will not be able to finance family medicine residency training within the foreseeable future. The future of family medicine education is highly dependent upon a widespread understanding that its financing needs are different. Family medicine has been supported as a national priority with high standards for training and certification, a potential for overcoming maldistribution problems, and an emphasis upon ambulatory rather than expensive inpatient care. In a sense, these are societal as well as program goals, and a continued sharing of the costs of training is essential.

A reasonable funding objective would be for a program and its sponsoring hospital to generate two thirds of total costs. The remaining third must come from some combination of state and federal sources. Even this pattern of funding will be difficult to achieve, since most programs do not have

a sufficiently large patient population, teaching hospitals face increasing pressures for cost containment, and no long-term plan for continuing federal support for family medicine education currently exists.

One may differ with the numbers presented here, and different primary care programs admittedly will have different needs, but the analysis in this study appears to be typical of most family medicine programs. It is critical that policy makers in medicine and in government recognize the magnitude of the discrepancy between costs and income potential in primary care training. Without that understanding and support, family medicine programs in this country face a bleak future.

References

1. Task Force on Graduate Medical Education: Graduate Medical Education: Proposals for the Eighties. Washington, DC, Association of American Medical Colleges, 1980
2. Report of the Graduate Medical Education National Advisory Committee to the Secretary, Department of Health and Human Services. Health Resources Administration, DHHS publication No. (HRA) 81-651. Government Printing Office, 1980
3. Joehnk MD, Allen RE, Spahr RW: The financial and economic implications of family practice residency programs: Nationwide operating experiences of established centers. Laramie, Wyoming, University of Wyoming, Health Planning Resources Center, DHEW contract No. 298-74-C-0008, 1979
4. Family Practice Residency Assistance Program Criteria. Kansas City, Mo, Residency Assistance Project Board, 1979
5. Interim final regulations for training requirements in family medicine. Federal Register. 43:47694 (Oct 16), 1978
6. Gaffney JC, Glandon GL (eds): Profile of Medical Practice 1979. Chicago, American Medical Association, 1979
7. Geyman JP: Alternatives for funding family practice teaching programs. J Fam Pract 9:1003, 1979
8. Memorandum No. 79-34. Washington, DC, Association of American Medical Colleges, June 20, 1980
9. Scott CA, Smith WC, Rosenthal J: Report on Medical School Faculty Salaries 1978-79. Washington, DC, Association of American Medical Colleges, 1979
10. Stern RS, Jennings M, Delbanco TL, et al: Graduate education in primary care: An economic analysis. N Engl J Med 297:638, 1977
11. Kahn L, Wirth P, Perkoff GT: The cost of a primary care teaching program in a prepaid group practice. Med Care 16:61, 1978
12. Dorsey JL, Stern RS: The primary care teaching program in a prepaid group practice [letter]. Med Care 16: 889, 1978
13. Pawlson LG, Watkins R: The costs of a family practice residency ambulatory care program. J Fam Pract 9: 1059, 1979
14. Wollstadt LJ, Boyd GE, Gaumer G, et al: Resource requirements for teaching continuity in primary care: Contrasts between a graduate and an undergraduate program. J Fam Pract 9:1065, 1979
15. Directory of Residency Training Programs, 1979-1980. Chicago, American Medical Association, 1979
16. Pierson S, Glenn JK, Hofmeister RW: Some considerations in the design of family practice residency experiences. J Med Educ 52:555, 1977