

# Physician Impact on the Total Cost of Care

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## Background and Objectives

Physicians' efforts at cost containment focus on decreased resource utilization and reduced length of stay. Although these efforts appear to be appropriate, little data exist to gauge their success. As such, the goal of this study is to determine trauma service cost allocations and how this information can help physicians to contain costs.

## Materials and Methods

The authors analyzed the costs for 696 trauma admissions at a level I trauma center for fiscal year 1997. Data were obtained from the hospital costing system. Costs analyzed were variable direct, fixed direct, and Indirect costs. Together, the fixed and indirect costs are referred to as "hospital overhead." Total Cost equals variable direct plus fixed direct plus indirect costs.

## Results

The mean variable, fixed, and indirect costs per patient were \$7,998, \$3,534, and \$11,086, respectively. Mean total cost per patient was \$22,618.

## Conclusion

The 35% variable direct cost represents the percentage of total cost that is typically under the immediate influence of physicians, in contrast to the 65% of total cost over which physicians have little control. Physicians must gain a better understanding of cost drivers and must participate in the operations and allocations of institutional fixed direct and indirect costs if the overall cost of care is to be reduced.

Cost containment, cost reduction, and diminished resource utilization have become the buzzwords of current surgical practice. Physicians are bombarded with new protocols, critical pathways, and process changes that purportedly lead to cost savings and are repeatedly told that reducing resource consumption contributes significantly to the financial success of the health system. Toward that end, physicians continue to expand their current hospital roles beyond simply rationing care to more fundamental redesigns of the way they provide care. For example, they have shifted care from inpatient to outpatient settings, implemented more advanced home health interventions, and applied emerging technologies. They have thereby reduced variable costs, at the same time creating a different allocation of institutional fixed and indirect costs.

However, few data have been available to evaluate these efforts, which are predicated on the belief that the total cost

of care is highly sensitive to the level of patient activity. Unless variable costs make up the vast majority of total costs, physician efforts to achieve major cost reductions by simply decreasing resource utilization may not yield major reductions in cost per patient.

The purpose of this study is to determine the actual distribution of the cost allocations on the trauma service and how these allocations can aid in directing the efficacy of physician efforts in cost containment.

## MATERIALS AND METHODS

We analyzed the associated costs for all 696 patients discharged from our university-based level I trauma service for fiscal year 1997. Data were obtained from the hospital finance department using the hospital's costing system, TSI (Eclypsis Inc., Newton, MA). These data include patient age, length of stay, variable direct cost, fixed direct cost, indirect cost, expected payment, diagnostic related group (DRG), and financial class. Allocation of costs to the trauma service are based on applying various cost accounting standards and statistics to data from the general ledger, billing,

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and payroll systems. This work is based on a collaborative effort between the finance department and the clinical departments.

Costs were categorized as variable direct, fixed direct, and indirect costs. The total cost of a patient care encounter is defined as variable direct plus fixed direct plus indirect cost. Hospital overhead is defined as the sum of fixed and indirect costs. Variable direct costs are those that vary with patient activity, such as laboratory tests, medications, surgical supplies, and nursing expenses. Fixed direct costs can be identified with the trauma service but do not vary with patient activity (i.e., trauma nurse coordinator, data registrar, and trauma surgeon's administrative salary). Examples of a fixed direct expense are the salaries of some office and administrative staff, such as the head nurse. Equipment and maintenance-related expenses can be allocated as a fixed cost. In addition, facilities, building lease expense, utilities, and off-site leasehold expense can be appointed to a fixed cost.

Indirect costs are hospital costs that cannot be identified either with a particular patient or a particular unit of the hospital. Indirect costs are those incurred by nonrevenue-producing areas of the hospital that must be allocated over all clinical revenue-producing departments. Examples of indirect expenses that are allocated over the various departments are hospital financial services, information technology, and plant operations maintenance expense. How these services are charged back to the various departments varies based on the service provided. For example, general hospital-based information technology expense can be allocated back to all departments based on the number of users supported. However, department-specific information technology expenses such as image storage and retrieval systems in radiology are allocated back to the individual radiology sections based on the volume of procedures performed. Allocations can also be system-specific rather than department-specific. For example, specific acuity-based nurse staffing models would be allocated to specifically identifiable nursing units. Also, systems such as the clinical scheduling system would be allocated to clinics but not to nursing units.

## RESULTS

The mean age of the population was 42 years. The average length of stay was 7.5 days. The mean total cost per patient was \$22,618 (median \$9,745). The variable, fixed, and indirect components of the total service cost allocation are depicted in Table 1.

The largest component of costs lay within the indirect component (i.e., hospital overhead). The trauma service incurred \$7,715,553 of indirect costs, accounting for 49% of total costs. The algorithm by which the accounting system tallies these indirect costs and assigns them to individual patients is both complicated and necessarily arbitrary (because there is no strong economic rationale for allocating

**Table 1. COST ALLOCATIONS ON THE TRAUMA SERVICE**

|                             | Variable    | Fixed       | Indirect    | Total        |
|-----------------------------|-------------|-------------|-------------|--------------|
| Total for service           | \$5,566,852 | \$2,459,453 | \$7,715,553 | \$15,741,862 |
| Mean per patient            | \$7,998     | \$3,534     | \$11,086    | \$22,618     |
| Median per patient          | \$3,328     | \$1,689     | \$4,728     | \$9,745      |
| Contribution to total costs | 35.4%       | 15.6%       | 49%         | 100%         |

overhead in one manner versus another). Moreover, the physician has no reliable rule of thumb to estimate these costs. In our institution, indirect costs are highly correlated with variable direct costs (correlation coefficient = 0.995), implying that the cost accounting system allocates relatively more hospital overhead to patients who use the most variable direct resources. A simple regression reveals that indirect costs = \$595.96 + 1.31 \* variable direct costs (adjusted *r*-squared = 0.99; *P* values < .001, *t* statistic). This suggests that as a simple rule of thumb, the physician can estimate that each patient is charged with \$600 of unit overhead plus \$1.31 of hospital overhead for each dollar of variable costs incurred. However, such estimates are not always accurate: in 226 of our 696 patients, the estimates deviated from the actual indirect costs by more than 20%.

## DISCUSSION

Knowledge regarding the cost structure of a service process is essential to survive in today's competitive markets. Increasingly, physician managers are being asked to develop process improvements that result in both diminished resource utilization and improved outcomes. These changes are being administratively driven as a result of increasing costs, narrowing margins in facility reimbursement, and professional fees. While physicians direct their efforts toward cost-containment or cost-reduction activities, the lack of economically meaningful data makes it difficult for physicians to focus their efforts on the highest-yielding projects. These projects include quicker discharges, reductions in service overhead, improvements in capacity utilization, fewer and less expensive diagnostic tests, and better scheduling of patient care. Moreover, by leading process change, physicians can influence both the clinical and the business aspects of patient care. Unfortunately, there is also little integration of the limited clinical and financial/administrative data available, so physicians work and make decisions in an information vacuum. Their decisions frequently give rise to unintended financial and clinical consequences.

Further, most hospitals tap nonphysician administrators to plan many of their operational and strategic decisions. Individual physicians have little control over the fixed and

(especially) indirect costs, which can represent two thirds or more of the cost of a trauma service. Moreover, primitive costing mechanisms preclude any meaningful analysis of the economic impact of these administrators' decisions.

The literature reports many strategies designed to reduce costs without compromising the quality of patient care.<sup>1-6</sup> However, the true financial impact of these strategies remains largely unknown. Our group has previously reported a 25% reduction in variable direct cost per patient,<sup>7</sup> but the exact impact of our interventions on total costs and the hospital's bottom line has yet to be ascertained. Our analysis revealed that variable direct costs account for approximately 35% of total patient care costs. Conversely, approximately 65% of costs are trauma service overhead (i.e., fixed direct costs) or hospital overhead (indirect costs). Recently, the group from Cook County Hospital reported that hospital overhead accounted for 84% of their total costs.<sup>8</sup> These expenses are beyond individual physicians' immediate control. If physicians are to be held accountable for the total cost of care, they must have more input into strategic decision making. Accounting structures should then flow from that design.

Inside corporate America, it is well understood that knowledge about one's cost structure and overhead allocations is critical if managers are to make informed decisions regarding pricing, product mix, and long-term strategic planning. Although health care management requires a mastery of complex interactions, it is not a unique industry in this regard. An industry that is organized differently but exhibits a similar underlying cost structure is the airline industry. Trauma care is a hospital-based service, one with high fixed costs and low variable (marginal) costs. The airline industry is much the same. There are similarly large capital investments and significant expenditures on labor (including management, back office operations, ticket takers, gate attendants, pilots, flight attendants, and mechanics). However, the cost of filling an empty seat just before departure is negligible, especially because at that point the labor and capital investments are all fixed and "sunk." The only variable (marginal) cost stems from one extra meal, ticket, and baggage. Similarly, once a hospital has invested in all of its infrastructure and committed to its salaried personnel, the expense associated with admitting one more patient or retaining any given patient for one more day is quite modest. The end result is that hospitals, like airlines, survive on efficient capacity utilization. It is this cost structure of high fixed cost and low marginal costs that explains why hospitals are feverishly contracting to fill their beds (to eliminate unused capacity).

To make this concrete, consider the following hypothetical situation that uses representative numbers from the trauma service budget. Begin by holding trauma service overhead stable at \$7.7 million for indirect costs and \$2.5 million for fixed direct costs, and suppose the service undertakes no new measures to reduce variable direct costs (so that the mean variable direct cost per patient remains

\$7,998). Suppose instead that the service recruits 10% more patients, creating a more efficient utilization of existing capacity. With \$10.2 million in overhead costs allocated across 766 patients rather than 696 (we have reported from our service), the mean cost per patient drops by \$1,336. To put this in perspective, the service would have to cut variable direct costs by 17% to produce the same savings without an increase in the patient base. Simply put, a modest increase in patient population (cared for without increasing the physical plant) can have an impact of the same order of magnitude as the most successful assault on variable direct costs.

However, despite this lower incremental cost to care for patients once the system is up and running, patients typically receive charges reflective of the average cost of care for all patients. Unlike the airline that fills seats by offering discounts to certain flyers and charges full rates to those who demand the most complete and timely service (first class, last-minute travelers), hospitals' charges routinely ignore capacity utilization concerns. Currently, hospitals do negotiate contracts that provide certain carriers with discounts. However, these contracts are designed to enhance entry into the health system by giving discounts to all patients within a plan. Unfortunately, this type of contracting does little to enhance capacity utilization.

Cost accounting mechanisms vary substantially between institutions. Our university hospital uses an activity-based accounting system. This type of cost accounting differs from traditional accounting systems in that it recognizes that products or services consume different resources and are based on multiple activities. Our hospital cost allocation determination is essentially a descriptive delineation of the accounting system that is unique to our institution, but it raises serious questions regarding the efficacy of physician-directed intervention on reducing total patient cost. Although well meaning, physician-led cost-containment efforts attempting to reduce only variable costs will not deliver the intended impact on total cost reduction. Understanding the cost structure of one's individual health system is an economic imperative that cannot be overlooked, because cost shifting and cost allocations into the indirect cost accounting pool can dramatically alter a department's bottom line. More simply stated, shifting costs from a department's variable and fixed direct allocations to an indirect allocation (which is dispersed over the entire health system rather than the individual department) can improve that department's bottom line. In addition, although other hospital-based trauma services may rely on different cost accounting systems, we strongly suspect that physicians elsewhere face similarly daunting obstacles to understanding and controlling their indirect costs. Adding yet another layer of complexity to the total cost issue is the fact that each institution, be it a university level I or a community-based hospital, is likely to have its own idiosyncrasies, thereby rendering specific cost comparisons difficult.

In short, few physicians can influence hospital overhead. Worse, most physicians lack a quick and reliable means to assess how their hospital accounting systems allocate specific costs to individual patients. To be successful, physicians must be given ready access to enhanced information systems, increased education, and more sophisticated economic data to make optimal decisions regarding appropriate practice modifications. Along with enhanced information, the physician of tomorrow will require the colocation of this information and appropriate decision rights.

Understanding all the subtleties and nuances of a hospital's complex accounting system is likely not worth the investment of time it would take to master it. However, a basic understanding of the cost structure and cost allocations is imperative for long-term physician survival. This understanding can be enhanced by working more closely with the hospital finance department and operations officers. Although they are seemingly odd bed-fellows for surgeons, these administrative personnel are part of the ever-evolving multidisciplinary trauma team. Incorporation of these services is essential if physicians

are committed to leading health care change into the new millennium.

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