CHAPTER 4 INTRODUCTION TO COSTING

LEARNING OBJECTIVES

After studying this chapter, students should be able to:

1. Explain how verb-adjective-noun triplets can define activities that can be aggregated to describe the work of an organization.
2. Explain the three basic schemes for paying for health care services and their relation to defining a health care organization's products.
3. Describe fundamental processes for tracing and allocating resources to activities.
4. Explain appropriate uses of historical cost data in estimating costs for planning purposes.
5. Recognize some ways that inaccuracies can occur from overly simplistic models.
6. Define the primary product of the health care industry, and define and explain the role of intermediate products.
7. Explain the relationship of the capacity issue to the fixed-cost problem.

INTRODUCTION

Health care managers are commonly interested in the costs related to six categories about which decisions must be made:

(1) products
(2) programs or product lines
(3) organization centers (e.g., departments)
(4) specific payers
(5) individual clinicians who order activities and resources
(6) patients and patient populations

We will first focus on costing individual products, and later expand the discussion to the more aggregated cost objects.

Product Costs for Management Decisions

Managers do not manage the past. Instead, they study the past to understand the processes involved in their organization's reaching its objectives and the factors that affect those processes. Managers make decisions about what their organization should produce, the processes (technology) that it will use, the combinations of resources that will be employed in the production, and how the output will be sold and distributed. The cost of providing outputs to its customers is basic to these decisions. The cost of providing an output must be less than the amount people are willing to pay for it, or in most cases, the output cannot be sold without a loss. The cost must also be near the cost at which it can be furnished by competitors, or the organization will be underpriced by competitors and probably lose its customers.

Payment Mechanisms

The first questions about cost that a care provider must ask itself are "What do we produce," or, "what are our products?" The fiscally relevant answer is that an organization's products are those things for which it is paid. A problem is that many care-delivery organizations operate concurrently under at least three fundamentally different types of payment systems, which cause them to have three fundamentally different products. Any other outputs of the organization are public relations or marketing items, but should not be considered products. The three different types of payment systems, or payment mechanisms, include fee for service, prospective payment, and capitation.

Fee for Service

Under this type of payment, the provider is paid separately for each item of service it delivers in the care of a patient. The amount is determined by the cost of the resources used to produce the services. These include items such as drugs, diagnostic tests, surgical procedures, therapy sessions, bed days, and so forth. They are referred to as *billable line items* because each appears on a separate line on the patient's claim form or bill. As discussed earlier, fee for service is the traditional method of paying for health care.

Prospective Payment

Under this system, prices for specific outputs are set ahead of the time care is delivered. The set price is the payment regardless of the amount of resources used to produce the output. When prices are those in a contractually agreed-upon list

of fees for services, paying by fee for service takes on a prospective aspect. However, today the term is used for systems that pay a predetermined amount for care of patients in predetermined case categories. The amount of the fee is set ahead of time for each of an array of diagnoses, patient conditions, and/or procedures. Examples of prospective payment groupings include diagnosis related groups (DRGs) for hospital inpatients, ambulatory payment classifications (APCs) for hospital outpatients, and fee schedules such as physician fee schedules. The price received for treating a specific patient depends on the category in which the patient's diagnosis, condition, and/or procedure is classified. In the case of DRGs, the payment is generally not directly related to the specific line items used in the patient's treatment. Payers usually compute the price for cases in a specific category based on averages of the historic cost of such cases.

A similar approach is to pay a specified rate per day of inpatient treatment (per diem) for patients in broader categories. These categories are usually determined by the ward or unit in which the care is given, because different wards or units have different fixed cost and intensities of individual patient care. An example is the difference between average daily costs of care in an intensive care unit, as opposed to a general medical/surgical ward.

Capitation

In a capitated system, the care provider is paid a flat fee to provide a client whatever services are necessary (as prescribed in a contract with the payer) over a defined period of time. Anyone who has bought health insurance has paid for health care in a capitated fashion; only rather recently have care deliverers received payment under a capitated system. Care providers make capitated payment arrangements with payers, such as insurance companies and managed care organizations (MCOs), who contract for the provision of care for large groups of potential patients. For reasons discussed throughout this book, costing to support capitated payments is still rather poorly specified. It pays inadequate attention to interactions among fixed-cost utilization, convenience of access, and efficiency. The payments themselves frequently appear to be the result of the negotiating power differential between the provider and the payer more than the outcome of appropriate and rigorous cost-of-service and benefit-of-service analysis. Capitated payment arrangements put the care deliverer in the position of insuring the capitated population it serves. Care providers usually lack the skills required to manage the insurance functions. Because of financial problems resulting from this weakness, providers are abandoning capitated payment systems. For instance, assume a large multidisciplinary group practice with its own clinics and hospital formed an HMO that contracted primarily with firms in white-collar industries. If that HMO did not adjust its per-member rate when it entered a capitated arrangement with a shipyard, payment for the care

demanded would probably be too low and would cause serious financial problems.

Identifying Appropriate Cost

At this point, it is helpful to consider what must be known in order to measure the cost of these three types of products.

Fee-for-Service

For a fee-for-service line item, the cost would be the sum of the direct costs and variable overhead, along with a share of the fixed overhead costs incurred by the activities necessary to produce the service. Because each line item is a salable product, costing under a fee-for-service system involves no more than determining the cost of each service.

Prospective Payment

The cost of the discharge of an inpatient paid under a prospective-payment system would be the sum of the costs of all the line items used in the patient's care. Though this is obvious, a related management problem is not. That problem is negotiating the prospectively set price for a category of patients, as opposed to retrospectively summing the prices of the line items used in the care of a specific patient. To negotiate a prospective price, the manager should know ahead of time the types and quantities of line items that will be needed for each category of patient that might require treatment. The manager must also know how much the activities necessary to produce each of these items will cost. Under a DRG-type system, the provider will be paid the same amount for every inpatient discharged in a particular category. This approach assumes that there will be many discharges in each category. The manager can, therefore, concentrate on the average cost within each category. If the average set of items needed for such patients is known, the average cost could be estimated. The average set of inputs is defined by the protocol of care for each category of patient. This is why much research is currently being done to discover normal, or standard, care protocols for a nearly exhaustive set of patient categories.

Capitation

For capitated contracts, as with prospective payment, care providers should know the cost of the line items they must produce and the usual set of line items that each category of patient will need. However, they also need to know how many of which categories of patients will demand care from among the populations of

people they have capitated. This information comes from sophisticated statistical applications, collectively referred to as *acturial science*. The lack of this expertise within care-delivery organizations is the reason for the decline in capitated systems just mentioned.

Summary: Increasing Financial Risk

In this book, the focus is on attempting to understand the cost of the activities needed to treat clients in these three generally used approaches to payment. It should be noted that as one goes from fee for service through prospective payment to capitated-payment systems, more of the uncertainty about the types and quantities of resources to meet the demands of the contracts falls on the provider. Under fee for service, the provider need only control the cost of the individual services it provides. It will be paid a negotiated amount for each of these. Under prospective payment, it must also control the quantity and kind of intermediate products it provides for its patients, because it will receive the same payment regardless of the array of services provided. However, the provider will be paid for each episode of care it furnishes. Under a capitated contract, the provider is also responsible for cost variations caused by the number of people in its capitated groups that present themselves for care. This means that the provider is not paid for each episode of care it provides. Instead, a set amount per period of time for each individual is paid to the provider by the company with whom it contracts to provide care. Each of these changes creates more financial risk associated with variation in physicians' ordering practices, severity of illness of patients, and the quantity and mix of patients seeking care under the payment contract. To control costs, the care provider must measure, understand, and project estimates of these variables.

DISCUSSION QUESTIONS

1. Explain the rationale behind the statement that health care delivery organizations have three different categories of products.
2. Explain why care providers have different levels of risk depending on the category of the product they have contracted to deliver.

Final Versus Intermediate Products

Earlier, we contended that the basic product of health care is wellness. If this is so, then the health interventions provided by health care providers are not outputs; they are health care inputs. It is not appropriate to refer to a bed day of hospital care as an output of the hospital. No sane person goes to a hospi-

tal to enjoy a day's experience in a hospital bed. The appropriate measure of health care output is the wellness of those served relative to their wellness had they not received the care given. The health care industry and policy makers are facing this truth, but results-oriented output measures are extremely difficult to create. Progress in that direction is occurring, but more slowly than managers would like.

Within health care organizations, goods and services are produced as inputs to produce wellness. Though a particular test is an input to a specific patient's care, it is an output of the laboratory. One can speak of these outputs as *intermediate products*, remembering that the final product, wellness, is the output sought by the customer. These intermediate products are the sort of things that have traditionally been billable line items. The actions that must be taken to produce the intermediate products will be called *intermediate activities*. They are the basic building blocks for estimating the cost of meeting the demands of any payment system or the product for which it pays. Estimating the cost of intermediate products is the starting point for more sophisticated costing by care providers.

The Capacity Issue

As discussed earlier, the full cost of a product is composed of two types of cost. The first type, *direct costs*, consists of those that can be directly traced in measured amounts to the product. The other type is *indirect costs*, often called *overhead costs*. Indirect costs are those that must be incurred by the care deliverer, but the amount used in the production of a specific unit of output cannot be directly observed. Such items as utilities, production administration, heating, building depreciation, and equipment rental are examples of costs that are indirect to a unit of a product.

Indirect costs also have two components: variable and fixed. Here we speak of variability with relation to the level of activity in the entity suffering the cost. Cost behavior analysis is used to separate mixed costs into their fixed and variable components. To reiterate, the fixed part of indirect costs is extremely troublesome in determining the cost of a single item. The trouble with fixed costs is that the cost per item depends on how many items were produced during the accounting period. In hospitals, this is so closely related to hospital utilization that it is called the *excess capacity issue*.

An extreme example will illustrate the importance of the excess-capacity problem at the total organization level. Suppose a small clinic has $50,000 of salary, building rental, equipment rental, and miscellaneous contract costs per month. These are all fixed costs because they must be paid whether the clinic sees 30 or 500 patients in a month. If the clinic sees 30 patients, the $50,000 must be assigned to those patients. This creates a fixed cost component of $1,667 per case. If 500 cases are seen, this component drops to $100 per case, or $50,000 ÷ 5000. At 1,000 cases, it drops to $50 per case. Note that if the caseload dropped from a

normal volume of, say, 800 cases per month to 200 cases, a nurse may be able to double as the receptionist and cut the monthly fixed costs by the salary of the receptionist. If the caseload was expected to remain low for some time, this would be a rational move. However, fixed costs such as building and equipment rental can usually not be reduced so easily.

Once a fixed cost structure is established by purchases or contracts for fixed cost items, it is usually expensive or impossible to change it quickly. This means that lowest cost per case, or per intermediate product, can only exist when the delivery organization is operating near the capacity for which it was designed. Excess capacity is expensive, especially because estimates show that approximately 80 percent of hospital costs are fixed costs.

Departments and Activities

Identifying and costing the activities leading to the discharge of an inpatient in a specific DRG, at first, seems to be an unacceptably complicated, time consuming, and expensive process. It is always wise to ask if the management information derived from an analysis is worth the cost of the analysis. The ease with which comprehensive activity analysis can be done depends on the degree to which it can be distributed across the organization and how many separate activities are costed. Because specific activities happen in specific departments within an organization, they can be analyzed independently of other departments. A corollary of this observation is that though activities flow in some sequence into any cost objective, each activity can be analyzed separately, and the activities necessary for any specific cost objective can be analyzed concurrently. The people involved in it can analyze each. To analyze activities across an organization, it does, however, need support personnel to:

- Train department personnel on activity analysis and cost measurement.
- Coordinate cross-departmental flows of information and resources.
- Integrate department-cost information into organization-level information.
- Report the resulting information for use by managerial decision makers.

These activities are the domain of management accountants working with information system personnel.

DISCUSSION QUESTIONS

1. Why do we say that most outputs of health care delivery organizations are intermediate, as opposed to final, products? Which product category is closest to being a final product—a billable line item, prospectively paid units of care, or capitated care? Why?
2. What circumstance of production makes capacity management critical to intermediate product cost? Why?

3. If we recognize that activities cause costs to be incurred, why must we analyze departments in order to estimate product costs?

Identifying Activities

We can begin by examining what must be done to determine the cost of producing a specific product by analyzing the cost of visits in a primary-care clinic. Cost refers to the amount that must be spent in order to produce, sell, and distribute the product. This amount is set by what has to be done to complete these three basic activities, what resources must be used, and what those resources cost. Activities can be identified in a verb-adjective-noun triplet, such as "perform a general physical." Resources flow into activities, and activities create products and their associated revenues. More pragmatically, resources are used in activities, and in turn, the outputs from these activities, along with more resources, are used in subsequent activities that eventually lead to providing a billable health care product.

Example: A Primary-Care Clinic

A physician owning a small primary-care clinic wanted to know whether each of the clinic's four categories of office visits was profitable. He was deciding whether some types of visits should be eliminated because they were unprofitable.Therefore, he needed to know the cost of visits in each category, as opposed to an average cost of all patient visits. The visit categories are defined in the notes accompanying Table 4-1. Each category demanded a standard set of activities, and its price was set by third-party payers. The managing physician began isolating the processes (activities) involved in patient visits. It is useful to chart activities according to who is taking the actions and their chronological sequence. Figure 4-1 is an example of such a chart. The persons or groups accomplishing the activities are listed across the top and the sequential steps are shown down the page. The average time taken for each activity was estimated from experience and is shown on the flow arrows leaving the activity ovals. Costing each category of visit was done using the following steps:

1. Separating fixed from variable costs. The physician-manager understood that fixed and variable cost behave differently from period to period, both in their total and in their effect on the cost of a single visit. He approached cost-behavior analysis rather simplistically by summing the total cost for a year of all the types of cost he believed were variable. He included salaries, supplies, and postage as variable costs. He determined their total cost from the general ledger. He then subtracted the total variable cost for the year from the grand total of costs and considered the difference to be the fixed costs for the year.

Table 4-1 **Cost of Visits by Category with Additional Services**

Visit Category*	Examination ($)	X-Ray ($)	Lab ($)	Consult. Order ($)	Report Process ($)	Pap Smear ($)	Medical Assistant ($)	Total ($)
99212	37.61							37.61
99213	37.61							37.61
99213	37.61			11.04	8.50			57.15
99213	37.61		8.50					46.11
99213	37.61	8.50	8.50					54.61
99213	37.61	8.50	8.50	11.04	8.50			74.15
99213	37.61	8.50	8.50	23.13	8.50			86.24
99214	80.69	Incl.	Incl.					80.69
99214	80.69	Incl.	Incl.	10.85	8.50	Incl.		100.04
99215	109.67							109.67
99215	109.67			11.04	8.50			129.21
99215	109.67			23.13	8.50			141.30
99215	109.67			11.04	8.50	8.50	1.20	137.71
99215	109.67			23.13	8.50	8.50	1.20	149.80

*Notes: 99212 - Self-limited or minor visit with problem-focused history, problem-focused examination, and straightforward medical decision making

99213 - Low-to-moderate severity visit with expanded problem-focused history, expanded problem-focused examination, low-complexity decision making

99214 - Moderate-to-high severity visit with detailed history, detailed examination, moderate-complexity decision making

99215 - Moderate-to-high severity with comprehensive history, comprehensive examination, high-complexity decision making

2. Determining fixed cost allocation. The next step was to determine how much of the costs that were fixed for a year should be allocated to each specific type of visit. He believed that fixed costs were caused primarily by doctors. He, therefore, decided that allocating fixed costs by the amount of time a doctor spends on a visit would assign fixed costs appropriately across visit categories. An intermediate variable was therefore created: "fixed cost per 10-minute block of doctor's time." This variable was computed by measuring the total number of 10-minute blocks of physician time used during the baseline year. The total fixed cost for that period was divided by the total number of physician 10-minute blocks used. The result was that each 10-minute period of a doctor's time was associated with $16.08 of fixed overhead cost. The number of time blocks for a visit category ranged from one to three.
3. Determining variable cost rates. The physician-manager decided that variable cost should be divided into two types: salary and nonsalary. Doctor, medical assistant, and receptionist costs were considered direct costs. Their cost was, therefore, their salary rate times the amount of time that each type of personnel was involved in an activity. Indirect variable

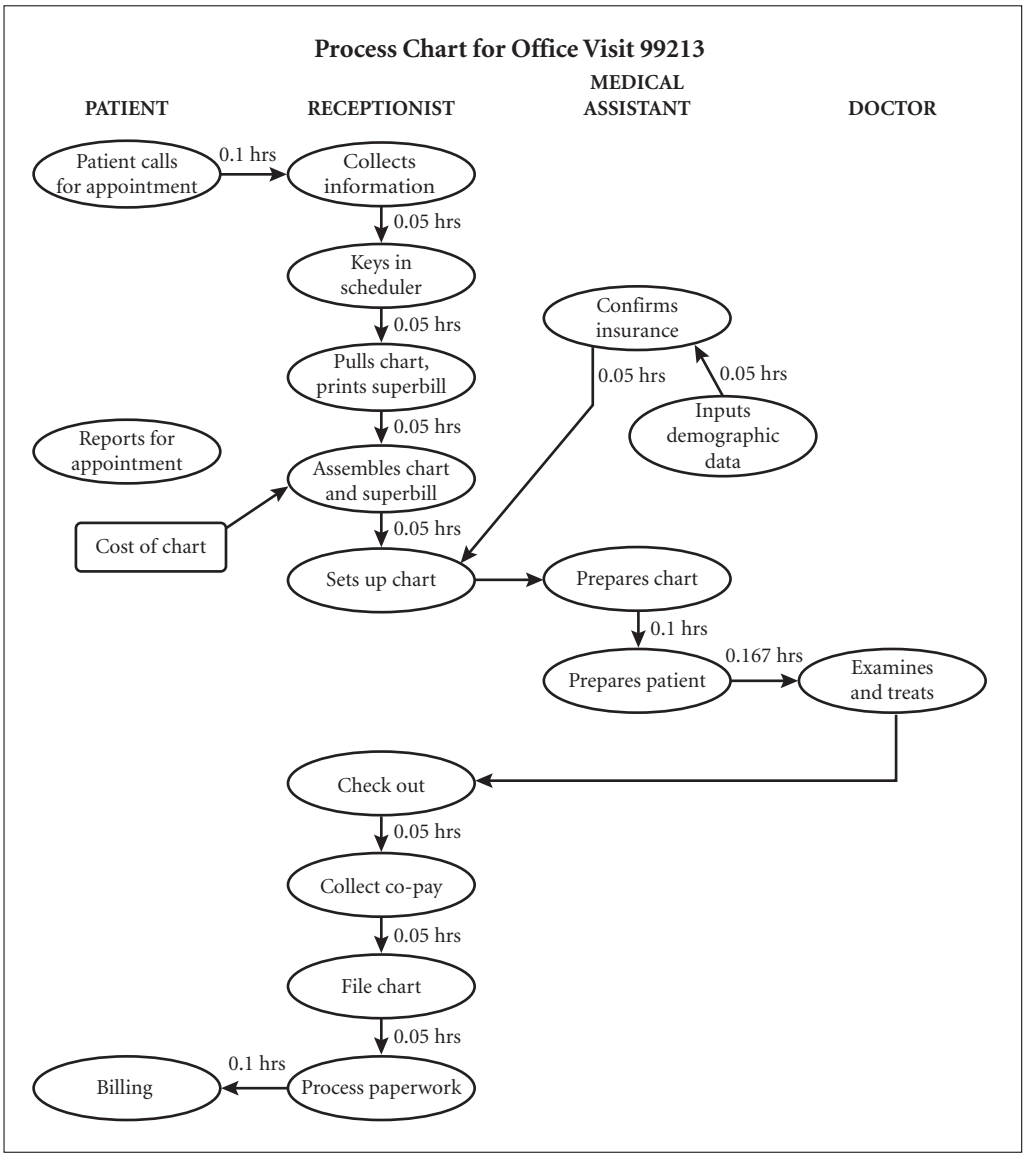

Figure 4-1 **Process Chart for Office Visit 99213**

costs of the practice were computed as the total variable costs less the salary costs. Visits were believed to cause an equal amount of variable overhead regardless of their category. The total nonsalary variable cost for the past year was divided by the total number of visits to get the variable-overhead rate. This came to $3.99 per visit.

4. Determining average cost-per-visit category. Table 4-2 lists the activities demanded by a routine office visit by a new patient and sequences them into four aggregate activities:

    1. Schedule the patient ("patient appointment scheduling").
    2. Receive the patient ("patient reception").
    3. Examine the patient ("examination").
    4. Discharge the patient ("patient checkout").

It also shows the cost of the resources used in each activity, the assignment of fixed and variable overhead, and the total cost of all activities required by that category of visit. Similar analyses were done for the other visit categories.

Table 4-1 also shows the total cost of visit categories, with additional activities such as radiological (X-ray) or laboratory testing. The other types of visits and the additional services were analyzed in the same way as the 99213 visit just described. This analysis showed, for instance, that a simple office visit by a return patient that included a laboratory work-up would cost $37.61 + $8.50 = $46.11. Clinic management then compared this cost information with prices offered by payers. With this product-specific analysis, managers could decide which visits were profitable, and which were not.

Management's Interpretations

The physician-manager interpreted the results shown in Table 4-1 as follows:

> An office visit for an established patient (99213) could cost me from $37.61 to $86.24, depending on what lab work or X-rays I ordered, or if I requested a consultation. My reimbursement was $38.11 or less. The cost of a brief visit (99212) is the same as for a limited one (99213), but the reimbursement is less. The intermediate office visit (99214) on an established patient cost me from $80.69 to $100.04, and the comprehensive evaluation (99215) cost me from $109.67 to $149.80. Some managed care companies downgraded my services from 99215 to 99213 and paid me $38.11 for what had cost me $149.80. I discontinued comprehensive evaluations of my patients. There is a need to achieve the objective of correct diagnosis and treatment without losing money. This led me to a belief that a new, fundamentally different way of evaluating patients is needed if the physician is to be compensated fairly, the patient is to be treated properly, and the current marketplace is to determine the value of the service.

Table 4-2 **Process Mapping Worksheet**

99213 - Routine visit, new patient

Activities	Direct Cost ($)	+ Allocated by	(Amount) × ($ Base Cost)		=	Total ($)
1. Patient appointment scheduling						
Collect information		Recpt.time	0.10 hrs.	8.50/hr.	.850	
Phone system		# of calls	1/apmnt.	0.18/call	.180	
Key into scheduler		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Software		Appointment	1	.04/use	.040	
Pull chart & start superbill	0.05(form)	Recpt.time	0.05 hrs.	8.50/hr.	.475	1.97
2. Patient reception						
Assemble chart		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Confirm insurance		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Input demographics		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Set up chart	1.50 (chart)	Recpt.time	0.05 hrs.	8.50/hr.	1.925	3.20
3. Examination						
Chart preparation		MA time	0.10 hrs.	12.00/hr.	1.200	
Patient preparation		MA time	0.10 hrs.	12.00/hr.	1.200	
Examination		MD time	0.167 hrs.	54.00/hr.	9.090	11.49
4. Patient checkout						
Check out patient		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Collect co-pay		Recpt.time	0.05 hrs.	8.50/hr.	.425	
File chart		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Process paper		Recpt.time	0.05 hrs.	8.50/hr.	.425	
Bill patient		Clerk time	0.10 hrs.	9.00/hr.	.900	
Source	.28				.280	
Postage	.34				.340	
Supplies	.01				.010	3.23
Total						$19.89
General overhead						
Fixed		MD time block	1	16.08		16.08
Variable		# of patients	1	3.99		3.99
Total						$39.96

> I realized that I needed business intelligence about the insurance companies and how they operate and handle claims. We profiled the various insurance companies, with respect to what they paid for each procedure, and determined our clinical approaches based on the revenue. The information from the activity-based analysis of my services leads directly into strategy and tactics. I quit performing 99215 exams because most of the companies would not pay for them. A refused claim only increases my costs. The cost of resubmission and documentation is not rewarded with enough revenue to justify its performance. If someone needed a complete evaluation and his or her insurance company reimbursement did not cover my cost, then I would refer the patient to a specialist. The insurance company would gladly pay the specialist more to do the work, the patient would get the necessary evaluation or treatment, and I would not lose money on poorly reimbursed processes.[1]

The primary point to be made with this example is that until the clinic's management could determine the *relative* cost of its different services, it could not react to the pricing problems it believed it faced. The cost differences among the different categories of visits were caused by differences in the activities they required. In addition, until the clinic could document the resource demands and costs for its different products, it would have great difficulty negotiating satisfactory prices.

Assumptions and Accuracy

This example is from the early days of basing costs on analysis of component activities, as opposed to more traditional approaches, which followed costs from department to department. More will be said about this transition later in this book. The physician-manager, who holds an MBA degree, attended a seminar on the activity-based approaches and believed that using it would give him a better understanding of the specific cost of his different products. He was forced to work from general ledger data because the clinic had not been collecting data specifically to support activity-based costing methods. In addition, he did not have a lot of time to devote to this study. Were it not for these constraints, he could have increased the accuracy of the results by modifying the analysis in several ways, based on material covered in Chapter 3.

DIFFERENTIATING COST COMPONENTS Table 4-3 shows the division of general ledger cost-account balances into fixed and variable categories. These values were established by using historical data from a baseline year. The variable overhead rate was set at $3.99 per patient visit (as used for a single visit at the bottom of Table 4-2) by dividing total variable overhead cost by the number of visits in the year. Realize that this variable overhead rate could also have been found through a cost-behavior analysis by regressing total overhead cost on patient visits and using monthly data. An advantage of the regression approach is that the *goodness*

Table 4-3 **Distribution of Fixed and Variable Costs**

Account	Variable Costs ($)	Fixed Costs ($)
Doctors' Salaries	280,500	
Employees' Salaries	162,264	
Payroll Taxes	30,187	
Supplies	33,161	
Postage	7,644	
Office Expenses		1,332
Building Rent		69,384
Computer		8,010
Supply		14,110
Print		4,315
Rental Equipment		1,415
Depreciation		21,643
Service Expenses		
Accounting		14,545
Computer		4,217
Legal		1,615
Payroll		1,966
Other		14,884
General Expenses		
Malpractice Insurance		16,479
General Insurance		3,034
Maintenance		1,320
Telephone		11,305
Subscriptions		1,363
Other Taxes		713
Nonshared expenses		86,014
Totals	$ 513,756	$276,332
Total cost =		$790,088

of fit would indicate the stability with which overhead rate varied from month to month. It would also indicate if a significant amount of variable overhead was caused by variables other than the number of visits. A poor fit should prompt further effort to find an appropriate causal variable. If regression analysis indicated a fixed cost per period different from that derived from the general ledger analysis shown in Table 4-3, the division of fixed versus variable cost would also need further analysis.

FIXED COST CONSIDERATIONS Table 4-3 shows that salaries and payroll costs were treated as variable costs. Their dollar-per-hour amounts were applied to the amount of time used for a visit, in order to determine the labor cost of that visit. However, when labor is paid a salary for a period of time, the salary is a fixed cost of that period. As with any fixed cost, the amount per visit depends on the number of visits. This number might be changed in the future through more efficient management of labor time, more time-saving technology, or, if labor is not being used at its capacity, a larger share of the market.

As indicated earlier, the fixed overhead rate was computed at $16.08 per standard 10-minute period of a physician's examination time (as used for a single 10-minute period at the bottom of Table 4-2). If the physician's time was not used to its capacity, this computed figure could be lowered by increasing the number of visits. Relatedly, this example analysis assumed that *all* fixed cost was related to physician time spent in examinations. But if nonphysician fixed-cost resources, such as equipment, are not used to their capacity, even if physician time is, cost per visit could also be lowered by better matching the demand for those resources to their capacities. This can be done in two ways: first, by increasing utilization through increasing patient visits, and second, by decreasing the quantity of fixed cost resources used if demand cannot be increased.

A critical point to be made is that when fixed cost is a material part of total costs and there is unused capacity, the cost per unit of output might be significantly greater than it could be. In this example, if labor costs are recognized as fixed costs to the clinic, Table 4-3 would indicate that fixed cost for the baseline year would be $749,283 of the total cost of $790,088 or 95 percent. Supplies and postage would be the only variable expenses. This would indicate that for this clinic, using fixed-cost resources near their capacity is much more important to the cost per visit than efficient use of the variable-cost resources. It could be that third-party payments are based on services provided by larger practice groups with better utilization of fixed-cost resources. If that is the case, this practice will probably be unable to negotiate higher payments and must increase the efficiency of utilization of its fixed-cost resources. Whether or not this is the case, it certainly should be investigated. There is the unfortunate possibility that further research will show that the clinic is too small to realize economies of scale of larger clinics and cannot become price competitive. This situation emphasizes the value of benchmarking across organizations to check on an organization's relative efficiency.

HISTORICAL VERSUS PROJECTED DATA The physician-manager stated that his purpose for activity analysis was to see if each type of visit was profitable. Using historical data is appropriate for the purpose of seeing if each visit was profitable in the baseline year, because the cost of each type of visit could be compared to the price received for it. If, however, the purpose is to determine if

each visit will remain profitable in the future, historical costs must be adjusted to their future amounts. This requires estimates of future resource price changes and efficiency changes caused by changed technology. Making estimates of these changes is especially difficult when care involves advanced technology that uses expensive fixed-cost resources and when the technology is subject to rapid change. The estimated fixed cost per unit of output then depends on the accuracy of the estimates of the operating life of the resources and the number of visits over which the annual depreciation or lease costs will be spread. Inaccuracies in either of these estimates can cause material inaccuracies in the estimated cost of activities.

OVERHEAD REVISITED The manager understood that from a financial viability standpoint, the clinic's products were the services for which it was paid. The activities needed to complete each billable type of clinic visit were charted based on observation of visits and information from the people involved in the component activities. This analysis was reflected in charts like Figure 4-1. At this point, it was obvious that all the costs necessary to complete a visit were not reflected in the direct costs charted. There were both fixed and variable overhead costs that had to be covered by visit revenue. It is impossible to estimate the full cost of a visit without distributing a portion of the overhead to it. In this example, management used its knowledge of internal cost relationships to determine the basic causes of overhead costs.

Managers decided that variable overhead for a period changed in proportion to changes in the total number of visits. How good this assumption is could be checked by noting the R^2 statistic for a regression of total overhead on the quantity of visits. If the R^2 statistic is high (and the $p<$ statistic is low), it is reasonable that the regression estimate of fixed cost per period is fairly accurate. It will also be fairly accurate as an estimate for a future period if the technology used does not change.

Managers believed that the fixed-cost resources existed to support physicians' work. They, therefore, chose to allocate fixed overhead to each type of visit based on the number of 10-minute physician time blocks used in the visit; however, the fixed overhead does not increase with each 10-minute physician work period. If it did, it would be a variable cost. For instance, part of the fixed cost is an equipment, maintenance contract, a flat fee per year. Within the contract period, additional physician work time will not increase this cost. The same holds true for any fixed cost whose utilization does not exceed the resource's capacity. If, for budgeting purposes, the clinic estimates future fixed cost for a visit using this approach, it will only be accurate if the cost-behavior analysis had a good fit, the array of fixed-cost resources does not change, and the number of visits in the budget period is accurately estimated. If the fixed costs for the period are accurately estimated, the cost per 10-minute period will depend on the number of 10-minute periods in the denominator of the fixed-overhead rate formula:

(total fixed overhead) / (total time blocks) = fixed cost per time block

In short, when fixed costs are a significant portion of total costs, accurate product costing depends on accurate output-volume estimates. Getting these numbers is not difficult when estimating product cost for a past period. However, accurate output-volume estimates for a future period are just that—estimates. Product costing for the future can be no better than those estimates.

This example also illustrates another problem in allocating fixed costs. Lumping all fixed costs into one quantity assumes that all of the different cost objects using the fixed-cost resources will use each component fixed-cost resource in equal amounts. This is rarely the case. Again, using equipment maintenance cost as an example, if one type of visit does not use certain equipment that is used in other types of visits, it should not have the maintenance of that equipment considered part of its cost. These fixed-cost problems cannot be eliminated. They can, however, be reduced by evaluating how the problems affect specific decision processes. Ways to do this will be addressed throughout the remainder of this book.

Case Summary

This rather simple example of cost analysis began with the need for a clinic's management to get accurate measures of the cost of its different prospectively priced products. The clinic suspected that among its products (categories of visits), some were profitable, while others were causing losses. It realized that differences among the costs of its products would be caused by differences in the activities needed to produce and sell them.

- It observed those activities and collected information from the people involved in them.
- The results of this data were organized into an activity flow chart for each product.
- The amount and costs of the resources used in each activity were incorporated into the flow charts.
- The cost of resources whose use was believed to vary with the number of patient visits were taken from the general ledger.
- Average physician, medical assistant, and receptionist time was traced to each product. The remaining variable costs were treated as a variable overhead pool.
- This variable overhead pool was divided by the number of patient visits during the baseline period to create a variable cost per patient visit.
- The remaining costs for the baseline period were assumed to be fixed costs.
- After examining the specific components of the fixed-cost items, the management believed that they were all incurred to support physician activities.

- It, therefore, divided physician time into 10-minute blocks and analyzed the average number of these blocks spent by a physician in producing each type of product.
- Physician costs for the baseline period were analyzed to calculate a physician cost per time block.
- Fixed costs were then assigned to each product based on the standard number of physician time blocks used to produce it.
- For each product, the traceable costs of each activity required were added to the variable overhead cost per visit and the assigned fixed overhead in order to compute the cost of the product.

Having what management considered accurate costs of its different products allowed the clinic to drop products that were creating financial loss; this gave information with which to attempt to negotiate appropriate prices for these products.

Note the assumptions and subjective judgments on which this analysis was based. Inaccuracies in these would, of course, create inaccuracies in the cost estimates. Management assumed that

1. salaries and equipment costs were variable costs.
2. all fixed costs were incurred because physicians spent time with patients, which was proportional to the time spent regardless of the type of patient visit.
3. variable cost not traceable to specific intermediate activities was caused by a visit, and was the same for any type of visit.
4. fixed cost per visit would not vary with the number of patient visits in a period or that the number of patient visits would not vary from period to period.
5. fixed cost resources are being used to their capacities.

All of these assumptions are most likely inaccurate, but the degree of their inaccuracy might be too small to materially affect costs computed. In the following chapters of this part, approaches to analyze the validity of such assumptions will be discussed, as well as the degree possible or appropriate to compensate for them.

DISCUSSION QUESTIONS

1. Why is understanding the relative costs among different products important to financial viability?
2. Explain the advantages of charting the flow of activities and resources into products.
3. Explain how improperly identifying costs as fixed or variable can lead to inappropriate decisions.
4. Explain the value of historical costs when attempting to estimate future costs. Why must they often be adjusted?

Key Points

- Organizations should consider their products to be the service or product for which clients pay.
- Health care delivery organizations have essentially three different products: (1) individually billable services, (2) prospectively priced encounters, and (3) capitated care.
- In the order just stated, each of these products creates more risk for the providers.
- Most health care providers are ill-prepared to manage the insurance risks associated with capitated products.
- Most care-delivery organization outputs are intermediate products combined to produce wellness, which is the final product.
- The cost of a single unit of an intermediate product is materially affected by the level of utilization of the fixed-cost resources used to produce it.
- The cost to produce any product is the sum of the costs of accomplishing the activities needed to complete its production.

Problem

Return to the exercise on page 3-22 in which you categorized the costs of running a dental facility. Based on your best estimates of activities and times involved in a visit that includes x-raying, cleaning teeth, and filling one simple cavity, construct a flowchart, similar to the one in Figure 4-1, of the activities and resources associated with the visit. You need not attach dollar amounts of the resources used.

References

[1.]Stuart, T. J. and J. J. Baker. *Activity-Based Costing and Activity-Based Management for Health Care*. (Gaithersburg, MD: Aspen Publishers, 1998).