

By Donna M. Falcone, MSM, MT(ASCP)

Basic financial management for laboratorians

The chief pathologist has been questioned by several staff physicians about the availability of a new test for disease XYZ. The pathologist then asks you, the chemistry supervisor, to look into the feasibility of offering this test. In researching the possibilities, you must consider several questions. What level of volume can you expect? What are the associated costs of adding this test to the menu? Will this addition require new equipment? Will this equipment be a capital expenditure? What staffing adjustments will be necessary? How many tests will the lab need to perform before realizing a profit?

The ability to answer these questions requires a basic understanding of financial management and is essential for the laboratory manager at any level. Understanding the role the laboratory plays in an overall hospital strategic plan assists the laboratory manager in planning for the direction the laboratory should take, both short-term and long-term. Unfortunately, there is often no formal training in managerial accounting or basic finance for the entry-level manager. In addition, understanding the relationship between revenue and expenses is an essential element in the budgetary process because the result of that process is the laboratory budget—a plan that can guide the laboratory to operational and financial success. Every lab manager should acquire a basic understanding of the financial terms and principles critical to that process.

Revenue and cost centers

In financial terms, institutions are composed of two groups: revenue centers and cost centers. Revenue is the intake of funds received by an organization for services rendered. A revenue center, therefore, is an area of the organization, be it an entire department or simply a unit of a department, which is responsible for generating a percentage of the total revenues expected by the organization. Costs, on the other hand, are expenditures incurred by the organization in the course of providing a service. A cost

center is a unit within the organization whose primary purpose is to provide a service at the least possible cost. Examples of cost centers in the hospital setting include the departments of maintenance, dietary, and medical records. Other cost centers, such as nursing, radiology, and pharmacy are also revenue producers.¹

The laboratory may be viewed as either a revenue center or a cost center, depending on how the organization is structured. In smaller institutions, the laboratory may be categorized as a single cost center; whereas in larger organizations, individual sections such as hematology and cytology are assigned as separate cost centers.² However, the laboratory does produce revenue in the form of the billable test. In this case, the laboratory (or section of the laboratory) could be thought of as a revenue center.

Assigning the laboratory to one of these categories can be difficult. Even the chief financial officers of health-care facilities differ on how they view the laboratory portion of their institutions. In *MLO's* poll of these executives, published in the September 1999 issue, 64% considered their labs revenue centers, 33% thought of them as cost centers, and 3% considered them to be both. In one case, the laboratory was viewed as a cost center for inpatient and outpatient testing and as a revenue center for its outreach program.³ As an emphasis is placed on reducing expenses rather than creating new sources of revenue, the laboratory is viewed as more of a cost center than a revenue center.

CONTINUING EDUCATION

To earn CEUs, see test on page 38.

LEARNING OBJECTIVES:

Upon completion of this article the reader will be able to:

1. Describe the differences between cost and revenue centers.
2. Identify fixed, variable, direct, and indirect costs in a laboratory operation.
3. Determine the break-even point on a test system.
4. List the kinds of budgets used in healthcare organizations and discuss the various stages of the budget process.

CE test published through an educational grant from





Costs

Costs, as described above, are expenditures and are classified as either direct or indirect. Direct costs are those that are specifically associated with a particular service or process. In the laboratory setting, examples of direct costs include instruments, reagents, and technical personnel. Indirect costs, on the other hand, cannot be specifically associated with a certain service or process and must be paid even when a particular service is discontinued.

Examples of indirect costs include clerical staff, inspection costs, and hospital overhead. These costs are shared among several departments or units and thus are allocated accordingly. For example, hospital utility costs may be allocated as indirect costs to departments based on the square footage of the particular unit.

Costs are also categorized based on their behavior patterns in relation to changes in volume. Variable costs are those that change proportionately

with a given change in volume. If the workload for a particular test or service increases by 10%, the variable costs of performing this test would be expected to increase accordingly. Fixed costs, on the other hand, do not vary as volume changes. In our example above, as the workload for the test increased by 10%, the cost of the department manager's salary would remain constant. While many of the direct costs associated with a particular test would be considered variable costs

Table 1

Examples of cost categories

	Direct	Indirect
Fixed	equipment	association dues
Variable	reagents	electric usage

Table 2

Fixed and variable costs in the laboratory

Fixed costs	Variable costs
Management salaries	Testing supplies and reagents
Allocated hospital overhead	Specimen collection supplies
Equipment repair and maintenance	Testing personnel salaries
Depreciation of testing equipment	Office supplies
Marketing costs	Telephone expenses

Source: Fantus J. Understanding cost behavior in the lab: The key to financial success. *MLO*. 1997;29(7):68–70.

(for example, supplies), other direct costs are considered fixed (see Table 1). Additional examples of fixed and variable costs in the laboratory can be found in Table 2.

Other costs have elements of both fixed and variable costs; that is, they vary with volume, but not in direct proportion. These costs are termed semivariable. Continuing with the example above, as the volume for a test system increases by 10%, the semivariable costs would increase, but not by 10%. Staffing requirements can fall into this category. For example, the test volume increase in our example could reach as high as 30% without additional supervisory staff becoming necessary. However, there could be a breaking point where the test volume increase (to say 40%) would necessitate another supervisory position, which forces an increase in the semivariable cost. The fixed and variable components of semivariable costs can be determined using cost behavior models.^{5,6} As shown in Figure 1, total costs, therefore, are the summations of the variable, fixed, and

semivariable costs or the total variable and the total fixed costs.

Cost per test

Once it is determined what the relative costs are, the cost per test can be calculated. This value is important for a number of reasons. It can be used to compare analyzers being considered for use in the laboratory, to compare costs in central versus satellite laboratories, to evaluate the benefits of changing a batch size, or to decide whether to continue to perform the test in house or refer it out for testing. It is important to include the *total* costs including direct and indirect supplies, salaries, and allocated administrative expenses as well as equipment and maintenance expenses when determining this figure. Costs that may be overlooked but that must be considered include the cost of calibrators, repeat testing, quality assurance costs, education, and losses such as expired reagents and spillage. The cost per test can then be calculated by dividing the total costs by the number of reportable tests.

For example, a laboratory wants to evaluate how the cost per test will change based on 3 potential monthly test volumes: 100, 250, and 500 tests performed. The laboratory supervisor has determined that the total fixed costs for this test system are \$300 and the total variable costs are \$1 per test. In Table 3, the relationship of these costs to the total cost per test is presented.

Note that as volume increases, total costs rise; however, the cost per test decreases because the fixed portion is spread over a larger number of tests. It is important to remember that this trend will continue until a certain volume limit is reached where additional fixed costs will be required (for example, the acquisition of an additional instrument to handle the increased volume).

Break-even point

Another important concept pertaining to costs is the break-even point. This point is achieved when the total costs for a test are equal to the total revenue received for performing the test. When revenue received is greater than this value, you will see a profit. When revenue is less than the break-even point, you will experience a loss. The break-even point is diagrammed in Figure 2. Using the previous example, where fixed costs are \$300, variable costs are \$1 per test, and assuming a revenue of \$4 per test, the break-even point (assuming no profit or loss) can be determined using the following variables⁷:

- X = volume of tests at break-even point
- R = revenue per test
- V = variable cost per test
- F = fixed cost per test
- C = net income.

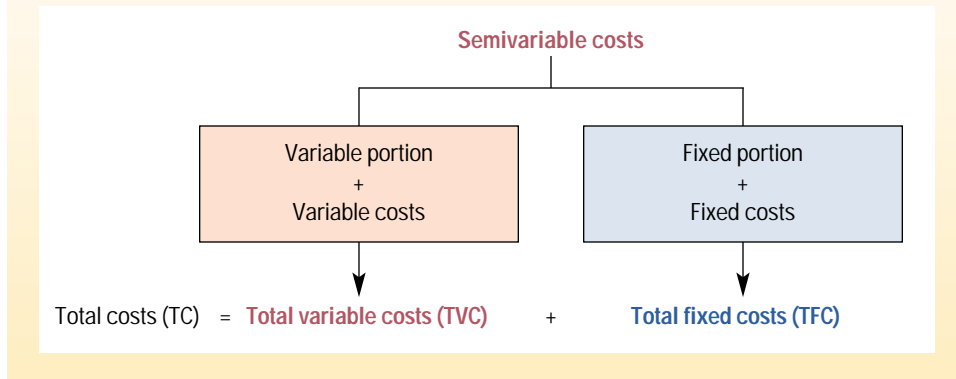
The equation to find the break-even point using these variables is as follows⁷:

$$RX = F + VX + C$$

$$X = (F+C)/(R - V)$$

Figure 1

Computation of total costs



Now, input the values from the previous example:

$$X = (\$300 + \$0)/(\$4 - \$1)$$

$$X = 100 \text{ tests}$$

The break-even point for this example is 100 tests. A test volume of less than 100 will result in a financial loss, and a volume of greater than 100 tests will show a profit. Note that in this example, the income value used is zero because the exact volume of testing where the total costs equal total revenue is the desired figure. Another way to use this formula is in the determination of what volume would be required to obtain a defined income. If a minimum income level of \$1200 were desired, the equation would look like this:

$$X = (\$300 + \$1200)/(\$4 - \$1)$$

$$X = 500$$

To cover total costs and achieve a profit of \$1200, a test volume of 500 is necessary.

In addition to the applications described above, a break-even analysis can be used to determine what price must be charged when the volume of testing is fixed. The break-even analysis is a useful tool that can predict what effect a change in cost, volume, or revenue may have and can help the supervisor to predict the success or failure of introducing a new test system.

Budgets

Once costs and their behaviors are defined, they can be applied to the planning process through the budget. The budget is a plan of operations expressed in quantitative terms.⁸ It is used to forecast anticipated revenues and expenditures over a given period of time, typically 1 year, to provide a ref-

erence for the evaluation of financial performance of a department or the organization, and to help control costs. The budget is also a measuring stick for financial accountability. Supervisors or managers are generally held responsible for operating within their approved budgets, plus or minus a small variance. It is important to remember that the budget should be driven by the organization's strategic plan and not visa versa. It is for this reason

that developing the budget should be a coordinated process between top organizational management and the department level manager.

Capital budgets. Often, organizations create separate budgets: the operating budget, which is for general operations; and the capital budget, which encompasses larger expenditures that cost more than a defined dollar amount and whose useful life is usually longer than 1 year. Examples of capital expenditures include safety issues (such as those needed to comply with governing agencies such as JCAHO or CAP), the replacement of old or obsolete equipment, and the addition of new equipment for use in cost reduction or revenue-generating projects.

Producing a capital budget requires management to perform several tasks when designing such projects. An estimation of initial cash outlay, an esti-

mation of the future revenues and expenses, and a risk analysis of the project are just some of the considerations required in the process.⁹ In the MLO survey of CFOs mentioned previously, participants were asked to describe the criteria used to assess laboratory capital spending. In their answers, 31% cited need, 29% looked at

Table 3

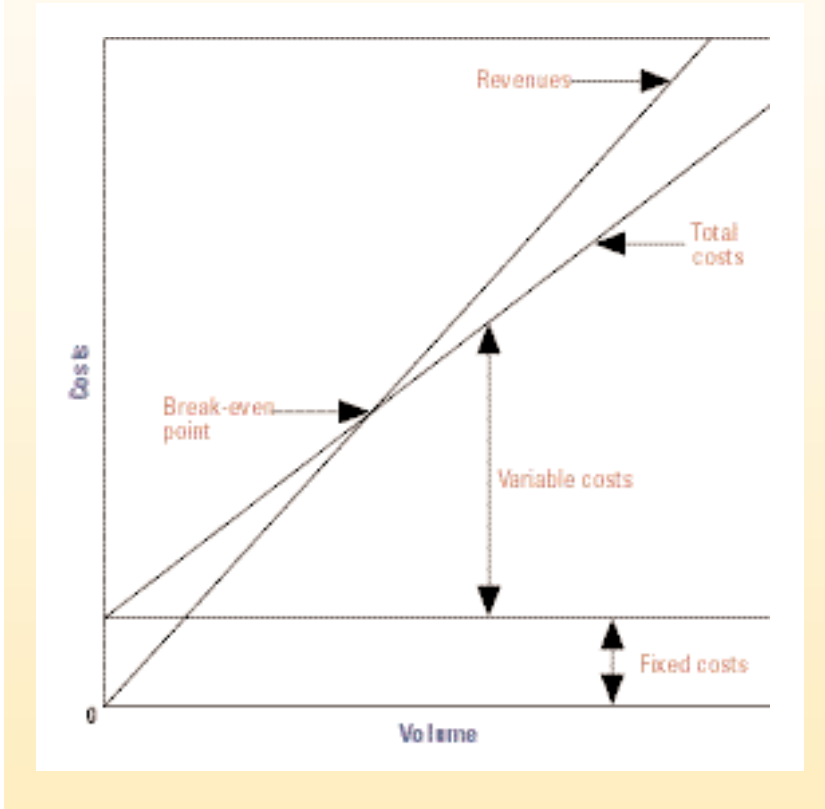
Example evaluation of cost per test

Volume	Fixed costs	Variable costs	Total cost	Cost per test
100	\$300	\$1 x 100 = \$100	\$300 + \$100 = \$400	\$400 ÷ 100 = \$4.00
250	\$300	\$1 x 250 = \$250	\$300 + \$250 = \$550	\$550 ÷ 250 = \$2.20
500	\$300	\$1 x 500 = \$500	\$300 + \$500 = \$800	\$800 ÷ 500 = \$1.60

Source: Adapted from Romfh P. Introduction to clinical laboratory management. Self study course #45. Denver, CO: CACMLE; 1994: 50.

Figure 2

Break-even point



return on income, 20% based their assessment on cost, and 16% evaluated revenue generation.³

Many institutions perform capital budgeting at the organizational rather than the departmental level because of the strategic financial implications. Some organizations also produce a separate budget for personnel costs. It is critical that these budgets are tied together in some respect so that changes in one are reflected in the others. For example, if a large capital equipment purchase is planned, it is essential that increases in supplies needed are noted in the operating budget and that any necessary addition of staff is reflected in the personnel budget.

Budget types. There are several kinds of budgets. An *appropriation budget* is one in which a fixed sum is applied to each department that has no relation-

ship to volume. This type of budget is common in government organizations. In a *fixed budget*, an expected volume or workload is defined and the revenues and expenses are forecasted from this volume. If the volume varies during the course of the budget cycle, the forecasted revenues and expenses do not change. The *flexible budget* recognizes that certain expenses will remain fixed over a given range of activity while others will vary directly with that activity. This does, however, make the flexible budget more time-consuming to develop. Because this type of budget is based on a range of activity or volume, that range must first be defined and then the patterns of costs expected during that period must be analyzed and separated by behavior (fixed or variable).¹⁰

Budget process. As mentioned previously, the budget is a plan. Managers

are often required to make forecasts as part of the budgetary process. Forecasts are essentially projections of future scenarios and can be short or long range. Changes in payer mix and utilization patterns can affect forecasts and therefore must be considered when performing this task.

The first phase of the budgeting process is the planning phase. During planning, several essential factors should be considered in the formulation of the budget, including the establishment of goals, the evaluation of the resources needed to meet these goals (including personnel, supplies, and equipment), and an estimation of what these resources will cost. Other things to consider are special projects and their impact on the resources of the organization (for example, the installation of a new information system), as well as large renovation plans and the operational consequences associated with them. One of the most important considerations at this stage is accounting for personnel and related matters, as this usually accounts for the majority of the laboratory's total budget.

The second phase of the process is the formulation of the budget. Line items on the operating budget of a laboratory may include payroll expenses (for management, technical, and clerical staff), benefits expenses (including taxes, vacation pay, and insurance), professional fees, supplies, and equipment fees (including service contracts and repair costs). Other miscellaneous expenses such as dues, subscriptions, and training costs are also included.

The next step is the allocation of the expenses to individual laboratory sections, followed by the actual implementation of the budget, known as budget execution. Finally, the budget is monitored for variances. A variance is the difference between the projected expenditure and the actual expenditure in a given category.¹¹ Often, managers are required to explain variances beyond a certain level using variance report forms. These forms often have entries for the projected and actual



'Laboratory managers must have a solid understanding of how the laboratory fits into the organization financially.'

expenditure level, the numeric value of the difference between them, and the reason for such a variance. Such reasons can include an increase in vendor price, increased workload, or even excess reagent usage by the technical staff. The monitoring phase of the budget process encourages managers to cast a critical eye to their operation and evaluate its financial performance on a routine basis (typically monthly).

Resources

Determining the costs associated with all testing performed in a laboratory and performing financial analyses to evaluate operational performance may appear overwhelming. Fortunately, computerized options are available that can lessen the burden of this task. For determining cost per test, the creation and use of a Microsoft Excel spreadsheet customized for the laboratory is a tool used by many institutions. Commercial software is also available for this purpose that can help manage financial information and provide a mechanism for comparing costs, for example, in central versus satellite labs or between 2 potential testing systems. Software is also available for evaluating capital expenditures. Washington G-2 Reports¹² offers several publications in the financial arena including one on budgeting/capital analysis and another on cost-based pricing strategies.

For physicians' office laboratories, a spreadsheet program developed by the Center for a Competitive Advantage in conjunction with Venture Resources is available through the American College of Physicians—American Society of Internal Medicine Web site.¹³ Entitled "Office laboratory check up: Is your lab financially fit," this program helps, among other things, evaluate a lab's profitability and assists in determining the financial consequences of performing a test in the office or sending it to a reference lab. There are also numerous printed materials available, including the NCCLS publication GP11-A, *Basic Cost Accounting for Clinical Services: Approved Guideline*.¹⁴

These and other resources can assist the laboratory manager in cost analysis. It is worth noting that the first resource in this area should be the accounting or finance department in the organization. Most likely, they will have useful cost accounting software or can make useful recommendations. Besides possibly saving the laboratory manager time and money, the methods employed will be compatible with those used by the organization as a whole.

The importance of adequately defining costs and their behaviors cannot be overstated. Cost accounting, that is, defining, measuring, and analyzing the financial elements associated with producing a billable test, is a crucial step in the development of a relevant laboratory budget. The budget provides the framework from which the laboratory will operate for the stated time period. It allows the laboratory to define staffing needs, establish operational goals, forecast revenues and develop strategies for improving the bottom line—whether that be increasing revenue or workload volume or decreasing costs.

Laboratory managers must also have a solid understanding of how the laboratory fits into the organization financially. What is the payer mix? What reimbursement rates are achieved? What are the expectations of the organizational leadership for the laboratory? In a time of increasing

uncertainty in the healthcare field because of managed care issues, hospital mergers and consolidations, and escalating regulatory compliance costs, a solid financial plan may be the difference between those organizations that survive and those that don't. While laboratories typically account for just over 5% of total hospital costs,¹⁵ the potential for positive financial contribution to the organization through cost containment and/or revenue-generating outreach programs is a goal worth pursuing. □

Donna Falcone is an independent project consultant in Naperville, IL.

References

1. Baker J, Baker RW. *Healthcare Finance: Basic Tools for Nonfinancial Managers*. Gaithersburg, MD: Aspen Publishers, Inc; 2000: 27–37.
2. Travers E. Laboratory manager's financial handbook. Cost accounting: The road map to financial success. *Clinical Laboratory Management Review*. 1996;10(3):265–285.
3. Ringel M, Gryniewski K, Pfohl S. How financial executives view their hospital labs. *MLO*. 1999;31(9):17–25.
4. Fantus J. Understanding cost behavior in the lab: The key to financial success. *MLO*. 1997;29(7):68–70.
5. Suver J, Neumann B. *Management Accounting for Healthcare Organizations*. Oakbrook, IL: Healthcare Financial Management Association; 1988: 15–26.
6. Romfh P. *Introduction to clinical laboratory management. Self study course # 45*. Denver, CO: CACMLE; 1994: 40–59.
7. Butros F. Cost Concepts and breakeven analysis. *Clinical Laboratory Management Review*. 1997;11(4):243–249.
8. Suver J, Neumann B. *Management Accounting for Healthcare Organizations*. Oakbrook, IL: Healthcare Financial Management Association; 1988: 150.
9. Butros F. Laboratory administration: Capitol budgeting. *Clinical Laboratory Management Review*. 1997;11(6):410–418.
10. Baker J, Baker RW. *Healthcare Finance: Basic Tools for Nonfinancial Managers*. Gaithersburg, MD: Aspen Publishers, Inc; 2000: 80–83.
11. Travers E, Wilkenson D. Laboratory manager's financial handbook: Developing a budget for the laboratory. *Clinical Laboratory Management Review*. 1997;11(1):56–66.
12. Washington G-2 Reports. <http://www.washg2.com>. Accessed 4/25/00.
13. American College of Physicians—American Society of Internal Medicine. <http://www.acponline.org>. Accessed 4/25/00.
14. National Committee for Clinical Laboratory Standards. <http://www.nccls.org>. Accessed 4/25/00.
15. Travers E. Laboratory manager's financial handbook: The laboratory's importance to the financial stability of a health-care organization. *Clinical Laboratory Management Review*. 1996;10(1):58–59.