
Family Practice Residencies in Community Health Centers —an Approach to Cost and Access Concerns

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Synopsis

An inadequate number of trained primary care clinicians limits access to care at Community Health Centers. If family practice residents working in these centers can provide care to patients at a cost that is comparable to the center's hiring its own physicians, then expansion of Family Practice Residency Programs into community centers can address both cost and access concerns.

A cost-benefit analysis of the Family Practice Residency Program at the Fresno, CA, community center was performed; the community center is affiliated with the University of California at San Francisco. Costs included (a) residents' salaries, (b)

supervision of the family practice residents, (c) family practice program costs for educational activities apart from supervision at the community center, and (d) administrative costs attributable to family practice residents in the community center. Benefits were based on the number of patients that residents saw in the community center. Using this approach, a cost of \$7,700 per resident per year was calculated. This cost is modest compared with the cost of training residents in inpatient settings.

The added costs attributable to training residents in community health centers can be shared with agencies that are concerned with medical education, providing physicians to underserved communities, and increasing the supply of primary care physicians. Redirecting graduate medical education funding from hospitals to selected ambulatory care training centers of excellence would facilitate placing residents in community centers. This change would have the dual advantage of addressing the current imbalance between training in ambulatory care and hospital sites and increasing the capacity of community health centers to meet the health care needs of underserved populations.

DECREASING ACCESS TO CARE and increasing health care costs are forcing Americans to re-evaluate their health care system. Community Health Centers (CHCs), sponsored in part by the Bureau of Primary Health Care (BPHC), a Public Health Service agency, were established to meet the primary health care needs of underserved populations. An inadequate number of trained primary care clinicians limits access to care at CHCs.

Four recent reports have called for significant increases in the training of primary care physicians (1-4). The importance of matching the physician workforce to requirements of the health care system has been noted (5).

The ambulatory focus of CHCs mirrors the practice patterns of most primary care physicians, in contrast to the inpatient orientation of the current medical education system (6-8). The rapid conversion to managed care will heighten this disparity between

medical education and primary care practice.

Federal initiatives encouraging linkages between CHCs and medical education programs have come from the Health Resources and Services Administration (HRSA) (9). A growing number of Family Practice Residency Programs (FPRPs) are affiliated with CHCs (10,11). This movement has the potential to strengthen community-based ambulatory training and improve access to care (12,13).

The cost of training family practice residents in CHCs is perceived to be a significant barrier to placing family practice residents in the centers (10). The primary Federal support for graduate medical education comes from Medicare passthroughs designed for hospitals sponsoring residency training. Reimbursement is based on time spent in the sponsoring institution and the percent of Medicare inpatients. For this reason, paying for graduate medical education in ambulatory care sites remains

problematic (14).

If family practice residents working in CHCs can provide care to patients at a cost that is comparable to the CHC's hiring its own physicians, then expansion of FPRPs into CHCs can address both cost and access concerns. To determine the financial impact of having family practice residents care for patients in a CHC, a cost-benefit analysis was performed at the Ventura P. Huerta Health Center in Fresno, CA. The family practice residency program at this center is part of the FPRP of the University of California at San Francisco (UCSF)-Fresno. Specifically, the cost-benefit analysis addressed the question: can family practice residents assigned to a CHC provide care to patients at a cost that is comparable to the CHC's hiring its own physicians?

Setting

The UCSF-Fresno FPRP is based at Valley Medical Center, a county hospital which is home to eight other residency programs. The UCSF-Fresno FPRP is one of four FPRPs affiliated with the university. The program is organized into three pathways. The Fresno Pathway, with six residents each year, began in 1970. A rural track, the Selma Pathway, began in 1980 with two residents per year.

The Sequoia Pathway, in the Ventura P. Huerta Health Center in Fresno, was developed in 1990 with the aid of a Model Education Project for Health Professions grant from HRSA, requested by H. John Blossom, MD, then Program Director of UCSF-Fresno FPRP, to encourage linkages between residency programs and CHCs. At the time of this analysis in 1993, there were two residents each in the first and second clinical years and one resident in the third year at the Sequoia Pathway.

Methods

In this analysis, the cost of family practice residents seeing patients in the CHC is compared with the cost of having the patient seen by a CHC physician. This analytic approach assumes that visit charges and collections associated with the patient encounter are equivalent for residents and CHC physicians.

Costs. The cost of using a family practice resident in a CHC was divided into four components: (a) the resident's salary and fringe benefits, (b) faculty costs for supervision of the family practice resident, (c) FPRP costs for educational activities not directly related to evaluating patients (such as recruitment of

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residents, orientation of residents, evaluating the resident's performance, provision of lectures, and so forth), and (d) CHC administrative costs attributable to the family practice resident.

Resident salaries. The CHC by contractual agreement with the County of Fresno pays 30 percent of the second year family practice residents' salaries (average salary plus benefits, \$40,000), 40 percent of third year family practice residents' salaries (average salary plus benefits, \$45,000), and none of first year salaries. This formula roughly parallels the number of half days per week that the family practice residents spend in the CHC.

Supervision. The cost of supervising residents can be estimated by comparing the number of patients seen by the CHC physicians when they are supervising family practice residents with the number of patients the CHC physicians see when they are not supervising residents. When this information is coupled with the salaries of the CHC physicians, we can estimate the physician cost of supervising the family practice residents.

The amount of supervision that family practice residents receive at the CHC varies by their year of training. Agreements with the Resident Review Committee for Family Practice (RRC) and the CHC have resulted in supervising physicians at the CHC being scheduled for half of their usual patient load when supervising one or two second or third year residents, and scheduled for no patients when supervising two first year family practice residents. Full-time physicians have an average of 376 patient encounters per month.

Administrative and educational costs of the FPRP. The cost to the FPRP of administrative and educational activities associated with the family practice residents working at the CHC can be estimated by analyzing the accreditation guidelines for family practice residencies (15,16). Each family practice

Table 1. Productivity of residents and supervising physicians in a family practice residency program at a community health center (CHC), April 1993

Type of physician	Average number of patients seen per half-day	Number of half-days per month
Residents:		
2 first year	4.0	7
3 second and third year.....	8.5	34
CHC physicians:		
Not supervising residents.....	9.4	40
Supervising 2 first year residents.....	0	4
Supervising 1 second year or 1 third year resident	7.3	24
Supervising 2 second or third year residents.....	5.4	5

'A study conducted by the Massachusetts League of CHCs calculated annual costs in teaching a resident at CHCs at \$14,100 to \$18,500 per year. Both of these estimates are modest when compared to the \$5 billion Medicare paid for 90,000 hospital-based residents in 1992, an average of \$56,000 per resident per year.'

program must have 1 full-time equivalent physician for every 6 family practice residents, at least 1 behavioral scientist for 24 family practice residents, and a program director in addition to the family practice faculty noted previously.

Secretarial and clerical positions are needed to support the listed positions. In Fresno County, an accepted formula is 1 secretarial position for every 1.6 faculty members. Also included in the cost calculations is the salary for one FTE residency administrator, although some family practice residencies use a chief resident to handle scheduling and personnel matters.

In a moderately sized FPRP with 24 residents, the administrative and educational personnel needs based on the guidelines just described include 4 FTE faculty (estimated salary plus fringe benefits of \$120,000 each, or \$480,000 for 4 FTEs), 1 behavioral scientist (estimated salary plus fringes of \$65,000), 1 residency director (estimated salary plus fringes of

\$140,000), 4 clerical-support personnel to support the 6 faculty just described (estimated salary plus fringes of \$26,350 each, or \$105,400 for 4 FTEs), and 1 administrator (estimated salary plus fringes of \$50,000). The administrative and educational personnel cost in this model is \$840,000, or \$35,000 per resident. A net administrative and educational cost of \$25,000 per resident is calculated by subtracting faculty revenues of \$10,000 per resident (based on historical financial data from the faculty practice group) from the \$35,000 per resident cost.

The CHC is expected to contribute to these administrative and educational costs in proportion to the number of FTE family practice residents working at their facility. This contribution can be estimated by looking at the number of clinic sessions per week that the family practice residents staff at the CHC. For example, if there are family practice residents at the CHC 10 half-days per week, this would be the equivalent of one FTE resident. This figure is increased by 15 percent to account for vacation, sick days, and continuing medical education time.

Administrative costs of the CHC. The administrative cost for the CHC is based upon the number of FTE residents at the CHC as a percent of the total number of FTE clinicians (30) in the CHC network. The CHC's administrative positions considered in this analysis parallel the administrative positions in the FPRP. These are the CHC's medical director and administrator and clerical support for the medical director. It is assumed these administrative officials spend the same proportion of their administrative time with family practice residents as with other physicians. Total CHC administrative costs are calculated to be \$185,200. Other CHC costs including space, malpractice insurance, and administrative positions such as the executive director and chief financial officer are not considered in this analysis.

Benefits. In this analysis, the benefit of having family practice residents at the CHC is based on how many patients the residents care for. It is assumed the total patient volume and revenue will stay the same and the residents will substitute for CHC physicians. This premise allows the CHC to benefit through savings of the CHC physician's salaries. The amount of the salary savings is determined by comparing the number of patients seen by the family practice residents with the number of patients seen by an average CHC physician. Other intangible benefits of having the family practice residents at the CHC, such as the infusion of new ideas, establishment of an educational milieu, improved recruitment, and affilia-

Table 2. Cost of residents' salaries in a family practice residency program at a community health center (CHC), April 1993

Number of residents and residency year	Salary per resident	CHC's contribution (percent)	Cost to CHC per resident	Annualized cost to CHC
<i>Current model</i>				
2 first year residents.....	\$36,000	0	0	0
2 second year residents.....	40,000	30	\$12,000	\$24,000
1 third year resident.....	45,000	40	18,000	18,000
Total.....	...	...	...	\$42,000
<i>Expansion model¹</i>				
2 first year residents.....	\$36,000	0	0	0
2 second year residents.....	40,000	30	\$12,000	24,000
2 third year residents.....	45,000	40	18,000	36,000
Total.....	...	...	...	\$60,000

¹2 residents per year, 2 half-day clinics per week in first year and 4 half-day clinics per week in second and third years.

Table 3. Cost of supervision of residents in lost productivity of community health center (CHC) physicians

Model and number of residents	When supervising		When supervising			Annualized cost of lost productivity F (\$120,000 × E)
	Number of patients seen per half-day A	Decrease in patients seen per half-day B	Half-days supervising per month C	Decrease in total patients seen D (B×C)	Lost productivity E (D ÷ 376)	
<i>Current model</i>						
No residents.....	9.4	0	40	NA	NA	
First year residents.....	0	9.4	4	38	0.1	\$12,000
1 second or third year resident.....	7.3	2.1	24	50	0.13	15,600
2 second or third year residents.....	5.4	4.0	5	20	0.05	6,000
Total cost.....	...	...	...	...	...	\$33,600
<i>Expansion model</i>						
2 first year residents.....	0	9.4	8	75	0.2	\$24,000
2 second and 2 third year residents.....	5.4	4.0	32	128	0.34	40,800
Total cost.....	...	...	...	...	...	\$64,800

tion with academic institutions are difficult to quantify and are not considered in this analysis.

Data collection. The April 1993 clinic schedules at the Ventura P. Huerta Health Center were analyzed to determine the number of family practice residents working each half-day at the CHC. The schedules of the CHC physicians were analyzed to differentiate which physicians were and were not supervising residents.

The number of patients scheduled and the number of patients seen by the family practice residents, the supervising physicians, and the nonsupervising physicians was recorded. The schedules were also analyzed to determine whether the supervising physicians were supervising first year residents, second and third year residents, one resident, or two residents.

Salary figures for residents, CHC physicians and

administrators, and family practice faculty and staff were obtained from the County of Fresno, the Sequoia Health Foundation, and the Central California Faculty Medical Group respectively.

Results

Table 1 presents the average number of patients seen by CHC physicians supervising and not supervising residents as well as patients seen by residents in each year of training and the half-days worked by the group of residents during the month. First year residents were in the CHC 1 half-day per week and second and third year residents for close to 3 half-days per week.

Table 2 presents the cost of residents' salaries including fringe benefits of 20 percent. Total CHC salary costs per resident were \$42,000 per year. In

Table 4. Contribution of the community health center (CHC) to the administrative and educational personnel costs of the family practice residency program (FPRP)

Cost item	Current model	Expansion model
A FPRP's administrative and educational costs per resident....	\$25,000	\$25,000
B Number of residents at CHC.....	5	6
C FPRP's administrative and educational costs for total CHC residents (A × B).....	\$125,000	\$150,000
D Residents' half-days per month at CHC.....	41	80
E Residents' half-days at CHC for vacation and continuing medical education (D × 15 percent).....	6	12
F Resident FTEs at CHC (E + D ÷ 40).....	1.2	2.3
G Percent of residents' time at CHC (F ÷ B).....	24	38
H CHC's contribution to administration and education per resident (A × G).....	\$6,500	\$9,500
I Total CHC contribution to administration and education.....	\$32,500	\$57,000

Table 5. Annual administrative cost to the community health center attributable to family practice residents

Cost factor	Current model	Expansion model
Total administrative costs.....	\$185,200	\$185,200
Total number of clinicians.....	30	31
Number of residents.....	5	6
Percent of residents to clinicians.....	17	20
Administrative costs attributable to residents.....	\$31,500	\$37,800
Administrative cost per resident.....	\$6,300	\$6,200

this and subsequent tables, costs and benefits are also calculated for a hypothetical expansion model in which two residents from each year of training are matched to the CHC, with each spending more time in the CHC than in the current model. In this expansion model, first year residents spend 2 half-days in clinic, and second and third year residents each spend 4 half-days in clinic. In the expansion model, annualized resident salary costs are \$60,000.

Table 3 is an analysis of the cost of supervising residents with CHC physicians. Using the data from table 1, costs were determined by first subtracting the number of patients seen by CHC physicians when supervising residents from the number of patients the CHC physicians saw when not supervising residents to determine the decrease in number of patients seen that is attributable to supervision of residents. The decrease in patients seen per half-day was 9.4 while supervising two first year residents, 2.1 while

supervising one second or third year resident, and 4.0 while supervising two second or third year residents.

After multiplying the number of half-days spent supervising residents (summarized in table 1), by the decreased productivity per half-day, (column D) and dividing this by the average number of patients seen per month by the attending physicians (376), the lost productivity secondary to supervising residents was determined (column E). When the decrease in FTE productivity is multiplied by the average cost of \$120,000 per year (including fringe benefits) for a full-time physician, the total cost for supervision of residents was \$33,600 in the current model, and \$64,800 in the expansion model (column F).

Table 4 summarizes the UCSF-Fresno FPRP administrative and educational costs attributable to residents at the center based on the percent of time residents spend at the CHC. The CHC contribution to UCSF-Fresno FPRP's administrative and educational activities is \$6,500 per resident in the current model, and \$9,500 per resident in the expansion model. The CHC's administrative costs attributable to the UCSF-Fresno FPRP, summarized in table 5, are \$6,300 per resident in the current model, and \$6,200 per resident in the expansion model.

Table 6 summarizes the benefits in CHC physician salary savings of residents working at the center. First year residents had a combined benefit of \$8,900, while second and third year residents had a combined benefit of \$92,400. In the expansion model, these benefits increase to \$20,400 for first year residents, and \$168,000 for second and third year residents.

Table 7 is a summary of the cost-benefit analysis of residents at the CHC. In the current model, the net cost is \$38,300 or \$7,700 per resident. In the expansion model there is a net cost of \$31,200 or \$5,200 per resident.

Discussion

The cost-benefit analysis of family practice residents substituting for CHC physicians demonstrates training costs of \$7,700 per year. Increasing the number of residents at the CHC decreased the cost per resident to \$5,200 per year. A study conducted by the Massachusetts League of CHCs calculated annual costs in teaching a resident at CHCs at \$14,100 to \$18,500 per year (17). Both of these estimates are modest when compared to the \$5 billion Medicare paid for 90,000 hospital-based residents in 1992, an average of \$56,000 per resident per year (18).

At the Ventura P. Huerta Health Center, second and third year family practice residents saw 8.5 patients per half-day, close to the 9.4 patients per half

day that the CHC physicians were seeing. The RRC expects second year residents to see 8 to 10 patients per half-day, and third year residents 10 to 12 patients per half-day (18). Not surprisingly, first year residents were less productive. The limited amount of time that first year residents spent in the CHC minimized the adverse effect of their productivity.

The number of patients seen by the CHC physicians (9.4 per half-day) was relatively low. This could be attributable to the amount of pre-existing illness in this population or to language barriers. CHC physician productivity annualizes to 4,512 patients per year, which is, however, within the 4,200–6,000 patients per year standard previously established by the Bureau of Primary Health Care for CHC physicians (15).

At the CHC, the number of patients scheduled for the supervising physician is proportionate to the number of residents scheduled at the center. The reduction in patients seen by the supervising physician is approximately 25 percent for each second or third year family practice resident, and 50 percent for each first year family practice resident. Supervising physicians are never scheduled for more than 50 percent of their normal load. This supervision model has been approved by the RRC even though the RRC generally requires family practice clinics to have a supervising physician without other responsibilities available at all times. The RRC's flexibility is appropriate, given the limited number of family practice residents working at the CHC.

Limitations of findings. This analysis focused on a single month of data for five family practice residents at a single CHC. As such, it is a limited sample. The administrative and educational positions that are included in the analysis are subject to debate.

The cost-benefit analysis assumes residents will substitute for CHC physicians. It does not consider actual patient charges or expenses. It is assumed that if there were not family practice residents available to see the patients, the CHC would hire other physicians to meet patient demand, or the needs of the patients would be unmet.

There are costs which are not considered in this analysis. These include malpractice insurance for the UCSF–Fresno FPRP, which is provided by UCSF, and space and maintenance costs at the CHC. Variations in the practice styles of residents impacting on nursing, supplies, front office staff, and room use are likewise not incorporated into this study.

Linkage agreements between FPRPs and CHCs are not standardized. The CHC contribution to UCSF–Fresno FPRP resident salaries (0 percent first year, 30

Table 6. Benefit of residents at the community health center in saving salaries of CHC physicians

Model and resident's year	Patients seen by residents per month A	CHC physician equivalent B(A ÷ 376 ¹)	CHC physician salary savings C (B × \$120,000)
<i>Current model</i>			
First year residents	28	.07	\$8,900
Second and third year residents ..	289	.77	92,400
Total benefit..	...	...	\$101,300
<i>Expansion model</i>			
2 second and 2 third year residents 4 half-days per week..	525	1.40	\$168,000
2 first year residents 2 half-days per week..	64	.17	\$20,400
Total benefit..	...	...	\$188,400

¹376 is the average number of patients seen by CHC physicians per month when not supervising residents.

Table 7. Cost benefit analysis of residents at the community health center (CHC)

Cost factor	Current model	Expansion model
A Resident's salary.....	\$42,000	\$60,000
B Supervision costs	33,600	64,800
C Cost to FPRP	32,500	57,000
D Administrative cost to CHC.....	31,500	37,800
E Total cost (A + B + C + D).....	139,600	219,600
F Benefit	101,300	188,400
G Cost-benefit (E - F).....	38,300	31,200
H Cost per resident (G ÷ number of residents)	7,700	5,200

percent second year, 40 percent third year) reflects the number of days residents spent in the clinic and their efficiency. This measurement may not be appropriate for other sites. Alternative scheduling and supervision models of family practice attending physicians and residents will result in different levels of productivity.

Conclusions

This cost-benefit analysis provides a framework for incorporating administrative and educational costs into an analysis of the productivity of family practice residents in CHCs. A similar approach can be used to evaluate residents' activity in a number of other ambulatory care sites, including clinics and private offices. The family practice residents in this study

contributed significantly to access to care in the CHC.

The cost-benefit analysis suggests that family practice residents can provide care to patients in CHCs, and the educational costs associated with FPRPs are increased only modestly. These costs, in the range of \$5,000 to \$8,000 per resident per year, are balanced by benefits to FPRPs such as expertise in working with underserved communities and development of training sites for ambulatory primary care. CHCs benefit through higher professional standards and improved recruitment and retention of providers. These are costs that legitimately can be shared with funding sources interested in improving medical education, providing physicians to underserved communities, and increasing the supply of primary care physicians.

Redirecting graduate medical education funding from hospitals to carefully selected ambulatory training centers of excellence would facilitate placing residents in CHCs. This redirection would have the dual advantage of addressing the current imbalance between training in ambulatory care sites and hospitals and increasing the capacity of CHCs to meet the health care needs of underserved populations.

References

1. Council on Graduate Medical Education: Improving access to health care through physician workforce reform: directions for the 21st century. Bureau of Health Professions, Health Resources and Services Administration, Public Health Service, Rockville, MD, 1992.
2. Reforming graduate medical education. Annual report to Congress. Physician Payment Review Commission, Washington, DC, 1993.
3. Primary care workforce 2000: federal health policy strategies. Pew Health Professions Commission, San Francisco, CA, March 1993.
4. Annual report. Josiah Macy, Jr. Foundation, New York, 1992.
5. Rivo, M. L., Jackson, D. M., and Clare, F. L.: Comparing physician workforce reform recommendations. *JAMA* 270: 1083-1084, Sept. 1, 1993.
6. Perkoff, G.: Teaching clinical medicine in ambulatory settings. *N Engl J Med* 314: 26-31, Jan. 2, 1986.
7. Brook, R., et al.: Educating physicians and treating patients in an ambulatory setting. *Ann Int Med* 107: 392-398 (1987).
8. Reuben, D., McCue, J., and Gerbert, B.: The residency-practice training mismatch. *Arch Intern Med* 148: 914-919 (1988).
9. Rivo, M.: Division of Medicine update. Health Resources and Services Administration, Public Health Service, Rockville, MD, 1992.
10. Primary care career enhancement and training experiences at public health service clinic sites. American Medical Student Association Foundation, Reston, VA, 1991.
11. Hale, F. A., Gordon, P. R., Denton, D., and Warrick, L. H.: The family practice residency community/migrant health

- center linkage manual. American Academy of Family Practice, Kansas City, MO, 1992.
12. Zweifler, J.: Balancing service and education: utilizing community health centers and family practice residency programs. *Fam Med* 25: 306-312 (1993).
13. Gessert, C., et al.: Family physicians for underserved areas: the role of residency training. *West J Med* 150: 226-230 (1989).
14. Eisenberg, J.: How can we pay for graduate medical education and ambulatory care? *N Engl J Med* 320: 1525-1531, June 8, 1989.
15. Residency Review Committee for Family Practice: Revised ACGME special requirements for residency training in family practice. Accreditation Council for Graduate Medical Education, Chicago, 1989.
16. Residency Assistance Program Project Board: Criteria for evaluation of a family practice residency program. Family Practice Residency Assistance Program, Kansas City, MO, 1989.
17. Analysis and report on cost of medical and health professions training at community health centers. Massachusetts League of Community Health Centers and the Center for Community Health Education, Research, and Service, Mar. 15, 1994.
18. Medical GME payment policy needs to be reexamined. GAO/AEHS-94-33. General Accounting Office, Washington, DC, May 1994.
19. Bureau of Health Care Delivery and Assistance: Common reporting requirements manual. Health Resources and Services Administration, Public Health Service, Rockville, MD, 1991.