Special Article

Indirect Institutional Revenue Generated From an Academic Primary Care Clinical Network

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Background and Objectives: *As the financial performances of US academic health centers have faltered under managed care and the Balanced Budget Act of 1997, increasing attention has been paid to the costs and benefits of operating primary care networks. This study examines the indirect revenues to a university hospital and faculty group practice that result from such a primary care network using a method of abstracting billing data.* Methods: *A primary care patient cohort was identified by selecting all patients who generated at least one charge in any of the 10 primary care clinics in the network over a 15-month period. All charges from the hospital and the faculty practice group for this cohort were then examined during a 6-month period, and the total charges generated in the primary care setting were compared with charges generated elsewhere in the health system.* Results: *The primary care patient cohort included 56,459 patients and generated a total of $7,243,312 in charges for primary care services, $43,559,741 of charges in the hospital billing system for non-primary care services, and $8,825,611 of charges for services from specialty faculty. This cohort accounted for 18.5% of the gross charges for hospital care and 17.6% of charges generated by the specialty physicians.* Conclusions: *Using a simple and replicable methodology, this study estimates a substantial financial benefit to the hospital and specialty practices from a primary care network.*

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Many US health care institutions are experiencing difficult financial times. The past 10 years have witnessed a rapid decline in the rate of growth in health care spending even as the cost of operating hospitals and physician offices has continued to grow. Health insurers are under constant pressure to limit increases in the premiums they charge to employers and have transferred that pressure to physician groups and hospitals. In an effort to protect market share and improve efficiency, many hospitals and specialty physician groups have added primary care practices to become integrated health systems. In some cases, dozens of primary care practices and scores of physicians were added to these systems, with a substantial flow of capital to fund the enterprise. The idea behind these affiliations was to create a new type of organization to truly manage the cost and quality of care, but, in many cases, there was little institutional understanding of the financial realities of primary care practice. As the practice acquisitions took place, ancillary sources of revenue such as laboratory and radiology fees were removed from the primary care practices. Simultaneously, practice overhead costs increased dramatically as managed care coordinators and utilization managers were added, and expensive centralized systems were installed to manage such processes as patient registration and scheduling.

Nowhere have these trends been more evident than in academic health centers, where the added costs of medical education have become harder and harder to cover. Academic health centers seemed to be especially vulnerable to a market driven by integrated systems.[1-3] The typical academic health center of the 1990s had little primary care capacity to support a large tertiary care infrastructure. Thus, many such centers were particularly anxious to affiliate with or build primary care systems. An implicit financial assumption in doing so was that an initial investment of money in primary care would yield a self-sustaining new division of primary care in the newly integrated corporation.

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Things have generally not turned out as planned, however. The Balanced Budget Act of 1997 exacerbated the funding crisis in academic health centers, and many of these institutions are experiencing unsustainable financial losses.[4] At the same time, there is a growing sense that managed care delivered through vertically integrated health systems with primary care as gatekeepers is not likely to be a sustainable long-term answer to the problems of affordable health care.[5] Most institutions have found that an initial investment in primary care has become what appears to be an ongoing subsidy. Together, these new realities are causing a number of institutions to reexamine the strategies put in place in the early 1990s with regard to primary care. Entire consulting companies have been built for the purpose of advising health systems about how to stop the losses, and the economic viability of primary care practices is being scrutinized as never before.[6]

At Oregon Health Sciences University, the primary care clinical operation was expanded substantially from 1992–1997. During this period, seven off-campus clinical practices were added to our existing three on-campus clinics. Four of these clinics were started *de novo,* while three of the clinics were built on a foundation of one or two primary care providers. Five of these new clinics were in large buildings (approximately 15,000 square feet) and were designed to accommodate a substantial teaching load, while the remaining two were smaller community practices. Three of the clinics were established as family practice offices, one was exclusively pediatrics, and three were multidisciplinary and included general medicine, general pediatrics, obstetrics and gynecology, and, in one case, family practice. All of the clinics were involved in both resident and student teaching, and all of the providers were employed as faculty members in various primary care departments of the school of medicine. Between 1992 and 1999, the annual number of patient visits grew from approximately 57,000 to 188,000, and the annual gross charges grew from $4.5 million to $17.7 million per year. The payer mix by visit for the 10 clinics was 49% private insurance, 24% Medicaid, 18% Medicare, and 9% self-pay.

As the need to control costs grew, the institution became acutely interested in better understanding the net financial effect of its primary care network on the rest of the health system. While accurate information about the gross and net revenues of the clinics and about the direct costs of operating them was available, there was insufficient information about how the growing primary care system affected specialty clinics and the hospitals. Previous studies have reported on the indirect revenues to academic medical centers from primary care practices, but these studies used registration data from the primary care practices to identify the cohort for study.[7-10] In Oregon, the university's patient registration system could not accurately identify which patients were receiving care in the primary care system. Therefore, a methodology was developed using billing information alone to identify the primary care patient cohort and to estimate the financial effect of these patients on the university's health system.

Methods

The focus of this project was to determine the financial impact of the primary care system on the financial performance of the university's health system. To do this, a cohort of patients associated with the primary care clinics was identified, and total charges and net revenue from this patient cohort were measured. First, the primary care cohort included any patient who had at least one charge from any of the 10 primary care clinics between January 1, 1998, and March 31, 1999. A computer file was created in which these patients were identified by their unique medical record numbers. Next, a database of all charges generated by this patient cohort between October 1, 1998, and March 31, 1999, (a 6-month period) was extracted from the hospital billing system and from the billing system of the faculty practice group.

From these databases, all charges were sorted into two groups: those that were generated in any of the primary care clinics and those generated elsewhere in the health system. The non-primary care charges in the hospital's billing system included charges for inpatient care, emergency care, hospital charges generated in any of the specialty clinics, hospital laboratory or radiology department charges, and pharmacy charges at the hospital pharmacy. The non-primary care charges in the faculty practice group billing system included charges for specialty physician services. It was not possible to analyze any charges generated at laboratories, pharmacies, physician offices, or hospitals outside of the university's system. An estimated collection rate was calculated on these charges. Finally, the charges generated by the primary care cohort were compared with the total charges generated by all patients in the health system.

Results

A total of 56,459 patients had at least one charge generated in any of the 10 primary care practices between January 1, 1998, and March 31, 1999. This group of patients was identified as the primary care cohort.

During the 6-month study period (October 1, 1998–March 31, 1999), there was $239,429,497 in total hospital charges and $53,960,047 of total charges from the faculty practice group for all patients in the health system. Of these totals, $3,496,502 (1.5%) of hospital charges and $3,746,810 (6.9%) of practice group charges were generated in the primary care clinics. The hospital's billing system is used for primary care

delivered by residents, for office-based laboratory and X ray, and for faculty professional services in two of the primary care clinics. The practice group's billing system is used for the remainder of the primary care faculty professional services. Thus, by subtracting the primary care charges in each of the two billing systems, it was possible to determine charges for services rendered by the faculty practice group.The hospital billing system included $235,932,995 of charges for non-primary care services, and the faculty practice group posted $50,213,237 of charges for specialty physician services.

Table 1 lists the charges attributed to the primary care patient cohort during the same time period. The primary care patient cohort accounted for approximately 18.5% of the total charges for hospital care. Traditionally, about 44% of University Hospital's charges are for patients who live in metropolitan Portland. Thus, the metro area non-primary care charges totaled approximately $104 million, of which nearly 42% were from the primary care cohort. The specialty physician charges attributable to the primary care patient cohort were approximately 17.6% of the total charges for such care.

During the period of time examined by this analysis, the hospital's collection rate for all patients was approximately 64% of charges. The collection rate for charges from the primary care cohort was 61% during the same period.

Discussion

Several previous studies have examined the indirect revenue or "multiplier effect" from primary care practices.[7-10] This term was first used in a 1989 paper describing institutional revenues generated from a family practice clinic at the University of Washington.[7] In that report of the multiplier effect, Schneeweiss et al reported $6.40 of billed charges in the entire health system for every $1 of charges in a family practice clinic cohort.[7] This study was done in the 1980s and included both specialty clinic and hospital charges. Other studies have examined the charges and revenue generated by referrals and hospitalizations from primary care practices, such as the study by Glenn et al that estimated that each primary care referral generated a conservative average of at least $3,000 of revenue to the health system in 1987.[8] Regardless of the methodology, these studies have generally found that teaching hospitals generate $6–$15 of so-called indirect revenue (revenue not generated in the primary care clinic itself) for every $1 of direct primary care revenue. In one such study, $10.32 of hospital revenue and $4.71 of specialty physician revenue was generated for every $1 of revenue in the primary care system.[10] Only about 13.5%[7] to 17%[8] of total charges were for primary care, while approximately 60% of the charges were for hospital care.

In the present study, our hospital generated approximately $6 of indirect charges for every dollar of direct charges in primary care. When specialty physician charges are considered as well as hospital charges, our health system produced $7.23 of charges for every $1 of charges in primary care. This is consistent with the previous reports, even though we used somewhat different methodology and even though specialty referrals to non-university physicians and hospital charges in other hospitals were not analyzed. During the study period, at least 10% of the specialty referrals and hospital admissions from our primary care system were sent into the community and thus were not captured by either billing system. This may explain the lower downstream revenue generated for specialists. Other reasons for this difference may be differences in the scope of primary care practice, an aggressive managed care market, or differences in cost structure, compared with systems involved in previous studies.

Woodcock reported approximately $1–$2.2 million of hospital revenue per primary care physician per year.[10] Our primary care system included approximately 30 full-time-equivalent (FTE) primary care physicians during this period. Thus, these data suggest hospital indirect (multiplier effect) revenue of approximately $1.45 million per primary care physician FTE per year, well within this range. Finally, many health systems have expressed concern about the payer mix of patients in primary care, where a disproportionate number of Medicaid and uninsured patients are seen. In our system, there was in fact a lower collection rate for hospital charges from the primary care cohort, but the difference was small given the mission relevance of teaching and service in these clinics. Overall, these data

Table 1

Health System Charges for the Primary Care Cohort (56,459 Patients)
October 1, 1998–March 31, 1999

Hospital Charges in the Primary Care Clinics	*Faculty Practice Charges in the Primary Care Clinics*	*Hospital Charges in Non-primary Care Settings*	*Faculty Practice Group Charges in Non-primary Care Settings*	*Total Charges for Health System for the Primary Care Patient Cohort*
$3,496,502	$3,746,810	$43,559,741	$8,825,611	$59,628,663

compare favorably to those previously reported in other health systems.

Limitations

This study was done using a similar methodology to that described by Schneeweiss et al[7] and Woodcock.[10] This method is easier to use than measuring the charges from each referral and hospitalization. Our analysis, however, identified the primary care cohort using billing data rather than a practice registration system. Thus, our analysis could be replicated even in institutions that lack the information system to identify the primary care population prospectively. There are, however, several limitations inherent in using these methods. This method does not measure primary care referrals. Some of the hospital and emergency department charges could have been generated before an individual patient ever visited the primary care clinic. In fact, some of the patients in the primary care cohort could have been referred to the clinic for follow-up after hospitalization. Another specific limitation to this study was that it was done over a 6-month period of time during the fall and winter quarters. It is possible that the demonstrated effect may be different than an analysis that examines an entire year due to seasonal variations. This study also did not examine specialty physician or hospital charges outside of the university system. Thus, these data probably underestimate the total economic effect of the primary care practices on the health system as a whole.

Conclusions

This study demonstrates that patients from the primary care system account for 18.5% of total charges for hospital care and 17.6% of the specialty physician business. Further, the difference in collection rates for primary care and non-primary care patient populations was small. The method of analysis used in this study was simply and quickly done using existing billing data from a university hospital and a faculty practice group. The results of this study are compatible with other studies that have used more laborious methods.

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References

1. Topping S, Hyde J, Barker J, Woodrell FD. Academic health centers in turbulent times: strategies for survival. Health Care Manage Rev 1999; 24(2):7-18.
2. Blumenthal D, Weissman JS, Griner PF. Academic health centers on the front lines: survival strategies in highly competitive markets. Acad Med 1999;74(9):1038-49.
3. Mechanic R, Coleman K, Dobson A. Teaching hospital costs: implications for academic missions in a competitive market. JAMA 1998; 280(11):1015-9.
4. Iglehart JK. Support for academic medical centers: revisiting the 1997 Balanced Budget Act. N Engl J Med 1999;341(4):299-304.
5. Bodenheimer T, Lo B, Casalino L. Primary care physicians should be coordinators, not gatekeepers. JAMA 1999;281(21):2045-9.
6. Beckham JD. Cleaning up the red ink in primary care. Healthcare Forum Journal 1998;July/August:58-62.
7. Schneeweiss R, Ellsbury K, Hart LG, Geyman JP. The economic impact and multiplier effect of a family practice clinic on an academic medical center. JAMA 1989;262:370-5.
8. Glenn JK, Lawler FH, Hoerl MS. Physician referrals in a competitive environment: an estimate of the economic impact of a referral. JAMA 1987;258(14):1920-3.
9. Kues JR, Sacks JG, Davis LJ, Smith R. The value of a new family practice center patient to the academic medical center. J Fam Pract 1991; 32(6):571-5.
10. Woodcock E. Primary care in the academic setting: understanding the differences between private sector and quantifying the multiplier effect to the institution. Tampa, Fla: American College of Physician Executives, 1995.