

Impact of a Family Practice Residency on a Community Hospital: A Case Study of Costs and Benefits

Kevin Patrick, MD, MSCM, C. Hilmon Castle, MD, and Nicholas Danforth, MD
Salt Lake City, Utah

A modified framework of cost-benefit analysis, including explication of direct, indirect, and intangible costs and benefits, is used to assess the financial impact of a university-affiliated family practice residency program upon a community hospital. During resident year 1978-79 it was found that a community hospital affiliated with the University of Utah Family Practice Residency Program may have experienced a net financial benefit of as much as \$243,543 or a net financial cost of as much as \$12,537. At the same time, the hospital is likely to have experienced substantial intangible benefits and moderate intangible costs. This approach may have utility in similar settings where community hospitals support family practice resident education.

The system that has evolved over the past several decades of hospital cost-based reimbursement for house staff salaries and educational costs works reasonably well only for training in specialties heavily dependent on hospital use.¹⁻³ With increasing time devoted to teaching and learning the art and science of ambulatory care, finding useable funds from hospital-based services be-

comes more difficult. In fact, the emphasis in primary care upon keeping people healthy and out of the hospital is directly counterproductive to the usual means of providing support needed for residency training.

Evidence is accumulating that ambulatory patient care income cannot completely support education for residents in family practice.⁴⁻⁷ Family practice educators have been able to delay the explicit recognition of this circumstance because of substantial federal and state subsidies legislated to encourage the growth of this new specialty. Shifting political realities, however, are forcing a critical reappraisal of the amount and justification of such external support. A tripartite mix of support, including patient care income, federal and

From the Department of Family and Community Medicine, University of Utah School of Medicine, Salt Lake City, Utah. Requests for reprints should be addressed to Dr. Kevin Patrick, Department of Family and Community Medicine, University of Utah School of Medicine, 50 North Medical Drive, Salt Lake City, UT 84132.

state subsidy, and support from hospitals participating in training programs, seems reasonable for meeting the challenge of continuing stable funding for primary care training programs.¹ It is probable, however, that each source will want to know not only the other sources and amounts but also the projected benefits that are to come from any involvement.

The purpose of this paper is to provide and demonstrate the use of a framework for the systematic analysis of the financial relationships involved in community hospital support for family practice residency education. Such financial relationships have been recognized and recommended as the basis for support of family practice training.⁸ A basic methodology for the assessment of benefits to community hospitals participating in family practice residency education has been offered,⁹ but, to date, no process has been provided by which a community hospital can establish, within reasonable limits, the *net* cost or benefit of residency training in primary care.

Background

From the perspective of a residency program director, income and expenses represent dollars flowing into and out of the program itself. Multiple sources of income exist, and various aspects of program activity compete for expenditures. This is the economic "field" in which the program exists. To the extent that income exceeds or matches outgo, the program is financially solvent. On the other hand, if outgo exceeds income, then something must be added to provide balance or the program cannot continue. To date, most studies dealing with the financing of family practice residencies have taken this program-based perspective.^{4,10}

The program-based perspective is most useful for program directors. Hospital administrators work in a very different field of economic activity. The fundamentals of income and outgo still exist, but the central consideration becomes the hospital rather than the program. When a hospital administrator considers the advisability of implementing or continuing a residency program, it is this perspective that must be considered. The addition

of a residency program will have an impact on the economic field both positively and negatively. Estimating the net effect of this impact is the central issue for hospital programmatic decision making.

Methods

This approach uses a modified framework of cost-benefit analysis from the perspective of the hospital administrator. Costs and benefits are considered as *direct*, *indirect*, and *intangible*. Direct costs (or benefits) are dollars spent (or earned), which may be clearly identified as spent on (or earned from) residents and their educations. These can be easily and precisely counted. Examples of direct costs are resident stipends and faculty salaries; direct benefits would be revenues generated for the hospital by residents and faculty. Indirect costs (or benefits) represent all other costs (or benefits) involving real dollars but which may be difficult to identify and count precisely. Imprecision in assessment does not, however, preclude estimation of these values. A range containing the indirect cost or benefit for any given item can be set with a reasonable level of confidence. An example of an indirect cost is increased demand on the hospital medical library; an indirect benefit would be a residency graduate's referral of patients to the hospital. Intangible costs (or benefits) represent either nonmonetary entities or monetary entities difficult to assess with any level of confidence.

Using these categories, costs and benefits can be summed separately and then compared. Since ranges are used for some values, three final figures can be derived.

The *best case value*—a dollar value representing the theoretical maximum yearly financial benefit (or minimum financial cost) that the hospital might achieve through a residency program.

The *worst case value*—a dollar value representing the theoretical maximum financial cost (or minimum financial benefit) the hospital might achieve through resident training.

The *most reasonable value*—the midpoint between the best and worst case values, representing the most reasonable assessment of the overall fi-

financial benefit (or cost) of the residency program to the hospital.

This approach was used to evaluate the financial impact of a training program for family practice residents upon a 330-bed community hospital. The hospital is affiliated with the University of Utah Medical Center and is located approximately two miles distant. With the exception of highly specialized services, this hospital offers a full range of primary, secondary, and tertiary medical care. As other hospitals have done over the past few years, this hospital has embarked upon a program of strengthening its position within the community through the development of primary care centers. This effort was initially developed as a response to a deficit of primary care services in certain underserved areas of the metropolitan area. More recently it has become evident that this ambulatory care program can have a favorable impact on hospitalization rates and provide patients for hospital-based secondary and tertiary medical services. An administrative ambulatory care unit of the hospital was created in 1973. Through this unit physicians are salaried by the hospital and housed in either a hospital operated facility immediately adjacent to the hospital or in one of three satellite centers within 25 miles of the hospital. The only center important to this analysis is the one adjacent to the hospital. This center contains the model family practice center (FPC) used by 12 of the family practice residents, as well as the practices of two hospital-salaried physicians.

The Salt Lake City component of the University of Utah Affiliated Hospitals Family Practice Residency engages this community hospital as a primary teaching hospital. Since residents rotate through services in three separate hospitals in Salt Lake City, only 12 full-time equivalent residents are located at all times at the hospital under consideration in this report. Faculty for the residency include the two hospital-salaried physicians located in the FPC (both family practitioners), medical staff of the hospital, and several full-time faculty of the University Medical Center (UMC). Faculty located at the UMC admit some of their patients to this community hospital and provide teaching on inpatients as well as in the FPC.

For resident year 1978-79, financial records were reviewed for the FPC, including charges, revenues, and operational costs. Data were obtained from the hospital on the average annual

hospital charges for all family physicians admitting to the hospital during this time as well as specific data on charges for resident-admitted patients and for patients of the residency faculty. Also obtained were estimates of residency program impact upon hospital services from representatives of various hospital departments, including medical records, medical education, medical staff, housekeeping, and the medical library.

Results

The following costs and benefits for the community hospital were determined and are summarized in Table 1.

Direct Costs

Resident stipends: \$166,824. These funds were paid by the hospital to the residency program for 12 full-time equivalent resident stipends.

Faculty salaries paid by the hospital: \$30,000. These funds were equivalent to the time spent by hospital-salaried physicians in direct participation in residency teaching (1,200 hours valued at \$20 per hour, plus 25 percent benefits).

Overhead costs, FPC: \$129,067. During the study period, approximately 47 percent of the visits at the FPC were to residents. From the \$261,270 in total overhead expenses, the above figure was established by assuming that resident patient care was 10 percent more consumptive of overall overhead expenses than was patient care delivered by the full-time practicing physicians.⁶

Duplication and printing services: \$3,000. Only that portion of hospital printing costs that could be directly attributed to resident activities were considered.

House staff quarters: \$5,000. These expenditures were for house staff quarters (housekeeping, maintenance) used by the residents while on call.

Indirect Costs

Family practice center opportunity costs: \$1,000 to \$2,000. The underlying assumption be-

Table 1. Hospital Realized Direct and Indirect Costs and Benefits of Residency Activity (dollars)

Costs		Benefits	
Direct		Direct	
Stipends	166,824	Outpatient revenues	155,513
Faculty salaries*	30,000	Inpatient revenues (residents)	123,641
Overhead	129,067	Inpatient revenues (faculty)	189,891
Duplication and printing	3,000	Subtotal	469,045
Housing	5,000		
Subtotal	333,891		
Indirect		Indirect	
FPCOC**	1,000- 2,000	Resident services	25,000- 35,000
ICOC†	70,846-141,691	Resident affiliation	0- 88,235
Excess hospital costs	18,000- 54,000	Resident referral	25,000- 75,000
Subtotal	89,846-197,691	Subtotal	50,000-198,235
Total	423,737-531,582	Total	519,045-667,280
*Community hospital salaried physicians' time only			
**Family practice center opportunity costs			
†Inpatient care opportunity costs			

hind this figure is that the hospital might have realized a greater income if it had not devoted space to teaching residents. Thus, the "opportunity" to derive greater revenues given similar expenditures was missed and may be considered as a cost. In this particular center it was assumed that instead of devoting space to the residents, two additional full-time salaried physicians could have been housed in the complex who would have been capable of generating up to \$170,000 (gross) more than the center did with the residents. Assuming (conservatively) an overhead of 40 percent for the FPC and a cost for each additional physician of \$50,000 (salary plus benefits), the net opportunity cost becomes only \$2,000. Since the FPC is located in an area reasonably well saturated with primary care physicians, an estimated range was developed based upon the assumption that 50 percent to 100 percent of this potential could actually have been realized.

Inpatient care opportunity costs: \$70,846 to \$141,691. If the FPC were staffed by full-time hospital-salaried physicians, a potential for an increased amount of inpatient revenues also might have existed. The average yearly amount of inpatient charges generated for the hospital by all staff family physicians during this time period was \$140,726. This includes per diem charges, use of ancillary services, and so forth. Based upon this figure and the actual amount of charges generated, it was concluded that as much as \$225,983 more inpatient charges could have been made with two additional full-time physicians. Assuming a 95 percent collection rate, this yields a gross figure of \$214,684.

In order to make this analysis internally consistent, an important adjustment was needed. Earned inpatient dollars must be made comparable to earned outpatient dollars. To do this, a hospital fixed-to-variable cost ratio of 66 percent to 33 per-

cent was assumed; ie, for every dollar earned through inpatient charges, two thirds amortizes fixed costs and one third amortizes variable costs. Fixed costs represent such things as physical plant costs, heating, basic personnel, and essential support services. Variable costs represent extra services or personnel needed for each extra unit of service given. If fixed costs are completely amortized, then 66 percent of each earned dollar may be considered a profit. Variable costs, on the other hand, are never completely amortized, as that part of each increased dollar collected goes to provide new services. For purposes of this analysis, it was assumed that all of the salaries and benefits of physicians employed by the FPC were included in the fixed-cost base. Thus, 66 percent of each inpatient dollar earned may be compared with 50 percent of each outpatient dollar earned, the amount of profit remaining after adjusting outpatient dollars for overhead costs. This 66 percent fixed-cost factor was used, and it was again assumed that the likelihood of achieving this theoretical maximum was small. Thus, a 50 percent to 100 percent range was developed.

Excess hospital operation costs associated with the residency: \$18,000 to \$54,000. Various hospital departments experience an increased workload due to the presence of house staff. Departments affected include the medical records department, the medical library, and the medical staff office. The impact of this factor was established by using an estimate provided by the medical records department of this hospital. The director of the department estimated a 12 percent to 15 percent increase in overall operational expenses as a result of the residents' occasionally excessive dictation habits. This amount was assumed for other departments as well, and the amount of \$36,000 was derived. Since this is an extremely soft variable, its value was set as plus or minus 50 percent of this amount.

Intangible Costs

Risk cost. One intangible cost might be the risk cost associated with having residents rather than medical staff care for patients, thus, perhaps, raising the malpractice profile of the hospital.

Resident annoyance cost. Another intangible cost was the potential "annoyance factor" for

medical and nursing staff who deal with residents. Although there is no specific evidence to support this concern, it is conceivable that this results in certain physicians choosing to practice in other hospitals rather than have their patients involved in a teaching environment.

Direct Benefits

Revenues generated by the residents in the FPC: \$155,513. This amount represents the proportion of revenues of the FPC attributable to resident patient care.

Inpatient revenues generated by resident patients: \$123,641. During the time period reviewed, \$197,194 was charged to patients directly admitted from the residents' practices. As before, this includes per diem charges as well as support services. Assuming a 95 percent collection rate and, again, making these dollars comparable to earned outpatient dollars by using the 66 percent fixed-cost factor, the above value was derived.

Inpatient revenues generated by residency faculty: \$189,891. In this particular situation, certain faculty members who are on the hospital staff admitted their patients to this hospital because the residents were there. These are faculty of the University Medical Center, who, if the residency were located in another hospital, would admit their patients to the hospital with the residency. During the time period reviewed, these individuals admitted patients that were charged a total of \$302,857. Using the assumed collection rate and fixed-cost factor, the above net income to the hospital was derived.

Indirect Benefits

Resident services: \$25,000 to \$35,000. It is generally acknowledged that residents serving in certain hospital activities provide services that would otherwise have to be paid for through increases in hospital-salaried physicians' time. In this circumstance, this phenomenon was most evident in the emergency room. It was estimated that from \$25,000 to \$35,000 worth of physician time was provided in this area.

Attraction of residency graduates to affiliate with the hospital when they enter practice: \$0 to

\$88,235. Even though the assessment of this factor is very difficult, it is important. It was arbitrarily assumed that this affiliation probability was greater than zero and probably less than .25. Since three graduates of the residency had established their practices near this hospital and since the average annual charges generated for the hospital by family physicians in private practice during this period was \$140,726, the above range of revenues was calculated, again assuming a 95 percent collection rate and using the 66 percent fixed-cost factor.

Residency graduates' (nonlocal) referral to hospital resources: \$25,000 to \$75,000. This represents referrals to this particular hospital from graduates of the program settling in nearby communities and utilizing some of the hospital-based specialists with whom they became acquainted during training. It was felt that this was a very real consideration but also quite difficult to estimate. The figures above represent the closest guess.

Intangible Benefits

In-house physician coverage 24 hours per day. The on-call system for residents during this period provided for two to three house staff to be in the hospital each night. Thus, the capability existed to respond to emergencies (eg, cardiac arrest) and to be available to assist the regular nonphysician staff and help answer patient related questions.

Enhanced quality of patient care. Separate from the constant availability of physicians for emergency care, it is generally believed that quality of medical care is enhanced in hospitals with house staff. Greater attention to detail, input on medical care plans by more than one physician, and the attraction of superior private medical staff to teaching hospitals all help to provide for increased quality.

Educational activities and intellectual stimulus to the private medical staff. The family practice residency is responsible for providing a number of teaching conferences that many private medical staff attend, especially when their patients are discussed in case presentations. This stimulus, coupled with frequent informal interchanges with house staff, is considered a significant educational benefit by many private attendings.

Prestige and recognition as a hospital with an

educational mission. The need to educate future generations of physicians is clearly a societal one. Hospitals involved in this endeavor can receive recognition and satisfaction in responding to this need.

Physician assistance with hospital procedures. Many procedures performed in the hospital, such as circumcisions, vein cutdowns, difficult intravenous line placements, aspiration of body cavities, and so forth, are performed with the assistance of house staff. Often these procedures are not billed to the patient, and the possibility exists that this assistance increases the overall productivity of medical and surgical staff.

Overall Results

Using the above values, the following results were derived for the residency year studied:

Best case: A \$243,543 net benefit to the hospital

Worst case: A \$12,537 net cost to the hospital

Most reasonable estimate: A \$128,040 net benefit to the hospital

These values may then be placed in perspective with the identified intangible costs and intangible benefits. For example, it may be considered that the intangible benefits were achieved at a financial cost no greater than \$12,537, plus the intangible costs. On the other hand, the hospital may have realized a financial benefit of as much as \$243,543 while "spending" only the intangible costs. The most reasonable estimate is that the hospital realized the intangible benefits, plus a financial benefit in the neighborhood of \$128,040 by "spending" only the intangible costs.

Discussion

The limitations of this case study must be emphasized. In many areas precise information on true expenditures or receipts was unavailable. In these circumstances an attempt was made to be as accurate as possible in the estimation process and to develop reasonable ranges when indicated. Certainly, a prospective cost accounting procedure would be preferable in an attempt to more accurately define costs and benefits.

Also, certain sources of hospital expense or income from the residency program may have been neglected altogether. Further use of this technique, however, should yield further refinement in item definition, especially if it is applied in a prospective fashion.

The notion of an opportunity cost associated with certain hospital activities may be difficult for some to accept. The hospital experiences an opportunity cost if it chooses not to pursue a number of activities, including opening a fast food franchise! Opportunity costs need to be addressed, however, as they represent the cost of choices between different modes of operation of supported activities. Many hospitals are now in the process of choosing between continuation or expansion of educational support or investing their efforts in other potentially productive endeavors. The opportunities involved in noneducational activities are often initially very attractive. Opportunity cost assessment aids in the consideration of these alternatives.

The distinction and clarification between earned outpatient income and earned inpatient income are based upon an important but arbitrary assumption: That fixed and variable costs of this hospital's operation are split roughly 66 percent and 33 percent, respectively. This split certainly varies from hospital to hospital and probably within this hospital from year to year. Changes in the assumed fixed variable split do not, however, substantially change the results of this analysis.

Conclusion

When institutions combine forces to develop and maintain educational programs, policy decisions will always be made. These decisions will be based on a combination of factors, including institutional and programmatic philosophy, goals and objectives, local environmental circumstances, and political considerations. Economic decisions must also be made. These may be made in an environment of assumptions and idiosyncratic perceptions or they may be made in a more formal way, as suggested by the method outlined here.

This approach has proven useful in making

more explicit some of the financial relationships involved when a university family practice residency program combines efforts with a community hospital. In this particular circumstance, an earlier version of this study was presented to this community hospital's board of trustees to provide them with some perspective upon which to base decisions about continuing support of medical education. Although the trustees' commitment to medical education was clearly evident, that commitment had previously been based upon a sense of the intangible value of education to the community. The results of this study enabled the trustees to establish an estimate of the net cost (or benefit) of providing that intangible commodity. This information appeared to strengthen the resolve on the part of many of this hospital's trustees to continue the support of residency education in their institution. This method is one which may elsewhere allow the important issue of institutional philosophy, mission, and goals to emerge more clearly.

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