

Product Costing: Attaching Costs to Patient Services



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Learning Objectives

- Understand why and how costs are attached to patient services.
- Describe how direct materials, direct labor, and clinic/hospital overhead are costed to patient services.
- Explain why predetermined overhead rates are usually used for costing.
- Identify the main differences among alternative measures for the denominator in the overhead rate.
- Explain why services should be costed for pricing purposes by using an overhead rate computed at normal volume levels.
- Describe how to allocate service center costs so that they can be included in overhead rates of operating departments.

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Introduction

Costs are used to accomplish an assortment of needs: to evaluate the profitability of goods and services, to aid in pricing and bidding decisions for negotiating contracts with insurers, to plan and budget operations, to evaluate performance, to control costs, and to establish inventory values for the balance sheet and cost of goods and services sold for the income statement.

This chapter discusses accounting for costs and presents ways to identify costs with products or services. Accounting for direct materials and direct labor comes first. Then, accounting for clinic/hospital overhead covers simple to more complex situations. Finally, we discuss how service center costs, such as transportation or laboratory costs, are included in patient service costs.

11.1 Costing of Patient Services

Serving patient needs involves the use of resources. As mentioned in Chapter 9, the costs of these resources are typically classified as materials, labor, and overhead. The costs are accumulated by jobs (patient care or procedure) or by departments. Then they are assigned to each unit of output (product, such as medical equipment, or service, such as nursing care or laboratory test) based on each unit's use of the resources. These relationships for assigning costs to products or services are depicted in Figure 11.1.

Figure 11.1: A view of cost linkage

The principles underlying product costing are applicable to manufacturing companies and service organizations. For example, a hospital may be interested in determining the cost of a specific medical treatment or the cost of outpatient care. A medical supply store may wish to know the costs associated with carrying and selling a particular line of wheelchairs. A building contractor, on the other hand, will accumulate costs by project. If a contractor is constructing a hospital for a community, for instance, the contractor will identify and trace the costs to the hospital project. A university may be interested in the estimation, measurement, and control of a program to train nurses and physicians. A museum may want to determine the cost of a particular exhibit for a season.

Regardless of the type of organization, costs are identified as direct costs when they can be readily connected to a cost objective. Indirect costs, which cannot as easily be connected to an objective, must be allocated using some reasonable basis for allocation. For example, all patient care requires heat and light, but that would not be billed per patient; instead it would be an indirect cost.

In a medical setting, costs are allocated by patient or by medication. A job would include everything involved in an individual patient's care. Some of these costs can be allocated directly, such as the costs for medications used, laboratory tests done, and staff time (physicians, nurses, and others) that is tracked directly by patient. Other costs will be overhead costs, such as housekeeping, transportation, administrators, and everything else that goes into operating a hospital or clinic that cannot be identified as direct patient care.

First, we take a look at costs that can be identified by patient. Then we a look at indirect costs that are allocated using a process called overhead costing.

11.2 Costing of Direct Costs

We now discuss how to determine the costs that are directly traceable to patient care. These costs consist of direct materials and direct labor.

Costing of Direct Materials

Materials include the medical supplies that have been purchased for patient care and can be allocated by patient. Many medical facilities today use a system to scan a medication or medical supply by bar code before providing care. That way, each type of medical supply can be directly allocated by patient. After a hospital stay, the bill the patient receives can have hundreds of these supplies listed. **Direct materials** are those that are identified with the treatment of a specific patient and are easily and economically traced to the patient; their costs represent a significant part of the total patient cost. All other materials and

supplies that become part of patient care are called **indirect materials**, which are part of hospital/clinic overhead.

The costs associated with acquiring materials and having them ready for patient care typically fall into four categories:

1. the acquisition cost purchase price of the materials;
2. in-transit charges, such as freight, insurance, storage, customs and duty charges;
3. credits for trade discounts, cash discounts, and other discounts and allowances;
and
4. the costs of purchasing, receiving, inspecting, and storing activities.

Categories 1 through 3 are typically included in the cost of materials, whether direct or indirect materials. Category 4 is treated as hospital/clinic overhead. We allocate those costs to patient services with one of the several approaches that will be discussed later in the chapter.

Suppose that Julz Medical Clinic purchased medical supplies on account for \$75,000. Upon receipt of the materials, we increase Medical Supplies and Accounts Payable by \$75,000 as follows:

Medical Supplies	Accounts Payable
\$75,000	\$75,000

Nurses requisition from the supply room the medical supplies required for a specific patient's care. Thus, each requisition becomes the basis for charging the cost of medical supplies to a specific patient. Assume that a month's requisitions at Julz Enterprises show that direct materials costing \$60,000 have been transferred from the medical supplies inventory to patient care. The total of \$60,000 is moved from Medical Supplies to Patient Billing (or Accounts Receivable). The latter account is a focal account for the tracking of costs to be billed to the patient or the insurance company. The costs of the three cost elements—direct materials, direct labor, and hospital/clinic overhead—are funneled through this account, as will be shown later. It is, therefore, the control account for all patient billing. The movement of medical supplies used in production for the month is shown as:

Medical Supplies		Patient Billing	
\$75,000	\$60,000	\$60,000	

Costing of Direct Labor

Labor is the total labor cost expended for the benefit of an individual patient. **Direct labor** can be specifically identified with an individual patient in an economically feasible

manner. **Indirect labor** is not readily traced to an individual patient, such as housekeeping or nursing administrative time.

Labor-related costs include the wages and salaries of the employees plus any additional expenditures made by an employer on behalf of an employee. These typically include bonuses, overtime premiums (i.e., the additional wages for overtime), shift differentials, idle time, employer's payroll taxes, and fringe benefits. These additional expenditures are usually treated as part of the hospital/clinic overhead costs. Some of these expenditures cannot easily be traced to individual patients. Others, such as overtime premiums and shift differentials, are treated as hospital/clinic overhead, so those patients receiving care during overtime hours or late shifts are not unfairly penalized.

Some medical facilities track nursing time by individual patients. This automatically generates a labor report. These reports show how much of the nurses' time and cost is charged to each patient. For the sake of simplicity, we will assume that all of Julz Medical Clinic's labor is direct labor. Suppose that during one month, the labor costs for Julz Medical Clinic were \$10,000 and the workers' take-home pay totaled \$7,400. The resulting transaction is shown:

Patient Billing	Wages Payable
\$60,000	
10,000	\$7,400
Other Labor-Related Payables	
	\$2,600

Other medical facilities don't try to calculate these costs with this much precision because they don't have an automated system to track nursing time, and it would be too costly to do it manually. Instead they may allocate nursing time per patient per day based on historical averages. For example, in an ICU unit more nursing time per patient will be allocated than in a lower-level-of-care floor. Check with your medical facility to find out how medical staff costs are allocated per patient.

11.3 Costing of Hospital/Clinic Overhead

Hospital/clinic overhead, unlike direct materials and direct labor, cannot be measured directly as a cost of any particular patient care. Overhead consists of a variety of costs, such as indirect materials, indirect labor, administration, insurance, depreciation, utilities, repair, and maintenance—all of which are indirectly related to patient services.

The indirect nature of overhead costs with respect to patient services creates difficulty in identifying service costs for each patient. For our purposes at this point, we take an overall, simplified approach to costing of hospital/clinic overhead to patient services. This is to convey the concepts involved. Later in the chapter, we explain overhead costs by employing departmental rates.

For the discussion that follows, hospital/clinic overhead is attached to services by means of a cost driver that links costs to patient services. The cost driver chosen as a basis for overhead allocation should be related logically to both the overhead and the service. For example, the operation of an MRI machine will include overhead costs such as power cost, lubrication, maintenance, repairs, depreciation, and other costs closely related to machine operation. The benefits received by the products can probably be best measured against the cost of the machine hours used in providing patient care. Therefore, these overhead costs should be allocated to the products on the basis of machine hours used to provide patient care. For other types of patient services whose operations are more labor intensive than capital intensive, direct labor cost or direct labor hours may be more appropriate for overhead allocation. The most common cost drivers chosen for overhead allocation are direct labor hours and direct labor cost.

The total cost driver activity for the hospital/clinic is divided into the total overhead cost to obtain an **overhead rate**. Services then are assigned overhead cost by multiplying the actual quantities of the activity by the rate calculated. Suppose that Julz Medical Clinic uses direct labor cost to allocate overhead. During the month in the earlier example, for which direct labor cost was \$10,000, the total overhead for the clinic was \$15,000. Consequently, the overhead rate would be 150% of direct labor cost. During that month, the direct labor cost incurred to treat patients amounted to \$2,700. Hence, \$4,050 ($\$2,700 \times 1.5$) of overhead cost would be allocated to each patient.

Predetermined Overhead Rate

Thus far, we have discussed **actual costing**, where the product costs consist of actual direct materials used, actual direct labor cost, and overhead allocation based on total actual overhead costs and total actual activity. Most companies, however, use a normal cost system or a standard cost system. The latter will be covered in Chapter 13. **Normal costing** differs from actual costing in that overhead is allocated using a **predetermined overhead rate**, defined as:

$$\text{Predetermined overhead rate} = \frac{\text{Budgeted hospital/clinic overhead}}{\text{Budgeted cost driver activity}}$$

With normal costing, the **applied overhead** would be determined by multiplying the predetermined overhead rate by the actual cost driver activity for the patient care. Typically, companies use a 1-year time horizon to calculate predetermined overhead rates.

Two major reasons exist for the use of normal costing rather than actual costing. The first is the timing of overhead cost incurrence. For example, air conditioning costs in the summer for many facilities in the Sunbelt tend to be higher than heating costs are in the winter. Should we allocate the higher air conditioning costs to patients who were served during the summer? The facilities and workers must be maintained regardless of the weather.

In addition, discretionary costs may fluctuate widely from month to month. For instance, managers may decide to incur substantial maintenance costs during some months and very little during other months. Because of seasonal and discretionary aspects of overhead, a more stable overhead rate requires a longer time horizon, such as 1 year.

The second reason for the use of normal costing is the potential fluctuation in the activity represented by the cost driver. Most companies do not have a constant level of activity every month. For example, employees take vacations during the summer months, or operations are scaled back to accommodate major repairs and maintenance. Normal costing, by using a 1-year time horizon for the overhead rate, averages costs over the units of work regardless of when work is performed. Therefore, patients are not penalized because they are treated during a period of low volume.

Calculating an actual overhead rate using a 1-year time horizon, prices, and other cost-based decisions could not be done until the end of the year. Clearly, medical facilities cannot operate this way. The use of a predetermined overhead rate allows costs of patient care to be calculated throughout the year as necessary. Moreover, a predetermined overhead rate helps managers to prepare bids when negotiating contracts with insurers or other third-party payers.

To illustrate the application of overhead in a normal cost system, suppose that, for 20X3, Bodker Medical Clinic has budgeted \$50,000 for fixed overhead costs and \$3 per direct labor hour for variable overhead costs. This is its overhead cost function. These budgeted costs correspond to a budget activity of 10,000 direct labor hours. The predetermined overhead rate would be computed as:

$$[\$50,000 + \$3(10,000)] \div 10,000 = \$8 \text{ per direct labor hour.}$$

Assume there were 10,000 direct labor hours worked, at a rate of \$50 per hour, during 20X3. Assume also that \$95,000 of direct materials was used. During production, various entries were made to cost the patient care. We could quite literally add \$8 to the patient bill every time one more hour of direct labor is worked. In normal accounting activity, these transfers to the patient bill are done periodically, most likely on a daily basis. If done in aggregate, a summary transfer of all overhead applied to patient services would show the following:

Facility Overhead	Patient Billing
\$80,000	\$ 95,000
	100,000
	80,000

Multiple Overhead Rates

Some reasonable, causal, or beneficial relationship should exist among the costs accumulated in facility overhead accounts, the cost driver selected, and the services to which the costs will be allocated. Simply stated: The activity (as represented by the cost driver)

is the link between the output of services and facility overhead spending. The implication is that more output requires more activity and, therefore, more overhead spending. For example, if a company uses direct labor hours as a cost driver, facility overhead costs should consist primarily or exclusively of costs that support direct workers. Such costs may include supervision and facilities for workplaces, as well as travel, training, and fringe benefits of workers.

In the examples up to this point in the chapter, we have assumed that only one cost driver is appropriate for the total facility overhead. However, diversity of products and services will often result in distorted cost allocations when only one cost driver is used. The greater the differences in services, the greater the diversity that exists in the operations. The more diverse the operations, the more likely it is that one cost driver cannot assign costs to all services fairly. In these situations, departmental overhead rates will assign costs more accurately to services than will one facility-wide overhead rate. A facility-wide overhead rate can only be justified for a clinic that specializes in one or two types of patient care.

For example, the patient transportation department must have the equipment for transporting patients and the staff to make those transports. An overhead allocation would be developed for the depreciation of equipment, storage of equipment, and the supervisory staff. This would be very different from the radiology department whose overhead would include much more expensive equipment that would need to be depreciated, technical staff as well as medical staff that would not be easy to allocate directly, supervisory staff, utilities, and other costs. The overhead allocated for services from this department would likely be higher than the overhead calculated for patient transportation.

When patients use the services of these two departments, patient transportation overhead may be allocated by patient transported, while radiology overhead may be allocated by test performed. For example, one patient could be sent to radiology for numerous tests. This could involve one patient transport and three possible tests.

Alternative Concepts of Volume

When selecting the denominator for the overhead rate, volume can be measured in one of four ways:

1. ideal capacity;
2. practical capacity;
3. expected volume; or
4. normal volume.

Ideal capacity is the maximum amount of service that can be rendered with available facilities. This is often too perfect a goal to be realized and is generally recognized to be beyond realistic expectations. Certain interruptions and inefficiencies in service are to be expected.

Practical capacity is full utilization of facilities with allowance made for normal interruptions and inefficiencies. For example, service will be slowed or stopped at times because of breakdowns, shortages of labor and materials, or retooling. These possibilities are considered in arriving at practical facility capacity.

Expected volume is the level of operation budgeted or estimated for the current period. This may be at or below practical capacity. It is the level at which management expects to operate during the next month or year.

Normal volume is generally a balance between practical capacity and patient care demand in the long run. Over a period of years, the peaks and valleys of patient care demand are leveled by averaging, and the average level of plant utilization is considered to be normal volume.

It may seem, at first, that overhead per unit should be calculated at the expected level of operation for the next year. Indeed, this is the practice of most healthcare providers. However, for service-pricing purposes, a better approach is to use the normal volume. Why should normal volume be used when you already know that the company may be operating below that level? After all, a rate computed at the expected level of operation will come closer to costing all of the overhead to the products, and product cost will be more in line with actual cost.

The problem with using an overhead rate based on expected, rather than normal, volume is illustrated by the following example. Assume that the normal level of operation for Cherrywood Medical Laboratory is 200,000 labor hours and that 100,000 items can be analyzed in that time. The fixed overhead for the year is budgeted at \$500,000. The normal fixed overhead per item is then \$5, computed as:

$$\$500,000/100,000 = \$5 \text{ Fixed overhead per item.}$$

But management expects to operate at only 100,000 labor hours next year and to analyze 50,000 items. An overhead rate at expected volume would be \$10 per item:

$$\$500,000/50,000 = \$10 \text{ Fixed overhead per item.}$$

If the lab plans to operate below normal volume, an overhead rate computed at the expected level of operations will result in more fixed overhead being assigned to each item. If prices are set by adding a markup to total cost, the cost of operations will be higher when fewer items are analyzed. Billing will not change because that is determined by negotiated contract rates.

For this reason, the objective is not necessarily to assign all overhead costs to products. The products should bear the normal overhead costs, and any unabsorbed fixed overhead should be recognized as a period expense. (Overabsorbed fixed overhead would likewise result in a reduction of period expenses.) Rather than allocating unabsorbed fixed overhead to products produced, this approach treats the costs of idle capacity as the costs of products the company did not produce.

11.4 Cost of Providing Services

An entity that provides services instead of tangible products may not operate with a formal cost accounting system that traces costs to jobs. Instead, all service job costs are treated as period costs and are often left in their original cost categories such as supplies expense, labor expense, and depreciation expense.

Nevertheless, costs will be used to measure performance by type of service and by patient groups. A rehabilitation facility, for example, provides an exercise room for its patients. The cost of supplies used exclusively for the exercise room, such as rubbing lotions and bandages, along with the salaries and wages of the room's employees, such as the manager and therapists, is identified with the exercise activities. Also, costs of special equipment used, such as depreciation and maintenance expenses, and other overhead costs increased by operating this service, will be included. These costs can be used as a basis for deciding how much must be added to a patient's bill to cover all costs and allow for profit. See Table 11.1 for example **service centers** and possible cost drivers.

Table 11.1: Possible cost drivers used for selected service centers

Service Center	Possible Cost Drivers
Purchasing	Number of orders, cost of materials, line items ordered
Receiving and inspection	Cost of materials, number of units, number of orders, labor hours
Storerooms	Cost of materials, number of requisitions, number of units handled, square or cubic footage occupied
Personnel	Number of employees, labor hours, turnover of labor
Laundry	Pounds of laundry, number of items processed
Cafeteria	Number of employees
Custodial services	Square footage occupied
Repair and maintenance	Machine hours, labor hours
Medical facilities	Number of employees, hours worked
Facility administration	Total labor hours, number of employees, labor cost
Power	Kilowatt hours, capacity of machines

Occasionally, companies may not allocate service center costs to **operating departments**, or organizational units most closely tied to the productive effort that results in products or services to customers, in order to ensure that the services are fully utilized by the operating managers. Some examples of this phenomenon include internal audit departments, credit-check services, facilities management, and computer services.

Two common approaches are available for allocating the costs of service centers: direct method and step (sequential) method. To illustrate the allocation of service center costs for the first two methods, we will use data from the Nursing School at Hardknox University. The Nursing School wishes to determine overhead costs per credit hour for its undergraduate and graduate programs. We will treat these as the two operating departments. The Nursing School has three service centers: Building Services, Staff Services (e.g., secretarial support, computer support, and photocopying), and Administration. Budgeted data for the coming year appear as follows:

	Square Feet Occupied	Employees	Overhead Costs
Service Centers			
Building Services	1,000	30	\$165,000
Staff Services	2,000	20	90,000
Administration	8,000	20	330,000
Operating Departments			
Graduate program	10,000	30	265,000
Undergraduate program	20,000	90	420,000

Building Services costs are allocated on square footage of classroom and office space. Staff Services and Administration costs are allocated based on number of employees (i.e., faculty and staff). Budgeted credit hours for the year are 20,000 for the graduate program and 60,000 for the undergraduate program.

Direct Method

Direct method allocations are made from each service center to operating departments in proportion to activity performed for each. Thus, the direct method does not assign costs to other service centers for work performed for other service centers. Allocation of service center costs uses only those cost drivers pertaining to operating departments. Once the service centers have their costs allocated, operating department overhead rates per unit of activity are calculated.

Space associated with the graduate program is 10,000 square feet; for the undergraduate program, the space used is 20,000 square feet. The allocation base, therefore, totals 30,000 square feet. Building Services costs are then prorated over the two programs as follows:

Graduate program	10,000 sq. ft.	$1/3 \times \$165,000 =$	\$ 55,000
Undergraduate program	<u>20,000</u>	$2/3 \times \$165,000 =$	<u>110,000</u>
Total	<u>30,000 sq. ft.</u>	Total cost	<u>\$165,000</u>

The double line is used to designate totals.

The same approach follows for Staff Services and Administration. These are summarized as follows:

Graduate program	30 employees	$1/4 \times \$90,000 =$	\$ 22,500
Undergraduate program	<u>90</u>	$3/4 \times \$90,000 =$	<u>67,500</u>
Total	<u>120 employees</u>	Total cost	<u>\$ 90,000</u>
Graduate program	30 employees	$1/4 \times \$330,000 =$	\$ 82,500
Undergraduate program	<u>90</u>	$3/4 \times \$330,000 =$	<u>247,500</u>
Total	<u>120 employees</u>	Total cost	<u>\$330,000</u>

In a clinical setting, a similar calculation would be used. Suppose you are allocating space for various sections in a clinic. A cancer care facility may have a radiology treatment section and a chemo treatment section. There are probably many more sections in a cancer care facility, but we are keeping things simple to introduce this concept.

Space associated with the chemo section is 2,000 square feet; for the radiology section, the space used is 4,000 square feet. The allocation base, therefore, totals 6,000 square feet. Building Services costs are then prorated over the two programs as follows:

Chemo section	2,000 sq. ft.	$1/3 \times \$75,000 =$	<u>\$25,000</u>
Radiology section	<u>4,000</u>	$2/3 \times \$75,000 =$	<u>50,000</u>
Total	<u>6,000 sq. ft.</u>	Total cost	<u>\$75,000</u>

The same approach follows for Staff Services and Administration. These are summarized as follows:

Chemo section	15 employees	$1/4 \times \$60,000 =$	\$ 15,000
Radiology section	<u>60</u>	$3/4 \times \$60,000 =$	<u>45,000</u>
Total	<u>75 employees</u>	Total cost	<u>\$ 60,000</u>
Chemo section	15 employees	$1/4 \times \$160,000 =$	\$ 40,000
Radiology	<u>60</u>	$3/4 \times \$160,000 =$	<u>120,000</u>
Total	<u>75 employees</u>	Total cost	<u>\$160,000</u>

Another way to perform these allocations is to divide the service center costs by the cost driver and apply the resulting rate to the operating department usage amount. For example, Building Services would have a rate of \$5.50 per square foot ($\$165,000/30,000$).

The results of service center allocations and the subsequent calculation of overhead rates for the operating departments are summarized as follows:

	Building Services	Staff Services	Adminis- trative	Graduate Program	Under- graduate Program
Costs	\$165,000	\$90,000	\$330,000	\$265,000	\$420,000
Building Services	<u>(165,000)</u>			55,000	110,000
Staff Services		<u>(90,000)</u>		22,500	67,500
Administration			<u>(330,000)</u>	82,500	247,500
	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	\$425,000	\$845,000
Credit hours				<u>$\div 20,000$</u>	<u>$\div 60,000$</u>
Overhead rate per credit hour				<u>\$ 21.25</u>	<u>\$ 14.08</u>

Step (Sequential) Method

Another more complicated method of allocating costs performed by other service centers is called the **step (sequential) method**. However, recognition of those services is a one-way process. The service centers are arranged in a sequence, and their costs are allocated one after the other. Once a service center's costs are allocated, no other costs are allocated back to that service center even though it may use resources of other service centers. The first service center's costs are allocated to all subsequent service centers and operating departments. The second service center's costs are then allocated to all subsequent service centers and operating departments, but not to the first service center. This process continues until all service centers' costs have been allocated to operating departments. The number of allocation steps will equal the number of service centers.

In a hospital setting, the Medicare cost step-down method to allocate costs by service line is the most common. This information is then used to develop an income matrix. That income matrix, along with a calculation of expenses by service area, can be used to manage financial performance. These calculations are highly technical and are usually done by the chief financial officer. The calculations are beyond the scope of this course.

Treatment of Revenues

Most service centers simply incur costs and generate no revenues. A few, such as a cafeteria, may charge employees or other outside parties for the services they perform. Any revenues generated should be offset against the service center costs. For both the direct method and the step method, we allocate the costs less the offset. In this manner, other service centers and operating departments will not be required to bear costs for which the service center has already been reimbursed.

Allocation of Costs by Behavior

Whenever possible, service center costs should be separated into variable and fixed classifications and allocated separately. As a general rule, variable costs should be charged to other service centers and operating departments on the basis of the actual activity that controls the incurrence of the cost involved. The service centers and departments directly responsible for the incurrence of servicing costs are, therefore, required to bear the cost in proportion to their actual usage of the service involved.

The fixed costs of service centers represent the cost of providing capacity. As such, these costs are most equitably allocated to consuming service centers and operating departments on the basis of predetermined amounts. In this way, the amount of costs allocated is determined in advance of the period in which service is provided. Once determined, the amount does not change from period to period. Typically, the amount allocated is based either on peak-period or long-run average servicing needs. This approach of allocating variable costs on the basis of actual activity and fixed costs using predetermined percentages is sometimes referred to as the **dual-rate method** of allocation.

The following example will illustrate undesirable consequences of not separating the allocation of fixed and variable costs. Suppose that Azer Hospitals has an Administration support center that services two hospitals: City Center and Rural Clinic. Based on needs forecast by these two operating centers, Azer hired staff and incurred other fixed costs amounting to \$1,200,000 per year. Sixty percent of this cost derived from the needs of City Center. In addition, Administration incurs costs that vary with the amount of labor hours worked in the operating centers. This averages about \$1 per hour.

In 20X3, City Center worked 400,000 hours, and Rural Clinic worked 200,000 hours. If fixed and variable costs are not separated, the allocation rate would be determined as follows:

$$\text{Allocation rate} = [\$1,200,000 + \$(400,000 + 200,000)] / (400,000 + 200,000) = \$3 \text{ per hour.}$$

The 20X3 allocations to each of the operating centers would be:

$$\text{City Center: } \$3 \text{ per hour} \times 400,000 \text{ hours} = \$1,200,000$$

$$\text{Rural Clinic: } \$3 \text{ per hour} \times 200,000 \text{ hours} = \$600,000.$$

In 20X4, Rural Clinic works the same 200,000 hours, but City Center's work drops off to only 100,000 hours. The allocation rate for 20X4 would change as follows:

$$\text{Allocation rate} = [\$1,200,000 + \$(100,000 + 200,000)] / (100,000 + 200,000) = \$5 \text{ per hour.}$$

The 20X4 allocations to each of the operating centers would be:

$$\text{City Center: } \$5 \text{ per hour} \times 100,000 \text{ hours} = \$500,000$$

$$\text{Rural Clinic: } \$5 \text{ per hour} \times 200,000 \text{ hours} = \$1,000,000.$$

Note that Rural Clinic's share of costs increased by \$400,000 (\$1,000,000 – \$600,000) even though it worked the same number of hours both years. Because fewer hours were worked in City Center, the allocation rate increased. This resulted in more fixed Administration cost charged to Rural Clinic than in the previous year. To avoid this inequity, each year the dual-rate method would assign \$720,000 in fixed cost to City Center ($0.6 \times \$1,200,000$) and \$480,000 to Rural Clinic ($0.4 \times \$1,200,000$). These allocations are in accordance with the forecasted needs that generated the total fixed cost of \$1,200,000. For the variable costs, the dual-rate method would assign \$1 per hour each year. Thus, with the dual-rate method, Rural Clinic International would be assigned a total cost of \$680,000 each year (\$480,000 + \$200,000), while Domestic City Center would be assigned \$1,120,000 in 20X3 (\$720,000 + \$400,000) and \$820,000 in 20X4 (\$720,000 + \$100,000).

11.5 Ethical Issues for Cost Allocation

Often, a department or division's performance is evaluated on the basis of profits after overhead costs have been allocated. Consequently, the choice of cost drivers can affect performance evaluation. One wishing to reward some managers and penalize others could attempt to do so by unethically selecting cost drivers that would shift overhead costs to the desired entities. Another consideration is scrutiny the healthcare facility may expect from government payers, who are beginning to look closely at how facilities are allocating costs in the cost reports. A governmental agency can disallow costs if they are not properly allocated, which can result in a loss of funds in the year-end settlement.

When the prices of certain services are cost based, while others are market driven, managers are often tempted to shift much of the overhead costs to those cost-based services or products. This can be accomplished by:

1. including in the overhead cost pool items that are not business expenses (e.g., entertainment expenses unrelated to the business) or
2. arbitrary selection of cost drivers.

When using the step method of allocating support costs, another way to shift overhead costs is:

3. arbitrary ordering of support centers.

Clearly, the inclusion of nonbusiness expenses is unethical. The arbitrary selection of cost drivers or of the order of support centers is not as clear. On one hand, management has an obligation to the company's owners to maximize profits using any allowable methods. On the other hand, there is a question of fairness to the parties purchasing the products or services. Moreover, when the government happens to be the other party, the issue extends to one of fairness to taxpayers.

Case Study: Birnbrey Home Health Services

Birnbrey Home Health Services is organized into three operating departments: Nursing Care, Home Health Aides, and Rehabilitation Services. Support functions include a secretarial pool and a billing center. An administrative function is responsible for managing the entire company. Birnbrey follows the practice of allocating support functions to the three operating departments in order to establish a cost-based charge for pricing the various health services to patients. Administrative costs are not allocated. (They are treated as period costs in the income statement.) But they are recovered through the profit margin developed as a percentage of all other costs.

Budgeting for the upcoming fiscal year has resulted in the following costs charged directly to all functions and departments:

(continued)

Case Study: Birnbrey Home Health Services (*continued*)

	Secretarial	Billing	Nursing Care	Home Health Aides	Rehabilitation Services
Salaries and wages	\$80,000	\$120,000	\$300,000	\$400,000	\$100,000
Fringe benefits	5,600	11,200	30,000	40,000	10,000
Depreciation	8,000	16,000	24,000	32,000	8,000
Supplies	16,000	3,200	4,500	6,000	1,500

The indirect costs that are prorated to administration, support functions, and operating departments are of four varieties: insurance, leasing, utilities, and janitorial services. The following means are used to prorate indirect costs:

- Insurance costs (\$160,000) are for malpractice coverage and for equipment, fixtures, and furniture. The premium (\$36,000) representing coverage on equipment, fixtures, and furniture is prorated on the basis of book value. The remainder of the \$160,000 is for malpractice. Since malpractice relates to people, the proration is based on the number of people in each department.
- Leasing costs (\$96,000) are incurred for the office space occupied by the firm. Therefore, these costs are prorated based on square footage occupied.
- Utilities costs (\$60,000) are for heat, light, and water. They are prorated on the basis of square footage occupied.
- Janitorial services (\$36,000) to keep the offices clean are contracted out. These costs are prorated on square footage.

In allocating the support functions to the operating departments, Secretarial is allocated on the basis of secretarial time. Billing is allocated on the basis of salaries and wages. Overhead rates for the operating departments are determined by using salaries and wages in the Nursing and Home Health Aides Departments, and staff time in Rehabilitation Department. The following budgeted data are available for the allocation bases:

	Adminis- tration	Secretarial	Billing	Nursing	Home Health Aides	Rehabili- tation Services
Number of people	2	4	6	4	6	2
Book values	\$10,000	\$70,000	\$80,000	\$120,000	\$160,000	\$40,000
Square footage	1,000	2,000	2,000	1,500	2,500	1,000
Staff time (hours)	4,000	8,500	12,500	9,000	12,500	5,000
Secretarial time (hours)	500	200	2,000	2,000	3,000	1,000

(*continued*)

Case Study: Birnbrey Home Health Services (*continued*)

Case Study Exercises

1. Complete the proration of indirect costs to all support functions and operating departments. Show the sum of direct and indirect costs in each function and department.
2. Explain why the proration of indirect costs is necessary.
3. Using the direct method, allocate the service functions' costs to the operating departments, and develop the overhead rates for each of the operating departments. (Round dollar allocations to the nearest dollar and overhead rates to four decimal places.)
4. Using the step method, allocate the service functions' costs to the operating departments, and develop the overhead rates for each of the operating departments. The secretarial pool is allocated first. (Round dollar allocations to the nearest dollar and overhead rates to four decimal places.)
5. Compare the answers in part (3) and part (4) and explain why the differences occurred. Is the direct method used in part (3) or the step method used in part (4) preferred? Why?

Key Terms

actual costing A costing system in which product costs consist of actual direct materials used, actual direct labor cost, and actual overhead cost.

applied overhead The amount of overhead cost determined by the product of the predetermined overhead rate and the actual activity.

direct labor Labor that can be specifically identified with a product in an economically feasible manner.

direct materials Materials that can be identified with the production of a specific product and are easily and economically traced to the product.

direct method A method of service center cost allocation that assigns costs only to operating departments.

dual-rate method A method of allocating fixed costs separately from variable costs.

expected volume The amount of activity that is anticipated during the coming year.

ideal capacity The maximum amount of product that can be manufactured or the maximum service that can be rendered with available facilities.

indirect labor Labor that cannot be specifically identified with a product in an economically feasible manner.

indirect materials Materials that cannot be identified with the production of a specific product or are not easily and economically traced to the product.

normal costing A costing system in which product costs consist of actual direct materials used, actual direct labor cost, and applied overhead cost.

normal volume An average level of plant utilization over several years.

operating departments Organizational units most closely tied to the productive effort that results in products or services to customers.

overhead rate Total overhead cost divided by total cost driver activity.

practical capacity Full utilization of facilities with allowance made for normal interruptions and inefficiencies.

predetermined overhead rate An overhead rate developed at the beginning of the year based on estimated costs and estimated activity.

service centers Organizational units that provide supporting services that facilitate the activities of the operating departments.

step (sequential) method A method of assigning service center costs that recognizes services provided to other service centers, but only in a one-directional manner.

Review Questions

The following questions relate to several issues raised in the chapter. Test your knowledge of these issues by selecting the best answer. (The odd-numbered answers appear in the answer appendix.)

1. Explain the distinction between direct and indirect costs.
2. What are the three criteria for determining whether materials are direct or indirect?
3. Explain why a budget is used in costing facility overhead, rather than assigning actual overhead cost after the end of the year.
4. Explain under what circumstances departmental rates are preferred to a facility-wide overhead rate.
5. Explain the difference between practical capacity and normal volume.
6. How are service center costs allocated to other service centers and operating departments under the direct method? Under the step method?

Exercises

1. **Computing order costs.** Hotz Repair Services specializes in the routine maintenance and repair of radiology machines. Three orders (#721, #722, and #723) were started and completed in March. Materials costing \$41 were used on order #721; materials costing \$17 were used on order #722; and materials costing \$8 were used on order #723. Labor is paid at a uniform rate of \$8.50 per hour, and overhead is applied at 80% of labor cost. During the month, 3 labor hours were used for order #721, 2 hours for order #722, and 4 hours for order #723.
 - a. Compute the costs of each order, showing separately the costs of materials, labor, and overhead.
2. **Computing labor costs.** Happy Hospital operates its facilities on a two-shift basis and pays a late-shift differential of 15% above the regular wage rate of \$35 per hour. The company also pays a premium of 50% for overtime work. During the year, work occurred in the following categories:

- | | |
|----------------------------------------------------|--------|
| Number of hours worked during the regular shift | 10,000 |
| Number of overtime hours for regular shift workers | 300 |
| Number of hours worked during the late shift | 6,000 |
- a. Compute the total cost to assign to direct labor.
 - b. Compute the amount of labor-related cost to assign to overhead.
3. **Computing total costs.** Greene's Radiology uses a normal costing system. Overhead and labor hours were estimated at \$42,000 and 6,000 hours, respectively, for 20X3. During July 20X3, only 400 x-rays were finished. Materials used on these x-rays totaled \$3,700, and labor costs were \$2,700 (at \$20 per hour). During 20X3, 5,000 labor hours were worked and \$38,000 in overhead costs was incurred.
 - a. What is the total cost of the x-rays finished during July?
 4. **Creating a T-account.** Rogin's Medical Clinic uses a normal costing system. The following transactions took place during the year:
 - (1) Purchased medical supplies (direct and indirect) on credit for \$55,000.
 - (2) Used \$37,000 of direct materials and \$11,000 of indirect materials.
 - (3) Applied \$42,000 of overhead.
 - (4) Patients treated had a total cost of \$275,000.
 - (5) Overapplied overhead of \$3,000 is closed out to Cost of Patients Treated.
 - a. Provide entries in T-account form for the Rogin's Medical Clinic transactions during the year.
 5. **Computing cost of services.** Evan's Medical Clinic uses a normal costing system. During April, transactions included the following items:

Direct labor cost	\$17,000
Actual overhead incurred	45,000
Overhead applied	41,000
Direct materials used	37,000
Indirect materials used	2,500

 - a. Compute the cost of services completed (and sold) during April.
 6. **Computing overhead rates.** Volova Research Laboratories performs contract research for government and private medical foundations. It is located in the Salt Lake Valley, where it has access to a labor market with advanced scientific and engineering degrees. Utah has several major universities graduating people who want to pursue careers while remaining in Utah. The company is divided into six divisions with appropriate support and ancillary facilities. Each division is housed in its own building within the industrial complex.

The company bills its customers based on costs of research work. Costs included are for direct equipment, direct labor hours, and overhead. The current overhead

rate used for billing purposes is the facility-wide rate, which is \$31.25 per hour for this year. The overhead costs and labor hours by division are as follows:

	Overhead (in thousands)	Labor Hours (in thousands)
Pharmaceutical	\$ 3,760	160
Instruments	13,120	800
Aquatic	2,975	170
Laser	113,400	2,250
Gases	16,471	910
Equipment	<u>37,290</u>	<u>1,695</u>
Totals	<u>\$187,016</u>	<u>5,985</u>

Several customers, particularly government agencies, question the overhead rate because it is too high for their projects.

- a. Calculate overhead rates for the overall facility and for each of the six divisions.
 - b. Show how much overhead would be charged to each of the following projects with a facility-wide overhead rate and then with divisional rates:
 - (1) Project #10106: Basic Cancer Care. (Funded by the U.S. Department of Health and Human Services.) During the year, this project had 31,400 hours of work recorded. Sixty percent of those hours were from the Pharmaceutical Division, and 40% were from the Instrument Division.
 - (2) Project #10111: Advanced Cancer Care. (Funded 30% by the State of Utah, 50% by the U.S. National Institutes of Health, and 20% by a private medical foundation.) This project absorbed 47,500 hours, of which 23,200 were in the Laser Division and the remaining hours in the Equipment Division.
 - c. Which of these two project sponsor groups would have a more legitimate complaint about the overhead rate? Explain.
7. **Using the direct method to allocate costs.** Karon Hospitals has three operating departments (Cardiac Care, Acute Care, ICU) and two service departments (Administration, Personnel). The budgeted data for the year are as follows:

	Overhead Cost	Labor Hours	Number of Patients	Employees
Service Departments				
Administration	\$ 55,000	12,000		22
Personnel	38,000	8,000		10
Operating Departments				
Cardiac Care	250,000	35,000	200	60
Acute Care	580,000	60,000	750	125
ICU	330,000	40,000	275	90

Administration costs are allocated based on labor hours, and the Personnel allocation is based on number of employees. Sixty percent of the Administration costs are fixed; the long-run needs of each of the operating departments were considered as being equal when these costs were incurred. The overhead rates in each operating department are based on the number of patients.

- a. Using the direct method in conjunction with dual-rate allocation, allocate the service departments' costs to the operating departments, and calculate overhead rates for each operating department.
8. **Using the direct method and the step method to allocate costs.** Carl Laboratories, a medical laboratory, has two operating departments relating to types of clients: Individual and Corporate. The laboratory also has two service departments: Patient Services and Processing. Estimated direct costs and percentages of services used by other departments are as follows:

Service Dept.	Used by Department			
	Patient Services	Processing	Individual	Corporate
Research	—	10%	40%	50%
Secretarial	20%	—	50%	30%
Direct costs	\$520,000	\$440,000	\$950,000	\$990,000

- a. Allocate the service departments' costs to the operating departments, using the direct method.
- b. Allocate the service departments' costs to the operating departments, using the step method. Allocate Secretarial costs before Research costs.

Problems

1. **Costs and overheads.** Perry Brickman owns and operates Brickman Medical Equipment Installation and Service. Two overhead rates are used in applying overhead costs to the jobs. One rate is based on direct labor hours, and the other is based on loader hours. The loader is only used when installing equipment. Overhead costs of operating the loader are kept separately, so that only the jobs requiring the use of the loader are charged an overhead rate per machine hour. For the year, \$126,000 of general overhead costs were budgeted for 6,000 direct labor hours, and \$21,600 of loader-related overhead costs were budgeted for 1,800 machine hours (hours of loader operation).

On February 1, the cost in Work in Process is \$440 and consists of only one job, the job for Dr. Esral. Costs and other data pertaining to jobs worked on during February are:

	Direct Materials	Direct Labor	Labor Hours	Machine Hours
Dr. Esral	\$ 135	\$ 320	16	—
Dr. Appelrouth	246	560	28	—
Dr. Spector	230	365	12	5
Dr. Vogel	84	60	3	—
All other jobs	<u>842</u>	<u>14,000</u>	<u>500</u>	<u>160</u>
Totals	<u>\$1,537</u>	<u>\$15,305</u>	<u>559</u>	<u>165</u>

All orders were finished during February with the exception of the Dr. Vogel order, which is still in process.

Instructions

- a. Compute an overhead rate per direct labor hour and an overhead rate per machine hour.
 - b. Prepare a summary of costs incurred for work performed in February.
 - c. Determine the cost of work completed during February.
2. **Step method and allocation.** Chaiken Imaging has two operating departments (MRI and XRAY) and two service centers (Maintenance and Billing). Maintenance costs are allocated based on square footage, and Billing costs are allocated based on number of employees. Data for December are as follows:

	MRI	XRAY	Maintenance	Billing
Materials	\$ 8,500	\$ 8,900	\$ 4,200	\$ 5,500
Labor	6,500	8,400	3,300	3,900
Overhead	<u>5,100</u>	<u>1,800</u>	<u>2,500</u>	<u>3,700</u>
Totals	\$20,100	\$19,100	\$10,000	\$13,100

In addition to these costs, Billing generated revenues of \$705. Other data are:

	MRI	XRAY	Maintenance	Billing
Number of employees	37	44	22	30
Square footage	2,800	3,700	2,000	1,400

Instructions

- a. Using the step method, determine the total overhead costs of each operating department after allocation of service center costs. Begin the allocation with Maintenance.

3. **Costs, overheads, and allocations based on independent requirements.** Slovin Medical Clinic of Manchester, England, specializes in cardiac care. The budgeted data for its facility are:

	Support Functions		Producing Departments	
	Administra- tion	Mainten- ance	Rehabilit- ation	Nursing
Overhead cost	£80,000	£30,000	£500,000	£600,000
Labor hours		10,000	50,000	80,000
Medical equipment hours			100,000	150,000
Square meters of space occupied	4,500	7,000	50,000	25,000

During the year, Fier Insurance contracted for services for its policy holders that was started and completed by year-end. Data for these services include the following information:

	Rehabilitation	Nursing
Direct materials cost	£95,000	£ 21,000
Direct labor hours	7,000	15,000
Direct labor cost	£56,000	£120,000
Medical equipment hours	16,000	30,000

Instructions

Treat each of the following requirements independently:

- The company follows a policy of applying overhead for the entire plant on the basis of medical equipment hours.
 - Calculate a facility-wide overhead rate based on medical equipment hours.
 - Apply overhead to the Fier job.
- The company follows a policy of allocating support function costs to the producing departments using the direct method. Administration costs are allocated on direct labor hours; Maintenance on square meters of space occupied; Rehabilitation on machine hours; and Nursing on direct labor hours.
 - Allocate support function costs to producing departments.
 - Calculate overhead rates for producing departments.
 - Apply overhead to the Fier job.
- The company follows a policy of allocating support functions' costs to the producing departments using the step method. Administration costs are allocated first using direct labor hours; Maintenance using square meters of space

occupied; Rehabilitation using machine hours; and Nursing using direct labor hours.

- (1) Allocate support functions' costs to producing departments.
 - (2) Calculate overhead rates for producing departments.
 - (3) Apply overhead to the Fier job.
- d. Prepare a summary of the results of allocating overhead to the Fier job for these two alternatives. Explain why the differences in overhead costs occur.
4. **Costs, overhead, and total costs per unit.** You find that the cost records at Oberman Laboratory Services have been poorly maintained. Some information has been entered, but other information is missing. Fortunately, the information given is correct.

The costs for Jobs 686, 687, and 688 are to be determined. The direct materials cost is \$528 for Job 686 and \$715 for Job 687. The cost of direct materials requisitioned during the month for all other jobs, except Job 688, is \$4,820. No jobs were in process at the beginning of the month. The total cost of direct materials requisitioned during the month was \$6,913.

Labor is paid at a uniform rate of \$10 an hour. Job 686 required 82 direct labor hours, and Job 688 required 43 direct labor hours. A total of 760 direct labor hours were worked during the month. The direct labor cost of all other jobs, with the exception of the three jobs for lab tests being considered, was \$5,850.

Two machine hours are used for each direct labor hour. Overhead is applied at a rate of \$4 per machine hour. The actual overhead cost for the month was \$6,320. Jobs 686, 687, and 688 were completed during the month.

Instructions

- a. Compute the costs for Jobs 686, 687, and 688. Show costs by cost element.
- b. Determine the amount of overhead applied to all orders during the month.
- c. Determine the amount of the underapplied or overapplied overhead.
- d. You have received a telephone call from the general manager requesting the total cost per unit on Job 686. There were 50 units of laboratory tests (books) on this order. Determine the total cost per unit.