Chapter 1

Financial Management

Chapter Objectives

The goal of this chapter is to help you become an informed *consumer* and *user* of financial and accounting information. When you have completed this chapter, you will be able to:

1. Use financial information, such as for practice expansion or new program development, to help you make decisions.
2. Assess the financial health of your practice or organization, and determine how well it is doing in comparison with past years.
3. Utilize cash and accrual accounting information to better understand the financial status of your practice or organization.
4. Evaluate the financial impact of capital decisions, such as purchasing additional clinical equipment.
5. Determine whether you should lease or purchase equipment.
6. Use a budget to help you plan, evaluate, and guide performance.

Physician leaders are in a unique position in the healthcare system. By virtue of their medical training, they are capable of understanding the medical implications of management decisions. Physician leaders who have acquired financial skills then can combine this medical perspective with their understanding of the financial implications of a decision. This ability to consider both the medical and financial components of a decision is unique to financially literate physician leaders, and provides them with the opportunity to make unique contributions to system decision making.

As noted, all too often physicians, practices, and healthcare systems use financial information as if it were an autopsy. Two years after the expansion was undertaken, or after the new physician was hired, or after the outpatient surgery center was initiated, the financial reports are examined, and the conclusion is "Oops! This sure isn't working well, is it?" Financially literate physician leaders can use their financial skills *proactively*; that is, they can consider the financial implications and risks *before* proceeding with a project or decision. This not only reduces the chance that a poor decision will be made, but it also results in identifying what things must occur for both the financial and clinical outcomes to be achieved. Then, by tracking progress against those scheduled goals, changes can be made before financial disaster ensues.

To use financial data proactively, physician leaders need to know what financial

information they need in order to make an informed decision. Consistent with the physician leader's appropriate role, assembling data, constructing spreadsheets, and undertaking other data collection and basic analysis tasks generally should be done by others. Physicians should not be replacing their accountants or chief financial officers. There is a direct analogy here to the physician's clinical role, which includes identifying tests to be performed but does not encompass personally conducting the laboratory analysis on a patient's blood. Similarly, the physician leader's critical financial role is to know what financial information to ask for, understand how to interpret the data, and make medically and financially informed recommendations and decisions.

The emphasis in this chapter is to describe financial tools and show how they apply to decision-making situations that physician leaders routinely encounter. The primary financial tools used by physician leaders include the following:

1. *Cost-Volume-Profit (CVP) Analysis*—this provides understanding of costs and how different types of costs along with volume affect profit. Understanding and managing CVP relationships is fundamental to the success of any medical organization.
2. *Capital Asset Planning*—evaluating the financial impact of major capital acquisitions, such as buildings, office equipment, and medical equipment, and using time value of money concepts, such as net present value (NPV) and internal rate of return (IRR) to evaluate capital projects.
3. *Statements, Reports, and Systems*—understanding the use and significance of standard financial statements, such as the income statement, balance sheet, and cash flow statement. Understanding the appropriate uses of cash and accrual accounting methods are fundamental to evaluating the strength of any health care organization.
4. *Control and Budgeting*—developing financial plans and using them to evaluate the performance of operations, using budgets to benchmark goals for financial performance. These help the physician leader to plan for the future, track progress, and made changes to avoid problems or take advantage of opportunities.
5. *Short-Term Financial and Cash Control*—accounting for cash, so that it is not diverted; converting receivables into cash; knowing what reports to examine so the organization meets its cash obligations. Having timely access to cash is necessary for all organizations. These reports and methods provide critical cash knowledge and deterrence.

Physician leaders in all settings should be proficient in the first four categories. The fifth category is covered in a separate chapter (Chapter 2), because it is most directly applicable to physician leaders who are working in a practice setting.

CVP ANALYSIS

CVP analysis examines how different kinds of costs interact with the volume of business to affect profit. It can help you to answer such questions as the following:

- How many procedures will have to be conducted in order to break even or to hit a targeted profit level?
- How would combining several primary care practices into a group affect profitability?
- What would happen to profitability if a partner were to leave the practice?

- What would happen to an integrated healthcare system, if it sells its psychiatric hospital?
- If a group of orthopedic surgeons starts an outpatient surgery center and takes 20 percent of our inpatient volume, how might this affect hospital costs and profitability?
- If I make an investment in education and equipment to learn a new procedure, how many procedures will I need to conduct to break even or to reach a profitability target?

As you can see, the issues raised in these questions are critical to the financial viability of any healthcare organization. CVP analysis, therefore, is one of the most powerful financial analysis tools available, and it should be routinely performed whenever decisions will be made that may affect cost, volume, or profitability.

To perform a CVP analysis, you must understand the nature of costs. Costs are expenditures of cash, such as for supplies, personnel, interest, and rent. Costs, however, can behave in different ways. Fixed costs remain the same irrespective of the number of procedures conducted, patients treated, hospital beds filled, and so forth. In contrast, variable costs change with the amount of service provided. As more patients are treated or hospital beds are filled, these costs change. Mixed costs have features of both fixed and variable costs. Understanding these distinctions is important, because the nature of a cost has a profound effect on how you manage it, and on the profitability of any healthcare organization.

Fixed costs remain stable as services vary. Typical examples include rent, compensation for salaried personnel, interest on equipment (computers, laboratory equipment, etc.), and property taxes. This notion of a cost being truly fixed, however, is a convenient convention. In reality, no cost is truly fixed. Over a period of years, rent may increase, salaries may change as personnel come and go and job performance changes, loans may be paid off, and taxes may increase. In addition, if volume changes enough, fixed costs may change. For example, if a health system obtains a new contract with an employer to cover an additional 20,000 lives, new physicians, nurses, and nonmedical personnel may have to be hired. As volume increases beyond a certain level, a hospital may have to build an additional wing, which will generate many additional fixed costs. Similarly, if volume decreases substantially, a hospital may be able to close a wing, downsize its personnel, and thereby reduce its fixed costs. Fixed costs, however, remain stable within a broad band of business activity, which is called the *relevant range*.

Fixed costs represent the risk of doing business. Irrespective of whether the patients come, the fixed costs will be there. Practices, programs, hospitals, and healthcare systems that have high fixed costs, generally speaking, have high risk. When you are negotiating the terms of a contract, for example, one of the important issues to consider is who has the fixed cost. Often, a negotiating objective will be to try to get the other party to take the fixed cost and, with it, the risk.

There are two strategies for controlling fixed costs. The first is procurement. The maxim "Don't buy a Mercedes if a Honda Civic will do the job" is appropriate. This statement assumes that the job to be done is basic transportation; getting from point A to point B. If the job, however, was defined as "doing this in a safe manner in the event of an accident, providing superior comfort (because we have a lot of work to do and need to arrive rested), and conveying a certain image (because that communicates a message

of success, and success begets success)," then a Honda Civic would be the wrong procurement decision. By effective procurement, I mean that we don't waste money on attributes that don't relate to our mission.

The second strategy for controlling fixed costs is *"Use it, use it, use it!"* Keep salaried personnel busy, keep treatment rooms full, expand office hours, and so on. All these tactics get more use out of costs that will be there anyway. This strategy is the economic driver behind the increased number of group practices that occurred in the 1980s and 1990s, the growth in the size of group practices, the amalgamation of individual hospitals into large healthcare systems, and the growth in the size of healthcare systems. One secretary, one nurse, one computer, and often one office suite can all service more than one physician. As the second physician is acquired, *the fixed costs remain the same,* but the second physician is generating additional revenue, so the *fixed cost as a percentage of revenue generated* is obviously lower. In effect, the practice has become more efficient.

Graphically, fixed costs plot as a series of stair steps, such as in **Figure 1–1**. Here, salary costs for intake at an imaging center remains the same for the first 300 patients per week. Once this relevant range is exceeded, additional salary cost is incurred, and we go up to a new cost plateau. When you examine this fixed cost–volume relationship, it is clear that you always want to be at the far right side of any fixed cost plateau, because this will give you the most revenue generated for the given level of fixed cost. In fact, it should be apparent that your net income (net revenue minus expenses) probably will go *down* as a result of taking on the 301st patient and the associated additional fixed cost. Obviously, you would not want to take on the 301st patient and move to the higher cost plateau if you didn't have good reason to believe that you could push the volume up well beyond this level.

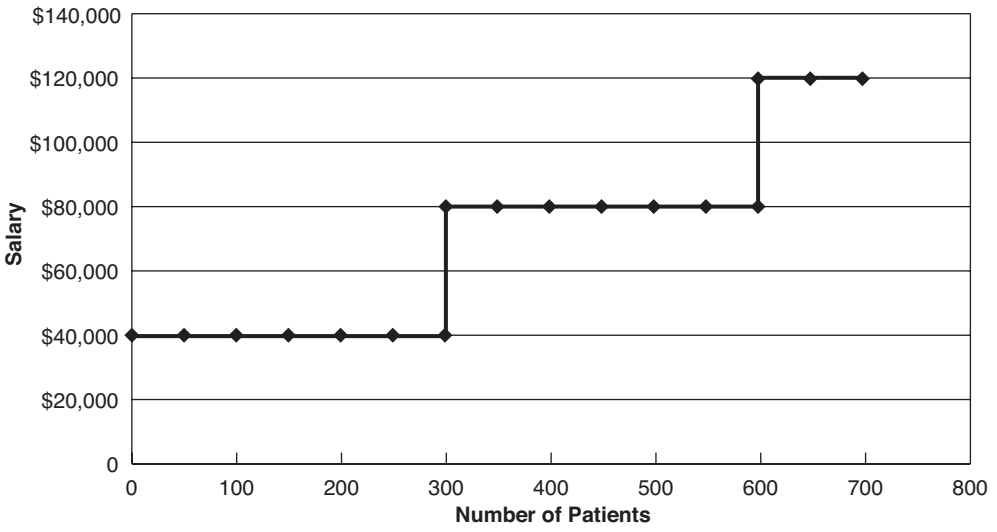

Figure 1–1 Imaging Center Salary Costs and Relevant Ranges.

This relationship between fixed cost and volume underlies the failure of many businesses and projects. Take, for example, the restaurant that given the opportunity to expand into adjacent space does so to address overbooked weekends during the summer. As a result, it greatly increases its fixed costs. These costs are present during weekdays and in slower seasons. The owner never comprehended that the expansion was perhaps tantamount to moving from the right end of a lower cost plateau to the left end of a higher cost plateau. Sometimes ill-informed decisions such as these translate into working harder just to stay in place. Sometimes they lead to lower profits and even failure. Uninformed decisions such as this may mean that you are betting the business on a large increase in volume.

Variable costs vary in total as activity varies. Typical examples include medical supplies, office supplies, postage, and the salaries of hourly personnel who can be called in or not called based on need. When more patients are treated, total variable costs increase; when fewer patients are treated, total variable costs decrease. Because total variable costs are obviously affected by volume, we need to think of them in terms of variable cost per unit, such as the variable cost per procedure, per patient, per DRG, or per minute of machine time. The unit of analysis (procedure, patient, DRG, etc.) is often called a *cost driver*, because this variable drives the total variable cost up or down. Another way to think of this is that the cost driver is an independent variable, with the variable cost being a dependent variable. Once I know the level of the independent variable, I can predict the level of the dependent variable. If my variable cost per patient is $30, then I know with some certainty that if I treat 100 patients my total variable cost will be $3,000.

As with fixed costs, there are two fundamental strategies to control variable costs. The first is procurement. The goal is to purchase at the lowest per unit cost. To do this, however, I must clearly specify the quality and characteristics that I need. Otherwise, suppliers will translate "lowest possible cost" into "cheap." A low variable cost that changes the nature of your product or service in ways that are unfavorable to the customer or the healthcare organization is a false economy. On the other hand, reducing variable costs that don't affect real or perceived quality is a legitimate cost control.

For example, Sutter Health in Sacramento, California, and Piedmont Hospital in Atlanta, Georgia, evaluated the cost of vegetables served to patients.[1] The cost of vegetables ranged from $2.22 per pound for asparagus to $0.69 per pound for baby carrots. Quality was controlled by specifying USDA Grade "A" frozen vegetables. An analysis of the costs showed that the annual expenditure for frozen vegetables was $45,468, of which $26,707 was for asparagus. By completely eliminating asparagus and consolidating all frozen vegetable purchases into a mix, they achieved a 54 percent savings while maintaining the prescribed quality standard. In addition, patients were not expecting a five-star meal anyway, and indicated equivalent levels of satisfaction on opinion surveys. In this case, the hospitals used three aspects of effective procurement to control variable costs. They specified a quality standard, they eliminated unneeded cost (asparagus), and they used their purchasing power to purchase a standard mix at the lowest possible cost per unit.

Another strategy for controlling variable costs is conservation. The goal is to eliminate waste and unnecessary usage. The cardiologist who without thinking asks to have

an extra package of balloons opened "just in case we need them" is a case in point. For example, an analysis of sutures used for total abdominal hysterectomy at Memorial Hospital in Houston, Texas, indicated that 27 percent of the sutures pulled were not used.[2] The hospital developed an education and conservation plan, and reduced the rate of unutilized sutures to 8 percent, for an annual savings of $5,625 for this one procedure.

With both fixed and variable costs, physician leaders should be very concerned with purchasing wisely and clearly specifying the quality that is needed. However, the prescription for utilizing fixed and variable costs is diametrically opposite. When we incur fixed costs, the goal is "use it, use it, use it," whereas with variable costs the goal is to conserve, eliminate waste, and restrict usage to when it is really necessary.

We have discussed fixed and variable costs as though items were intrinsically in one category or the other. Often, this is not the case. Employees can be compensated on the basis of an annual salary (fixed), or on a commission (variable), or for call-in hours worked (variable). In fact, some employees receive both forms of compensation. Similarly, rent can be fixed for a time period or taken as a percentage of sales, or both. One of the goals of good financial management is to try to take costs in their most favorable form. For example, if you believe that you can get high volume, then it may be advantageous to take costs such as salary and rent as fixed. If, however, you are uncertain of your volume level, then you can pass the risk to others by negotiating salary and rent as a percentage of revenues collected. A reasonable strategy if you are seeing about 300 patients given the data in Figure 1–1 would be to hire part-time help until you move further to the right on that cost plateau. The part-time staffing is called in only when needed. Another example of gaining efficiency by choosing how you take your costs would be to routinely collect patient e-mail addresses at intake, obtain appropriate written releases, and replace some patient mail (variable cost) with e-mail (fixed cost).

Finally, some items have characteristics of both fixed and variable costs. These are called *mixed costs*. Some cell phone contracts, for example, have a fixed component for in-network calls and minutes per month, and a variable component for roaming or exceeding your monthly minutes budget. Employee compensation may be composed of a fixed salary plus a commission based on volume. Similarly, rent can be a fixed monthly base plus a percentage of sales. Mixed costs must be broken into their fixed and variable components to control them effectively and to perform the calculations described later.

Contribution margin is defined as the excess of net revenue per unit over variable costs per unit.[3]

$$\text{Contribution Margin} = \text{Net Revenue per Unit} - \text{Variable Cost per Unit} \quad (1\text{–}1)$$

For example, if a hospital collects average net revenue of $170 on a panel of outpatient diagnostic tests, and if its variable cost for consumable supplies (e.g., reagents, disposable syringes, report paper, etc.) is $20, then the contribution margin is $150. This contribution margin of $150 is not profit! Remember, we still haven't paid for the fixed costs (e.g., the building, salaries, etc.). The contribution margin can then be used to *contribute* to paying these fixed costs. Once the fixed costs are paid, then the contribution margin goes to the bottom line, meaning that it all becomes profit.

Different products and services have different contribution margins. For a gastroenterologist a flexible sigmoidoscopy generally has a higher contribution margin than an office visit, and a colonoscopy a higher contribution margin than a flexible sigmoidoscopy. Variability of margins occurs in all industries. In the fast food industry, the biggest margins are on soft drinks, and the margins on hamburgers are much smaller. When the order taker asks you whether you want fries and a deep-fried pie with your burger, that question is not necessarily directed at achieving a nutritionally balanced meal. The fries and the pie each add higher margin items to your order, with no increase in fixed costs.

The portfolio of services offered by a healthcare organization or a practicing physician has varying margins. A healthcare system's outpatient chemotherapy center may have higher margins than the emergency department or maternity center. As a physician or healthcare system leader, you need to offer those services that are medically necessary. As a business, however, you need to understand *where* the margins are, and be certain that the mix produces a financially acceptable outcome. For example, immunizations may have negative margins (variable cost is greater than net revenue), especially if they are administered by a physician. This is not to suggest that you should stop providing immunizations. This service, however, must be balanced somewhere else in your portfolio. Similarly, you might want to examine your portfolio of services and their margins to consider how the services that are being promoted relate to their margins. Do you really want to develop a high-profile promotion campaign around a low-margin service? Correspondingly, is there something that you could do to variable costs to change a low-margin service that must be provided into one with more favorable margins?

Once we understand which costs are fixed and variable, and what our contribution margin is for a service, we can make some calculations that will tell us the volume necessary to break even and the volume necessary to achieve a stated level of profitability. We will do this with two forms of CVP analysis called *Break-Even Analysis* and *Target Analysis:*

$$\text{Break Even (in Units)} = (\text{Total Fixed Costs}) \div (\text{Contribution Margin per Unit}) \quad (1\text{–}2)$$

For example, if a dialysis center receives on average \$150 for a dialysis, and variable costs average \$40 per dialysis this would result in a contribution margin of \$110 per dialysis (\$150–\$40). If monthly total dialysis center fixed costs are \$40,000, then the break-even point would be 363.64 dialyses per month (\$40,000 ÷ \$110). If each patient on average received 13 dialyses a month, this would mean that the facility would break even with 28 full-time equivalent (FTE) patients per month (363.64 ÷ 13). Conducting a break-even analysis is appropriate when you can make the following assumptions: You can determine whether a given cost is fixed or variable, you can break mixed costs into their fixed and variable components, and there is a consistent linear relationship between costs and some measure of activity, such as the number of patients treated or the amount of revenue.

Generally, we are in business not just to break even, but also to achieve a certain profit level. Target Analysis allows you to state the volume level that must be achieved to achieve a net income target:

$$\text{Target Volume} = (\text{Fixed Costs} + \text{Net Income target}) \div (\text{Contribution Margin per Unit}) \quad (1\text{–}3)$$

In this dialysis center example, if the center wishes to make $10,000 of net income per month, then this would be achieved with 455 dialyses or 35 FTE patients if patients average 13 monthly dialyses:

$$\text{Target Volume} = (\$40{,}000 + \$10{,}000) \div (\$110) = 455 \qquad (1\text{–}4)$$

Case: General Hospital MRI System[4]

General Hospital is the flagship hospital in a system that includes four other hospitals. The staff of General Hospital was asked to evaluate a proposal to acquire a second MRI system. At the request of the hospital president, the following financial data were accumulated.

Equipment Cost and Useful Life

The estimated total cost of the installed system is $2,800,000. The expected useful life is 5 years, and depreciation[5] is accounted for by recording one fifth of the system cost each year (the straight line method). Warranty coverage for equipment maintenance and repairs includes the first 2 years of operation. Repairs and maintenance costs for year 3 are projected at $248,000.

Revenue Projections

The average gross revenue per MRI scan before subtracting bad debt and contractual adjustments is expected to be $625. Based on past experience, bad debt and contractual adjustments average 25 percent of gross revenue. Volume projections take into consideration that volume for the first year of operation will be unusually high because of an existing backlog. The estimate for the first year of operation is 2,260 MRI scans from new demand plus 940 scans from the existing backlog. After the first year, volume is projected to grow at the annual rate of approximately 15 percent. Thus, Year 2 volume is projected to be 2,599 (115% $\times$ 2,260), Year 3 volume is projected to be 2,989, Year 4 volume is projected to be 3,437, and Year 5 volume is projected to be 3,953.

Operating Costs

Supplies and film. These expenses are based on historical expense information and include film, developer, contrast media, chemicals, and other miscellaneous expenses. In Year 1 the cost is estimated at $30 per MRI scan.

Salaries. Salary expense for Year 1 is projected at $120,000 based on four technicians and one receptionist for 10 hours per day, 5 days per week. Additional staffing costs of $20,000 are required when the volume approaches 3,800 MRI scans. Employee benefits, including the employer's share of payroll taxes, health insurance, life insurance, and other benefits, are estimated at 25 percent of wages.

Cryogens. Cryogen expense is based on historical information. This cost is estimated at $40,000 for Year 1.

Indirect expenses. Indirect expenses are allocated to the MRI facility by General Hospital. Indirect expenses are charges to the MRI facility for costs that don't directly relate to treatment, such as hospital administration, parking lot, cafeteria, and the like. The allocated indirect expenses for Year 1 are $142,000.

Inflation

Based on past experience, cash operating costs (with the exception of salaries) are expected to increase at the rate of 5 percent per year. Salary costs include a provision for inflation and merit raises that are expected to total 8 percent per year.

Case Analysis: Building and Using a CVP Model

This case describes a typical situation in which physician leaders may be asked to participate with professional administrators to make a decision that has both financial and medical implications. Without a way to organize the information, you may find the task to be confusing, if not overwhelming. Without an idea of how to use the information, you may not answer, or even ask, the important questions. The CVP model provides a way of organizing the information and provides answers to some of the most critical financial questions. To construct the model, the following data are required:

- net revenue per MRI scan
- variable cost per MRI scan
- projected volume
- total fixed costs

Exhibit 1–1 MRI Facility CVP Analysis

Gross Fee per MRI Scan	$625
Less Adjustments (25%)	$156
Net Fee per MRI Scan	$469
Variable Costs per MRI Scan	$30
Contribution Margin per MRI Scan	$439
Fixed Costs	
Salaries	$120,000
Benefits	$30,000
Cryogens	$40,000
Indirect Expenses	$142,000
Depreciation	$560,000
Total Fixed Costs	$892,000
Break-Even Calculation	
Units at Break Even	2033
Net Revenue	$952,991
Total Fixed Cost	$892,000
Total Variable Cost	$ 60,991
Total Cost	$952,991
Net Income	$0

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The model that we will build will provide a description of the cost, volume, and profit relationships within the MRI project. We can use this model to compute the break-even point, determine a safety margin, perform target analysis, and gain a better understanding of the financial risks involved.

The cup model is in **Exhibit 1–1**. The gross fee per MRI scan is $625, which is reduced by contractual adjustments and bad debt to result in a net revenue per MRI scan of $469. Next, we identify our variable costs, which in this case are $30 per MRI scan. We then calculate the contribution margin by subtracting variable cost per scan from net revenue per scan, for a contribution margin of $439. This $439 now is available first to cover fixed costs and then, once they are paid, to contribute to net income. Total Fixed Costs are $892,000. We can now calculate the break-even point by dividing the Total Fixed Costs by Contribution Margin per MRI Scan. If we have $439 left over after we pay the variable costs for each MRI scan, then we must conduct 2,033 scans to break even. Exhibit 1–1 also reports revenue and cost totals at breakeven.

Exhibit 1–2 column A uses the CVP model that we developed to project the outcome for the first year when we anticipate a total of 3,200 MRI scans. The projected net income (profit) is $512,000, with a safety margin or cushion above breakeven of 1,167 MRI scans. **Exhibit 1–2** column B contains a projection for the second year. We can see that variable costs are projected to grow, and fixed costs have increased as a result of salaries, benefits, and cryogens, with a large increase due to maintenance. As a result, the break-even point has increased to 2,717 MRI scans, and the safety margin is down to 283

scans over the projected volume. At this level of operation, the projected net income will be down to $123,410.

Once this model has been built in a spreadsheet, it is then easy to run a "what-if" analysis, which is also called a *sensitivity analysis*. For example, what if increased competition and other market factors increase the average adjustment to gross fees from 25 percent to 35 percent in Year 3? The answer (**Exhibit 1–2** column C) is that projected net income would be a *negative* $64,090. In effect, we sensitize the spreadsheet to alternative scenarios and see what happens. Using our model, we can see how susceptible this project is to changes in fees, fixed costs, variable costs, and volume.

If we decide that we don't want to purchase an additional MRI machine unless we can generate $500,000 of net income per year by the third year, then we can conduct a target analysis using Formula 1-3 (**Exhibit 1–2** column D) to determine that this would require conducting 3,592 MRI scans:

$$(\$1{,}183{,}615 + \$500{,}000) \div (\$625 - \$156) = 3{,}592 \text{ scans}$$

CVP analysis and its variants break-even analysis, target analysis, and sensitivity

Exhibit 1–2 MRI FacilityProjections

	A Year 1	B Year 2	C 35% Adjustment Year 3	D Target Analysis
Projected MRI Scans	3,200	3,000	3,000	
Fee per MRI Scan	$625	$625	$625	$625
Gross Fees	$2,000,000	$1,875,000	$1,875,000	
Less Adjustments	$500,000	$468,750	$656,250	$156
Net Fees	$1,500,000	$1,406,250	$1,218,750	
Variable Cost per MRI	$30	$33	$33	
Total Variable Costs	$96,000	$99,225	$99,225	
Contribution Margin	$1,404,000	$1,307,025	$1,119,525	$469
Fixed Costs				
Salaries	$120,000	$139,968	$139,968	
Benefits	$30,000	$34,992	$34,992	
Cryogens	$40,000	$44,100	$44,100	
Indirect Expenses	$142,000	$156,555	$156,555	
Depreciation	$560,000	$560,000	$560,000	
Maintenance	$—	$248,000	$248,000	
Total Fixed Costs	$892,000	$1,183,615	$1,183,615	$1,183,615
Projected Net Income	$512,000	$123,410	$(64,090)	$500,000
Break-Even Point	2,033	2,717	3,172	
Safety Margin	1,167	283	(172)	
Target Volume				3,592

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analysis is fundamental to understanding the finances of any healthcare organization irrespective of its size or mission. For example, suppose a physician in a solo practice was considering enlarging his or her facility, hiring an additional secretary, and bringing on an associate. By adding the projected additional fixed costs to current fixed costs and using current variable costs to estimate the variable costs associated with the new associate's production, the physician then could project how much revenue the new associate would have to produce for the practice to break even or to reach a profit goal.

As the product mix becomes more complex, the calculations may become longer, but they remain fundamentally the same. For example, if fixed costs are common to a range of services with different contribution margins, then a weighted average variable cost must be calculated. Suppose that fixed costs for three procedures are $100,000. The procedures are provided in the ratio of 5:3:1, and their contribution margins are respectively $100, $75, and $25. The weighted average contribution margin is [($100 × 5) + ($75 × 3) + ($25 × 1)] ÷ 9 = $83.33. The break-even point would be calculated by dividing the total fixed cost of $100,000 by $83.33, or 1,200 procedures distributed in the projected 5:3:1 ratio. If you build a model such as this, then an important leadership role would be to review reports to see if productivity is occurring in the projected 5:3:1 ratio, and to adjust financial projections, if necessary, so there are no nasty surprises down the road.

As a physician leader, generally, you will not be assembling the spreadsheets and performing the calculations.[6] You should, however, cause them to be generated, examine the analyses, and ask "what-if" sensitivity analysis questions to better understand the financial impact of varying conditions. Your role is to *use* the financial data, along with your knowledge as a physician, to make decisions.

CAPITAL ASSET PLANNING

Capital purchasing is the process of acquiring equipment, buildings, and other items with lives longer than 1 year. Examples include purchasing an electronic medical record system, laboratory and diagnostic equipment, a building to locate a practice, computer equipment, a new wing to a hospital, or a new hospital. Capital asset planning methods are used to evaluate the consequences of these purchase decisions. Consistent with the theme of this book, the physician leader's goal is to use financial data to anticipate these consequences before making the purchase decision.

Asset decisions are particularly important because, by definition, they involve major expenditures with long-term commitments. Resources that are unwisely invested in one area are unavailable for opportunities in another. Because most asset decisions in healthcare systems have both financial and medical consequences, asset planning is an area in which physician leaders can make major contributions. The ability of financially literate physicians to consider both the medical and financial consequences of capital asset decisions offers their organizations a uniquely insightful perspective. We will use three tools to evaluate the financial consequences of a capital asset decision: payback analysis, net present value (NPV), and internal rate of return (IRR).

Payback Analysis

This method asks the very simple and direct question: "How long will it take to recover the original investment?" To calculate the payback period, you must first estimate

the annual net revenue flow. This then is compared with the initial capital investment to determine the year and month in which it would be repaid. If the income stream is equal over the life of the project, the calculation is easy. For example, a surgery suite that costs $1,500,000 to construct and is estimated to generate $400,000 of net revenue per year has a payback period of 3 years and 9 months ($1,500,000 ÷ $400,000 = 3.75). If the revenue stream is projected to be uneven, then the calculation is somewhat more involved. For example, **Exhibit 1–3** contains a payback analysis of the General Hospital MRI facility. Payback will be reached at approximately 3 years and 4 months.[7]

Exhibit 1–3 MRI Facility Payback Analysis

Year	Projected Net Revenue	Cumulative Net Payback
1	$1,072,000	$1,072,000
2	$783,313	$1,855,313
3	$678,552	$2,533,865
4	$831,764	$3,365,628

Estimated Capital Cost: $2,800,000

Year 4: Average Monthly Revenue	$69,314
Year 4: Residual to Earn	$266,135
Year 4: Months to Break Even	3.84

Payback Period: 3 Years 4 Months (Approx.)

Note: See Exhibit 1–5 for projected net revenue source data.

Payback analysis is a very limited analytical tool because it does not take into account the *time value of money.* A dollar you receive a year from now is worth less to you than a dollar in hand today, because the latter can earn interest during the year. In addition, payback tells you nothing about profitability. Payback analysis is useful, however, to gain a sense of risk. If a piece of equipment has a useful life that is not much longer than it takes to pay it off, then this indicates a high level of risk. In the MRI machine example, there appears to be about a 2-year window of opportunity, given the 5 years to obsolescence stated in the case and the payback period of 3 years 4 months. Payback analysis can be useful, therefore, for a first, quick, but limited analysis of a project's financial implications.

Net Present Value and Internal Rate of Return

Net Present Value (NPV) uses the time value of money concept to compare, or net, the projected financial benefits of a project against its projected financial costs. Internal Rate of Return (IRR) is the interest rate that a project returns when financial benefits are exactly balanced by the financial costs, and once again considers the time value of money. Because it is unlikely that two or more investment alternatives will have the same capital requirements, the IRR provides a way of directly comparing two otherwise disparate projects.

Both the NPV and the IRR concepts are based on the notion of present value (PV). PV is the value today of money received in the future. Money received in the future can't generate revenue for you between now and then, so the PV of the sum to be received in the future must be *discounted* to account for the lost opportunity. The present value of an amount received in the future is a function of the interest rate you could have earned if you could have invested the money, and the length of time between now and the receipt of the money.[8]

A hand-held calculator or computer spreadsheet program can be used to calculate the PV of an amount. Prior to the development of computers and calculators PVs were calculated by using a PV table, such as

the one in **Table 1–1**. We are going to use the PV table, because it is helpful to actually see how the financial numbers are derived. The columns in Table 1–1 are for various interest rates, and the rows are for various time periods. The entries in the table tell you the present value of $1.00 given the time period and the interest rate. For example, you receive an offer today for a lot you own that would net you $48,000 after transaction costs. Your cousin Phil has told you that he will buy it from you in 1 year for $50,000, once again, net of all costs. The land market has been flat, so you have no reason to believe that your lot will increase in value during the next year. What should you do?

Family issues aside, first you need to determine an interest rate. You look at alternatives. A 1-year certificate of deposit from a bank will net you 5 percent. Your mutual fund has averaged 13 percent over the last 5 years. You feel confident that you could safely invest the money in a AAA corporate bond at 8 percent. You choose to use the 8 percent interest rate. You enter Table 1–1 in the 8 percent column and the 1-year row. The factor 0.9259 indicates that $1.00 that you have to wait a year to receive is worth 92.59 cents today. Stated another way, if you invest 92.59 cents at an 8 percent annual yield today, you will have $1.00 in a year. Therefore, your cousin's offer of $50,000 that you must wait a year to receive is equivalent to $46,295 today ($50,000 × 0.9259). The current offer of $48,000 is greater than $46,295, so if selling price is your only consideration, you should take the current offer.

The concept of an annuity also is useful for evaluating capital investments. An *annuity* is a series of equal payments that are received periodically. For example, how much would you be willing to pay right now for the right to receive $1,000 cash annually for 3 years? Let's assume that the prevailing interest rate is 10 percent. The value of this income stream would be equivalent to the PV of the stream of payments. **Table 1–2** is a PV annuity table. It is used in a similar manner to Table 1–1. The columns are for various interest rates, and the rows are for the number of payments. In the example just stated, each dollar invested has a PV of 2.4869, so the $1,000 revenue stream for 3 years has a present value of $2,486.90. Stated another way, $2,486.90 invested today at 10 percent is equivalent to three annual payments of $1,000. An annuity calculation is a shorthand way of doing a series of PV calculations. In fact, you

Table 1–1 PV Figures

Periods	*6%*	*7%*	*8%*	*9%*	*10%*	*11%*	*12%*
1	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929
2	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972
3	0.8638	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118
4	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355
5	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674
6	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066
7	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523
8	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039
9	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606
10	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220

Table 1–2 PV Annuities

Periods	*6%*	*7%*	*8%*	*9%*	*10%*	*11%*	*12%*
1	0.9434	0.9346	0.9259	0.9170	0.9091	0.9009	0.8929
2	1.8334	1.8080	1.7833	1.7590	1.7355	1.7125	1.6901
3	2.6730	2.6243	2.5771	2.5310	2.4869	2.4437	2.4018
4	3.4651	3.3872	3.3121	3.2400	3.1699	3.1024	3.0373
5	4.2124	4.1002	3.9927	3.8900	3.7908	3.6959	3.6048
6	4.9173	4.7665	4.6229	4.4860	4.3553	4.2305	4.1114
7	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638
8	6.2098	5.9713	5.7466	5.5350	5.3349	5.1461	4.9676
9	6.8017	6.5152	6.2469	5.9950	5.7590	5.5370	5.3282

will notice that the entries for a single time period (the top row) are the same in both Tables 1–1 and 1–2. In effect, the PV of an amount is equivalent to a one-period annuity. In addition, the entry in Table 1–2 for any given interest rate and number of payments is equal to the sum of the entries for an equivalent number of time periods in Table 1–1. For example, the sum of the entries in Table 1–1 for three periods at 10 percent is 2.4869 (0.9091 + 0.8264 + 0.7513), which is the same as the entry for the three-period annuity at 10 percent as noted previously.

It is also possible to calculate the future value of a dollar received today. For example, suppose that you invested $10,000 today in a certificate of deposit that pays 10 percent annually for 3 years. A future value table provides a factor of 1.3310, so the future value of the $10,000 is equivalent to $13,310 in 3 years at 10 percent interest. Generally, future value calculations should *not* be used for making capital acquisition decisions, because psychologically we tend to have difficulty judging the effects of inflation. Stated another way, you have a better sense of what a dollar is worth today than tomorrow. Therefore, the methods that we will use to evaluate capital decisions will "bring back" future financial effects into today's dollars.

Let's now use these time value of money concepts to evaluate an investment in new equipment. This equipment will require an initial investment of $30,000. You estimate that its useful life to you is 5 years, and that you may then be able to resell it for $4,000. In addition, you must keep $5,000 worth of parts and supplies available to keep the machine in operation. These parts and supplies, however, can be easily resold, so when you sell the machine you can recover your parts and supplies inventory costs. Finally, you estimate that if you purchase the machine, you will be able to generate an additional $12,000 in net revenue each year as a result of providing additional services. Is this a desirable investment from a financial perspective?

A payback analysis indicates that payback will be achieved in 2.5 years ($30,000 ÷ $12,000). Another simple analysis that does not take into account the time value of money indicates that the equipment will generate $64,000 of revenue ($12,000 × 5 years + $4,000 for the resale of the equipment) and $35,000 of costs, for a net revenue of $29,000 and a total return of 183 percent ($64,000 ÷ $35,000). Given the 5-year useful life, the equipment is looking promising.

We will now use NPV and IRR, to gain a better understanding of the financial conse-

quences of this decision. **Exhibit 1–4** lists the various elements of this problem as either a benefit or a cost. Some of the elements, such as the $12,000 of net revenue (gross revenue – expenses) that the machine will generate each year, are currently stated in future value terms and will have to be "brought back" to the present. Other elements, however, such as the initial capital investment of $30,000, are currently stated in PV terms.

To evaluate this investment, all the elements should first be converted into PV terms. This also has been done in Exhibit 1–4 in the "PV Equivalent" column. Let's examine the benefits first. We will assume that the going interest or discount rate is 10 percent. The $12,000 annual revenue for 5 years has been treated as an annuity at an interest rate of 10 percent. This is the equivalent of $45,490 in today's dollars (Table 1–2: $12,000 × 3.7908). The resale price of $4,000 will not be realized for 5 years, so this number currently is being expressed as a future value. It is necessary, therefore, to convert this into today's dollars, which is accomplished by calculating the PV of $4,000. At 10 percent interest, each dollar in 5 years is worth 0.6209 of today's dollars (Table 1–1), which equates to $2,484. The PV of the total benefits is, therefore, $47,973.

Examining the costs, the capital investment of $30,000 is already expressed as a PV, because the equipment is being purchased today. The $5,000 for parts and supplies inventory is currently expressed as a PV, because these must be purchased when the machine is purchased. The resale of these parts and supplies in 5 years when the equipment is sold currently is expressed as a future value and must, therefore, be converted into PV terms. The PV of $5,000 in 5 years at a discount rate of 10 percent is $3,105 ($5,000 × .6209). Because we will be selling these parts, they are listed as a reduction in cost by $3,105. The PV, therefore, of the total costs is $31,896.

The *net* present value (NPV) of this investment, $16,078, is defined as the PV of the total benefits ($47,973) minus the PV of

Exhibit 1–4 NPV and IRR Analyses of Equipment Acquisition

	Amount	PV Equivalent
Benefits		
Net Revenue ($12,000 per Yr. × 5 Years)	$60,000	$45,490
Resale of Equipment	$4,000	$2,484
Total Benefits	$64,000	$47,973
Costs		
Capital Equipment	$30,000	$30,000
Parts and Supply Inventory	$5,000	$5,000
Inventory Recouped in 5 Years		$(3,105)
Total Costs	$35,000	$31,896
Discount Rate	10%	
PV of Total Benefits	$47,973	
PV of Total Costs	$31,896	
NPV	$16,078	
IRR	27.47%	

the total costs ($31,896). Because the NPV is positive, this indicates that the investment will exceed the 10 percent hurdle rate or the return that we want from this investment in order to proceed. If the NPV had been negative, that would mean that the investment would not meet our 10 percent criterion.

The IRR is the discount rate at which the PV of the projected benefits is equal to the PV of the projected costs. It is calculated through trial and error by using different discount rates and observing the effect on NPV. When NPV is zero, the IRR has been found. Alternatively, computer spreadsheet programs[9] and hand-held calculators can determine IRR using this same trial-and-error approach. In this example, the IRR is 27.47 percent. The IRR is useful if you are comparing this project with other projects and trying to determine which one to finance. If, for example, you had an office expansion alternative with an IRR of 20 percent, this would tell you that it would be an inferior *financial* investment compared to the project generating a 27.47 percent IRR.

Given that you have no other projects with a more favorable IRR, and the NPV of this investment is a positive number at a hurdle rate that you find acceptable, purchasing the equipment is worthy of consideration. Remember, however, that as a physician leader the financial considerations are only *one* aspect of your total decision-making process. For example, you might decide to purchase the equipment for ethical, convenience, or quality of care considerations even if the financial return is projected to be lower than another alternative. This thinking strikes back to one of the advantages of having physician leaders involved in the decision-making process. Performing the financial analysis first will tell you what your ethics, quality, or convenience considerations would be costing you.

Next, we will apply these tools to a more complex problem by revisiting the General Hospital MRI facility case. **Exhibit 1–5** contains an evaluation of the MRI facility based on expected volumes. With a discount rate of 12 percent, the NPV is $352,091.32. This indicates that the project passes the selected hurdle rate of 12 percent, since the NPV is positive, and that the PV of the benefits exceeds the PV of the costs by $352,091.32. The IRR is 17.08 percent, so this number could be used to compare the MRI project with other hospital projects competing for the same investment funds. The data in Exhibit 1–5 are simply the financial information provided in the preceding MRI discussion, extrapolated forward through year 5. The NPV and IRR are calculated using the NPV and IRR functions in Microsoft Excel. These financial data are one set of information that the physician leader can qualitatively consider along with expected clinical impact when evaluating this project, as well as from other projects competing for the same funds.

Here is a more detailed look at the NPV and IRR analyses in Exhibit 1–5. Begin by looking at the column Year 1. This presents the financial facts of the case, such as the projected volume (3,200 cases), average charge ($625), and so forth. The projected net revenue is $1,500,000, contribution margin is $1,404,000 and total fixed costs before depreciation are $332,000, which results in cash generated by operations of $1,072,000. Year 2 is simply based on a projected volume of 115 percent (stated in the case) of the 2,260 Year 1 base cases (remember, there was a 940 case backlog projected for Year 1). Following the rows down under Year 2, this results in a projected cash generated by operations for Year 2 of $783,313. This is then repeated for each of the remaining years covered in the projection.

Exhibit 1–5 General Hospital MRI Proposal: NPV and IRR Analysis

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Volume		3,200	2,599	2,989	3,437	3,953	16,178
Average Charge		$625	$625	$625	$625	$625	$625
Gross Revenue		$2,000,000	$1,624,375	$1,868,031	$2,148,236	$2,470,471	$10,111,114
Less Bad Debt and Contractual Adj. (25%)		$500,000	$406,094	$467,008	$537,059	$617,618	$2,527,778
Net Revenue		$1,500,000	$1,218,281	$1,401,023	$1,611,177	$1,852,853	$7,583,335
Less Variable Expenses							
Supplies and Film		$96,000	$81,869	$98,856	$119,369	$144,138	$540,232
Contribution Margin		$1,404,000	$1,136,413	$1,302,167	$1,491,808	$1,708,716	$7,043,104
Less Fixed Expenses							
Salaries		$120,000	$129,600	$139,968	$151,165	$183,259	$723,992
Employee Benefits		$30,000	$32,400	$34,992	$37,791	$45,815	$180,998
Cryogens		$40,000	$42,000	$44,100	$46,305	$48,620	$221,025
Indirect Expenses		$142,000	$149,100	$156,555	$164,383	$172,602	$784,640
Maintenance		$—	$—	$248,000	$260,400	$273,420	$781,820
Total Fixed Costs Before Depreciation		$332,000	$353,100	$623,615	$660,045	$723,715	$2,692,475
Cash Generated by Operations		$1,072,000	$783,313	$678,552	$831,764	$985,000	$4,350,629
Less Depreciation		$560,000	$560,000	$560,000	$560,000	$560,000	$2,800,000
Net Income		$512,000	$223,313	$118,552	$271,764	$425,000	$1,550,629
Discount Rate	0.12						
Cash Flows	(2,800,000)	$1,072,000	$783,313	$678,552	$831,764	$985,000	$4,350,629
IRR	17.08%						
NPV	$352,091.32						
Break-Even Point		2,033	2,088	2,717	2,811	2,970	

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The cash generated by operations row contains the values that will be used in the NPV and IRR calculations, and these are simply copied into the cash flows row so that all of the variables used for the NPV and IRR analyses are located in the same part of the spreadsheet for the sake of clarity. The case states a discount rate of 12 percent. The initial investment is stated as a negative cash flow of $2,800,000, so this appears as a negative number in the Cash Flows row.

The Microsoft Excel formula for calculating IRR is:

IRR (Value1, Value2, Value3, . . . ValueN)

or in this case,

IRR (−$2,800,000, $1,072,000, $783,313, $678,552, $831,764, $985,000)

which returns a value of 17.08%.

The Microsoft Excel formula for calculating NPV[10] in this instance is:

NPV (Rate, Value1, Value2, . . . ValueN) + Original Investment

The original investment in this case is occurring at the *start* of the first period and this is indicated to Microsoft Excel by adding it to the NPV results, or in this case,

NPV (.12, $1,072,000, $783,313, $678,552, $831,764, $985,000) + −2,800,000

which returns a value of $352,091.32.

You can obtain a feel for how these formulae work and develop a sense of how the variables interact by opening a Microsoft Excel spreadsheet, entering the cash flows and discount rate data into cells, and then calculating IRR and NPV. Change a few of the variables, such as the discount rate, initial investment, or a cash flow and see the effects on NPV and IRR. Then, imagine what would be necessary in order to achieve this change. This type of "what if" sensitivity analysis is illustrated in detail in Exhibits 1–6 and 1–7.

Once a model like this is created in a spreadsheet, it becomes easy to test the project's sensitivity to various assumptions. For example, an analysis at the 85th volume percentile (**Exhibit 1–6**) paints a very different picture. A drop of 15 percent in volume results in a decrease of more than 41 percent ($512,000 − $301,400 = $210,600) in year 1 net income. The reason that a 15 percent volume reduction can cause a 41 percent drop in net income is that this operation has a high proportion of fixed to variable costs. Each dollar in contribution margin is, therefore, very important. The NPV at the 85 percent volume level is −$384,324.77, which indicates that the costs exceed the benefits by this amount if we need to obtain a 12 percent return on our investment. In addition, the IRR is now 6.12 percent, which is the return that we will receive when benefits equal costs at the 85 percent volume level.

Finally, **Exhibit 1–7** shows the analysis at 115 percent of expected volume. NPV is $1,085,670.27, with an IRR of 26.98 percent. Once again, a modest change in volume has a large impact on net income, NPV, and IRR.

After an examination of these statistics, it becomes very clear that the financial success of this project is highly dependent on the volume level. A physician leader considering this project should question very closely how the volume projections were derived. In addition, he or she should look at the marketing plan to see whether there is a concrete strategy to obtain the needed volume. The model also could be sensitized to other critical assumptions, such as the average charge

Exhibit 1–6 General Hospital MRI Proposal: NPV and IRR Analysis at 85th Percentile of Projected Volume

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Volume		2,720	2,209	2,541	2,922	3,360	13,751
Average Charge		$625	$625	$625	$625	$625	$625
Gross Revenue		$1,700,000	$1,380,719	$1,587,827	$1,826,001	$2,099,901	$8,594,446
Less Bad Debt and Contractual Adj. (25%)		$425,000	$345,180	$396,957	$456,500	$524,975	$2,148,612
Net Revenue		$1,275,000	$1,035,539	$1,190,870	$1,369,500	$1,574,925	$6,445,835
Less Variable Expenses							
Supplies and Film		$81,600	$69,588	$84,028	$101,464	$122,517	$459,197
Contribution Margin		$1,193,400	$965,951	$1,106,842	$1,268,037	$1,452,408	$5,986,638
Less Fixed Expenses							
Salaries		$120,000	$129,600	$139,968	$151,165	$163,259	$703,992
Employee Benefits		$30,000	$32,400	$34,992	$37,791	$40,815	$175,998
Cryogens		$40,000	$42,000	$44,100	$46,305	$48,620	$221,025
Indirect Expenses		$142,000	$149,100	$156,555	$164,383	$172,602	$784,640
Maintenance		$0	$0	$248,000	$260,400	$273,420	$781,820
Total Fixed Costs Before Depreciation		$332,000	$353,100	$623,615	$660,045	$698,715	$2,667,475
Cash Generated by Operations		$861,400	$612,851	$483,227	$607,992	$753,693	$3,319,163
Less Depreciation		$560,000	$560,000	$560,000	$560,000	$560,000	$2,800,000
Net Income		$301,400	$52,851	($76,773)	$47,992	$193,693	$519,163
Discount Rate	0.12						
Cash Flows	(2,800,000)	$861,400	$612,851	$483,227	$607,992	$753,693	$3,319,163
IRR	6.12%						
NPV	($384,324.77)						
Break-Even Point		2,033	2,088	2,717	2,811	2,912	

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Exhibit 1–7 General Hospital MRI Proposal: NPV and IRR Analysis at 115% of Projected Volume

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Volume		3,680	2,989	3,437	3,953	4,546	18,604
Average Charge		$625	$625	$625	$625	$625	$625
Gross Revenue		$2,300,000	$1,868,031	$2,148,236	$2,470,471	$2,841,042	$11,627,781
Less Bad Debt and Contractual Adj. (25%)		$575,000	$467,008	$537,059	$617,618	$710,261	$2,906,945
Net Revenue		$1,725,000	$1,401,023	$1,611,177	$1,852,853	$2,130,782	$8,720,835
Less Variable Expenses							
Supplies and Film		$110,400	$94,149	$113,685	$137,274	$165,759	$621,266
Contribution Margin		$1,614,600	$1,306,875	$1,497,492	$1,715,579	$1,965,023	$8,099,569
Less Fixed Expenses							
Salaries		$120,000	$129,600	$139,968	$171,165	$184,859	$745,592
Employee Benefits		$30,000	$32,400	$34,992	$42,791	$46,215	$186,398
Cryogens		$40,000	$42,000	$44,100	$46,305	$48,620	$221,025
Indirect Expenses		$142,000	$149,100	$156,555	$164,383	$172,602	$784,640
Maintenance		$0	$0	$248,000	$260,400	$273,420	$781,820
Total Fixed Costs Before Depreciation		$332,000	$353,100	$623,615	$685,045	$725,715	$2,719,475
Cash Generated by Operations		$1,282,600	$953,775	$873,877	$1,030,535	$1,239,307	$5,380,094
Less Depreciation:		$560,000	$560,000	$560,000	$560,000	$560,000	$2,800,000
Net Income		$722,600	$393,775	$313,877	$470,535	$679,307	$2,580,094
Discount Rate	0.12						
Cash Flows	(2,800,000)	$1,282,600	$953,775	$873,877	$1.030,535	$1,239,307	$5,380,094
IRR	26.98%						
NPV	$1,085,670.27						
Break-Even Point		2,033	2,088	2,717	2,869	2,974	

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and bad debt assumptions. We would expect that, given the sensitivity to changes in net revenue, controlling these other two variables also would be critical to the project's success. Once again, making certain that the business plan for this project makes reasonable volume, fee, and collection assumptions, and that there will be a plan to manage these variables after project implementation will be critical to the project's success. The physician leader who asks these questions, who ensures that reasonable assumptions are being made, and who ascertains that the business plan makes reasonable provision for achieving and monitoring critical success these factors is making a very positive contribution to his or her organization.

LEASE VERSUS PURCHASE DECISIONS

Another capital asset decision that healthcare organizations often need to make is whether to purchase equipment outright or through a lease. Once again, the technique of pulling all financial considerations back to the present through a PV analysis provides a time-consistent method of addressing this problem. For example, suppose that you either could buy an office networked computer system for $10,000 or lease it with the following terms: an initial payment of $1,000, three annual payments of $2,500 at the end of each year, and an option to buy the computer system at the end of the lease for $3,500. In addition, you feel that the value of the system in 3 years will be $4,000. Under both arrangements, you will have to maintain it. The prevailing interest rate is 10 percent.

The real cost of the lease can be determined through a PV analysis, as shown in **Exhibit 1–8**. The initial payment of $1,000 is stated as a PV. The PV of the three $2,500 payments is evaluated as an annuity at 10 percent, which has a PV of $6,217 (Table 1–2: $2,500 × 2.4869). Assuming that you want to keep the computer at the end of the lease, the PV of the $3,500 payment is $2,630 (Table 1–1: $3,500 × .7513). The total PV for the lease comes to $9,847 ($1,000 + $6,217 + $2,630). The purchase alternative costs $10,000, so that leasing the computer is $153 less expensive.

Exhibit 1–8 Analysis of a Lease versus Purchase Decision

Item	Amount	Lease PV Equivalent	Purchase PV Equivalent	Difference
Purchase After 3 Years				
Initial Payment	$1,000	$1,000	$10,000	
3 Annual Payments @ $2,500	$7,500	$6,217	$ —	
Purchase at End of Lease	$3,500	$2,630	$ —	
Total		$9,847	$10,000	$(153)
Do Not Purchase After 3 Years				
Initial Payment	$1,000	$1,000	$10,000	
3 Annual Payments @ $2,500	$7,500	$6,216	$ —	
Est. Selling Price	$4,000	$ —	$(3,005)	
Total		$7,216	$ 6,995	$222
Discount Rate: 10%				

If you do not buy the computer system at the end of the lease, the PV analysis in Exhibit 1–8 indicates that leasing will be $222 more expensive than purchasing. Note that the purchase choice includes selling the computer, so the outcome for both the lease and purchase is that you no longer own the computer system. Obviously, this analysis is very sensitive to the resale price of the computer in 3 years. It could be performed, however, for any level of equipment value, and the physician then could make a decision to lease or buy based on the subjective probability of various resale values. This analysis also excludes the cost and inconvenience of selling the computer.

FINANCIAL STATEMENTS, REPORTS, AND ACCOUNTING SYSTEMS

Three financial statements form the basis for describing the financial status of any organization, whether it is a solo private practice or a large healthcare system. They are the balance sheet, income statement, and cash flow statement. They provide a standard, accepted way of presenting and summarizing important and fundamental financial information. They are informative in their own right, but they can also be used as the basis for additional analyses. The *balance sheet* is a listing of the organization's assets and claims against the assets at a point in time. The *income statement* compares the wealth generated by the organization against the expenses incurred as a result of generating that wealth during a time period. The *cash flow statement* describes cash receipts and cash disbursements that have occurred during a time period.

Exhibit 1–9 contains a balance sheet for a private practice as of December 31, 20XX. A balance sheet shows the financial condition of an organization on a given day, and it is based on the following financial model:

$$\text{Assets} = \text{Liabilities} + \text{Owner's Equity}$$

The items in Exhibit 1–9 under the heading "Assets" delineate all the wealth owned by the practice. This can be cash, office equipment, medical equipment, receivables, and the like. Generally, they are listed in order of their liquidity, or the ability to turn the asset into cash. The liabilities are a listing of the claims against the assets. Examples include accounts payable (unpaid bills), salaries owed, taxes due, and loans payable. Owner's equity is that part of the assets that exceeds the liabilities. In effect, the owner(s) own whatever is left over after creditors have been assigned their claims against the assets.

Owner's equity can occur in various ways. Retained earnings represent the earnings over the life of the organization that have not been distributed to the owners. When the organization generates earnings but keeps them in the company, perhaps in anticipation of financing additional growth, this constitutes retained earnings. Contributed capital is wealth that the owner has put into the organization in the form of cash, equipment, or some other asset. In this case, most of the owner's equity has resulted from retained earnings ($184,412) due to operational activity, and only $20,000 is due to contributed capital. If the situation were reversed, it would provide a very different economic picture. In a private practice, retained earnings are usually distributed to the owner each year to avoid double taxation.[11]

Balance sheets always must balance. The sum of liabilities and owner's equity always must be equal to assets. Someone always has a claim against the assets, whether it is creditors or owners of the organization. If liabilities exceed assets, then there will be a negative

Exhibit 1–9 Balance Sheet: Arnold Bennett, MD, PC

December 31, 20XX			
ASSETS			
Current Assets			
Cash	$40,589		
Accounts Receivable	$145,664		
Adj. Participating Contracts and Bad Debt	$(43,699)		
Marketable Securities	$3,572		
Prepaid Expenses	$7,325		
Inventory: Medical and Office Supplies	$3,589		
Total		$157,040	
Property and Equipment			
Building	$109,237		
Land	$40,896		
Medical and Office Equipment, Furniture	$87,567		
Less Accumulated Depreciation	$(23,879)		
Total		$213,821	
Total Assets			$370,861
LIABILITIES			
Current Liabilities			
Accounts Payable	$28,479		
Refunds Due Patients	$879		
Salaries Due	$29,875		
Prepaid Patient Fees	$527		
Payroll Taxes Due	$5,010		
Salaries Due on Accounts Receivable	$61,179		
Total		$125,949	
Long-Term Debt			
Bank Loan Capital Equipment	$40,500		
Total		$40,500	
Total Liabilities			$166,449
OWNERS EQUITY			
Contributed Capital at Start-Up	$20,000		
Retained Earnings	$184,412		
Total Owner's Equity			$204,412
TOTAL LIABILITIES AND OWNER'S EQUITY			$370,861

owner's equity. A negative owner's equity indicates that the organization is insolvent.

At this point, it is appropriate to say a few words about depreciation. Depreciation is an adjustment for capital items, such as office equipment, surgical lasers, computers, buildings, and the like, which are consumed through their use. All capital except land wears out with use and over time. An estimate is made of an item's useful life, and its cost is depreciated on that basis. If a lithotripsy machine has an expected useful life of 6 years and costs $300,000, then we would take $50,000 ($300,000 ÷ 6) each year, if we are using straight-line depreciation.[12] Depreciation appears on the balance sheet as a negative

value under assets. This indicates that the full value of the asset is being reduced by the amount of the depreciation.

If depreciation of capital equipment is not provided for, then it is possible that when the equipment does wear out, there will not be cash available to purchase a replacement. Imagine, for example, a self-employed trucker who does not set aside cash every year for the day that his rig wears out. If this trucker makes no provision for depreciation and treats all his net income as profit available for spending, he may well be living off his depreciation. When the inevitable happens and the rig does wear out, he may not have the cash available to purchase a replacement.

Cities, such as New York in the 1970s, and countries, such as Great Britain after World War II, found themselves in the predicament of not being able to tax their citizens at a sufficiently high rate to renew their capital infrastructure and pursue all the other initiatives that were politically desirable. As a result, both these entities did to some degree live off their depreciation, which ultimately resulted in near bankruptcy for New York, along with potholed roads and crumbling bridges.

The income statement compares the wealth generated by an organization with the expenses incurred as a result of generating the revenue for a particular time period, such as a month or year. The income statement is built on the following financial model:

$$\text{Income} = \text{Revenues} - \text{Expenses}$$

Exhibit 1–10 contains an income statement for a private practice. Revenues reflect the acquisition of wealth. They can be generated by clinical services, laboratory fees, patient beds, the gift shop, consultations, or any other product or service that the organization provides. Expenses are all the costs incurred by the organization to generate those revenues. These could include clerical and professional salaries, rent, medical supplies, and so on. Net income is what is left over after expenses have been subtracted from revenues.

Both the balance sheet and the income statement are examples of *accrual basis accounting*. Accrual accounting records events when wealth is generated, as opposed to when cash is received. Similarly, it records expenses when the wealth that they are associated with is generated, as opposed to when a check is written to pay for the expense. By pairing the wealth generated with the expense of generating that wealth, it is possible to determine whether the practice, program, or hospital, is operating at a profit or loss.

This should be contrasted with *cash basis accounting* (also called *checkbook accounting*), in which revenues are recorded when they are received and expenses are recorded when they are paid. With cash basis accounting, there is no attempt to match revenues with the specific expenses that they generated to determine income. As a result, if cash disbursements lag or precede the collection of cash, you cannot determine your true profit or loss position.

The cash flow statement is a cash-based analysis of cash receipts and cash disbursements for a given time period. **Exhibit 1–11** shows a cash flow statement. It begins in the first column with the current cash balance. Cash receipts and cash disbursements for the period then are noted, and a net income for the period is calculated. This then is added to the entering cash balance to calculate an ending cash balance for the period. This ending cash balance then becomes the entering cash balance for the next time period. The cash flow statement tracks cash, which is very important, because creditors have to be paid in cash. An organization can have wealth, but if

Exhibit 1–10 Income Statement: Arnold Bennett, MD, PC

January 1, 20XX, to December 31, 20XX

REVENUE			
	Clinical Services	$1,056,825	
	Bad Debt and Adjustments	$(264,206)	
	Consultation Fees	$12,587	
	Speakers Fees	$8,655	
	Total Revenue		$813,861
EXPENSES			
	Clerical Salaries	$103,667	
	Professional Compensation	$296,438	
	Payroll Taxes	$118,575	
	Rent	$48,000	
	Advertising	$8,995	
	Office Supplies	$37,889	
	Medical Supplies	$56,551	
	Interest Expense	$1,229	
	Local Taxes	$4,670	
	Insurance	$67,889	
	Education	$8,977	
	Telephone—Land Line	$1,320	
	Telephone—Cell	$1,200	
	Depreciation	$14,278	
	Total Expenses		$769,678
NET INCOME			$44,183

it is not present in the form of cash when the bills need to be paid, it will have a serious liquidity problem.

Organizations need both cash and accrual information. Each serves a different purpose. Cash accounting is necessary to pay the bills. It is the financial minimum that all organizations need. Cash management is important, because bills must be paid with cash, checking accounts need to be balanced, and cash should be managed so it is in the most favorable place to earn interest and be available to pay expenses. Accrual-based accounting information is used for making decisions. It provides a more complete picture of the financial situation by controlling for when bills *happen* to be presented, and when payments *happen* to be received. Both cash information and accrual information are necessary to effectively manage an organization's finances.

For example, suppose that you pay an annual liability insurance premium of $12,000 in April. You need to record the full amount in a cash disbursements journal in April, because it reflects the reality that your checking account has $12,000 less in it. If other total disbursements for April were $38,000 and total monthly receipts were $45,000, then on a cash basis you would be showing a $5,000 loss for the month ($45,000 − $12,000 − $38,000 = −$5,000). The full $12,000 will appear in the cash basis cash flow statement. This cash basis information, however, would provide a misleading picture of how well you did financially in April. The

Exhibit 1–11 Cash Flow Statement: Arnold Bennett, MD, PC

	January	February	March	Year to Date
ENTERING CASH BALANCE	$10,237.67	$49,434.44	$27,328.36	$10,237.67
CASH RECEIPTS				
Fees Collected	$60,046.06	$33,082.35	$68,746.74	$161,875.15
Interest Income	$61.49	$59.73	$48.56	$169.78
TOTAL INCOME	$60,107.55	$33,142.08	$68,795.30	$162,044.93
CASH DISBURSEMENTS				
Salaries—Management	$0.00	$6,812.22	$7,322.70	$14,134.92
Salaries—Administrative	$1,735.79	$4,016.14	$6,429.97	$12,181.90
Salaries—Physician	$7,536.15	$30,723.40	$22,976.23	$61,235.78
Temporary Help	$401.85	$619.20	$0.00	$1,021.05
Employee Benefits	$236.98	$445.70	$440.00	$1,122.68
Building Rent	$5,789.95	$7,021.41	$5,492.48	$18,303.84
Equipment Rental	$0.00	$836.74	$418.37	$1,255.11
Utilities	$447.95	$381.69	$626.91	$1,456.55
Maintenance and Repairs	$0.00	$46.25	$40.50	$86.75
Advertising	$0.00	$570.25	$407.34	$977.59
Office Overhead	$1,409.03	$656.80	$1,804.09	$3,869.92
Professional Services	$500.00	$700.00	$250.00	$1,450.00
Service	$0.00	$0.00	$321.00	$321.00
Insurance	$1,060.01	$455.06	$877.99	$2,393.06
Interest	$0.00	$0.00	$0.00	$0.00
Credit Card Discounts	$30.50	$84.29	$53.53	$168.32
Bank Service Charges	$25.68	$25.68	$25.68	$77.04
Dues and Subscriptions	$97.47	$58.00	$51.47	$206.94
Auto and Travel	$0.00	$0.00	$178.00	$178.00
Meals and Entertainment	$626.49	$146.35	$318.99	$1,091.83
Taxes and Licenses	$739.03	$1,375.27	$1,969.83	$4,084.13
Fines and Penalties	$0.00	$0.00	$10.00	$10.00
Depreciation	$294.00	$294.00	$294.00	$882.00
Amortization	$5.00	$5.00	$5.00	$15.00
TOTAL DISBURSEMENTS	$20,935.88	$55,273.45	$50,314.08	$126,523.41
NET INCOME	$39,171.67	($22,131.37)	$18,481.22	$35,521.52
ENDING CASH BALANCE	$49,409.34	$27,303.07	$45,809.58	$45,759.19

insurance payment is an annual premium, and you are distorting the April results by dumping all the insurance expense into that month. To gain a better understanding of how the practice really performed in April, you should recognize that you really only used one twelfth of the premium ($1,000) during April. An accrual analysis, such as found in an income statement, would show net income for April of $6,000 ($45,000 − $1,000 − $38,000 = $6,000). Both perspectives are important. You need cash accounting to be certain that the cash is available to pay the insurance premium. You need accrual information to understand the financial position of the organization and for planning purposes.

Accrual-based accounting utilizes the following adjustments that otherwise would distort the financial picture:

- *Revenue collected in advance, but not yet earned (deferred revenue)*—Mr. Chandhari sees you on January 23 for a sinus infection. You treat him and tell him to return in 2 weeks. Mr. Chandhari's copayment is $25, but he makes a $50 payment to cover today's appointment and the future visit. In this case, the cash that was collected for the future visit preceded the recognition of revenue, because you have not yet provided the service. Mr. Chandhari's payment for the future appointment would appear as a balance sheet liability, because it is a debt or obligation that you owe to Mr. Chandhari. It might appear under a category such as "Prepaid Patient Fees." This second $25.00 payment would not affect the income statement because the activity that generates the recognition of wealth (the follow-up visit) has not yet occurred. Both $25.00 transactions would be logged as a cash receipt in the cash flow statement, because cash was received.

Prepayment of fees to cover a panel of patients for a future time period also falls into this category. Failure to treat the prepaid fees in this manner could lead to disbursements of cash to physicians because cash would be available. Unfortunately, the expenses (patients coming in for services) would then follow. In addition, the fixed expenses associated with these future time periods would also become payable. The result could be that cash might not be available to cover them.

- *Revenue earned, but not yet collected (accrued revenue)*—When you provide services today but patients or insurance carriers pay at a future time, the moneys are recorded *now* as revenue. Revenue is recorded when you provide the service irrespective of whether the service is paid for immediately in cash, whether you extend credit in the form of a promise to pay, or whether you bill an insurance company. Some revenue will translate into future cash, and some will not, such as bad debt or insurance company contractual adjustments. Revenue that will be paid at a future time can be listed as an asset in the form of an accounts receivable item, such as on the balance sheet in Exhibit 1–9. Notice also that this balance sheet makes a provision for bad debt and contractual write-offs. Wealth in this category will appear on the income statement under revenue (See Exhibit 1–10). Once again, it would be appropriate to make an adjustment for expected bad debt and contractual write-offs. Items in this category would not affect the cash flow statement because no cash has been received.
- *Expenses paid in advance, but not yet incurred (deferred expenses)*—Expenses that are paid in advance must be deferred to the future time periods to which they apply. These prepaid items appear as assets on the balance sheet. Prepaid expenses could include annual insurance premiums, computer service contracts, rent, and so on. Prepaid expenses appear on the balance sheet as an asset. They don't affect the income statement because the activity that generates the recognition of wealth has not occurred yet. They do appear on the cash flow statement, because cash has been expended. From a cash receipts and disbursements perspective, deferred expenses can create cash flow problems. Usually, you will have no choice regarding the prepayment of these items. The malpractice insurance company, for example, may want the whole annual premium now. Examining this situation from an accrual perspective will not make the insurance company's

"bite" any less painful. It will put it into perspective, however, so that you can see the real relationship between your assets and your liabilities, and between your revenues and expenses. Obviously, from a time value of money perspective, this category of expense should be avoided.

Prepaid expenses do not affect the income statement. Once again, the activity that generates the wealth, and therefore its associated expenses, has not occurred yet. Prepaid expenses *do* appear on the cash flow statement. In this case the whole prepayment is entered, because that was the actual amount of cash that was disbursed.

- *Expenses incurred but not yet paid (accrued expenses)*—Expenses in this category must be recorded in the time period in which they were incurred irrespective of when you actually pay them. For example, suppose your local government assesses a 0.58 percent annual tax on gross receipts in arrears. Your cash flow statements and your checkbook will show no local tax payments for 12 months, and one large payment in the 13th month. Accrual-based accounting, however, would recognize 0.58 percent of gross receipts as they are earned. The balance sheet, therefore, will show a tax liability and the income statement will show an expense. The cash flow statement would not be affected because no cash has been disbursed. Once again, cash-based accounting would be deceptive of the true economic situation. If you are deceived and don't make a provision for the taxes you have incurred, a cash flow problem may appear when the tax is due.[13]
- *Allocation of the cost of long-term assets considered used up in the current period to help generate revenues*—An example is the requirement that a hospital record monthly depreciation charges (expenses) for a portion of the property, plant, and equipment that is considered to be consumed each month. The effect on the balance sheet is to reduce assets, such as capital equipment, along with retained earnings on the liability side. This item also affects the income statement, since the asset has been consumed or depreciated in value in the process of generating revenue. It does not affect the cash flow statement, because no disbursement of cash has taken place.

Case Analysis: Angus McLeod, MD[14]

Angus McLeod, MD, was perplexed. "I can't figure it out," he said. "I've run my own practice for almost a year now, and I have more patients by far than I have ever had. Yet here I am, just before Christmas, and I don't have enough cash in the bank to pay for that new HDTV for my family. What has gone wrong?"

Dr. McLeod started his own practice on January 1, after leaving a seven-physician group psychiatric practice, where he had worked for 3 years. He left the group because he did not like the "politics." He took $80,000 from savings, rented office space, purchased the necessary furniture and supplies, and hired a secretary/business manager.

By midyear, his practice had grown substantially, and he hired a clinical psychologist to take his overflow. He also hired an insurance/collection clerk to deal with the volume, upgraded his computer system for billing and word processing, and signed a lease for adjacent office space for the new staff. "Other than this, I don't recall any other major changes," he added. It seemed to him, however, that the better his practice became, the less cash he had in the bank.

Dr. McLeod was confident that his December work would bring in enough cash to meet the December 31 payroll. Even so, he

had far less cash in the bank at the end of the year than when he started his practice. This disturbed him because, as he put it:

> I have sunk a lot into this practice—given up the security of a large group practice, and have worked day and night to make a go of it. If this isn't going to pay off, I'd like to know it soon, so that I can make other plans. Recently, for example, a health system asked me if I would like to join them in a salaried position. I've made a lot of sacrifices in this past year, and I'd like to know whether it was all worthwhile.

A balance sheet for Dr. McLeod's practice dated October 1, 20XX, is shown in **Exhibit 1–12.** The top row of data in the spreadsheet in **Exhibit 1–13** is the same as the data in the balance sheet in Exhibit 1–12, but turned on its side so we can use them more easily to do calculations. We will use this spreadsheet to construct a new income statement, balance sheet, and cash flow statement based on the following events that occurred in October. The numbers of the following items pertain to the Items column in Exhibit 1–13:

1. The total revenue generated in October through therapy sessions, medication evaluations, hospital rounds, and his employed psychologist is $60,000. Of this amount, $10,000 is received in cash or check, and the remainder is billed. *Effect:* We add $10,000 to the cash account and $50,000 to the receivables account. Because balance sheets always must balance, we must add $60,000 to the retained earnings account. *Notice that all the wealth is recorded at the time it was generated,* not when it happens to be converted into cash collected.
2. $38,000 in cash is collected on old accounts. *Effect:* Add $38,000 to the cash account and subtract $38,000 from the receivables account. Notice that nothing needs to be done to the right side of the spreadsheet because the wealth was recorded at the time that it was generated. What has happened is that the form of the wealth has shifted from receivables to cash, which is of course a welcome shift.
3. Dr. McLeod pays an annual insurance premium, due November 15, of $6,000. *Effect:* We move $6,000 from cash into prepaid insurance. Once again, nothing needs to be done to the right side of the statement, because we are simply changing how we are holding wealth that has already been accounted for. Note also that none of the value of the insurance has been consumed yet.
4. $8,000 cash is paid for monthly operating expenses exclusive of salaries. *Effect:* Cash is disbursed, so the cash account is reduced by $8,000. The balance sheet must remain in balance, so retained earnings must also be reduced by $8,000. The

Exhibit 1–12 Balance Sheet: Angus McLeod, MD

Balance Sheet: October 1, 20XX

ASSETS		
Cash	$10	
Accounts Receivable	$60,000	
Prepaid Insurance	$1,000	
Equipment	$24,000	
Total		$85,010
LIABILITIES		
Accounts Payable	$2,000	
Total		$2,000
OWNER'S EQUITY		
Capital Contributed	$80,000	
Retained Earnings	$3,010	
Total		$83,010
LIABILITIES AND OWNER'S EQUITY		$85,010

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Exhibit 1–13 Spreadsheet Analysis: Angus McLeod, MD

Transactions for October 20XX

	ASSETS				=	LIABILITIES + OWNER'S EQUITY			
Item	Cash	Accounts Receivable	Prepaid Insurance	Equipment	=	Accounts Payable	Contributed Capital	Retained Earnings	
	$10	$60,000	$1,000	$24,000	$85,010	$2,000	$80,000	$3,010	$85,010
1	$10,000	$50,000						$60,000	
2	$38,000	$(38,000)							
3	$(6,000)		$6,000						
4	$(8,000)							$(8,000)	
5	$(22,000)							$(22,000)	
6	$(8,000)			$8,000					
7	$(3,000)							$(3,000)	
8			$(800)	$(500)				$(1,300)	
9		$(15,000)						$(15,000)	
	$1,010	$57,000	$6,200	$31,500	$95,710	$2,000	$80,000	$13,710	$95,710

Note: Item numbers refer to description in the text.

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distinction between this disbursement and the preceding one is that this time the disbursement is for items that have been consumed in this month. Retained earnings represent the wealth retained in the organization. The $8,000 cash is gone, as is the value of what it purchased. Retained earnings, therefore, must be reduced by this amount.

5. Cash is paid to employees for salaries of $22,000. *Effect:* Once again, we have a disbursement for work that was fully utilized in this month, so both the cash account and the retained earnings account are reduced by $22,000.
6. $8,000 cash is paid for new computer equipment and upgrades in office furnishings. *Effect:* This transaction simply changes the form in which we are holding this wealth. As a result, we decrease the cash account by $8,000 and increase the equipment account by $8,000. Our balance sheet remains in balance.
7. Dr. McLeod pays himself $3,000 in salary for the month. *Effect:* We reduce the cash account by $3,000. Because this is a transfer of wealth outside the practice, we also must reduce the retained earnings account by $3,000, and our balance sheet remains in balance.
8. Monthly adjustments are made of $800 for expired insurance and $500 for depreciation. *Effect:* We reduce the prepaid insurance account by $800 and the equipment account by $500 because we have consumed a month's worth of insurance and equipment life. The retained earnings account must also be reduced by these amounts because this wealth has been consumed. The balance sheet remains in balance.
9. During this month, Dr. McLeod writes off $15,000 of his outstanding receivables as uncollectible. *Effect:* Both the accounts receivable and retained earnings accounts are reduced by $15,000. The balance sheet remains in balance.

If we now examine our final spreadsheet, the bottom row constitutes our new balance sheet. We can construct an income statement for October 20XX by looking at the new revenues and expenses that have been incurred during October 20XX. Finally, we can construct a cash flow statement from the cash account by noting the beginning balance, the cash transactions that occurred, and the ending balance.

A new set of financial statements appears in **Exhibit 1–14**. What conclusions can we draw about Dr. McLeod's practice? We can see from the cash flow statement that he is short on cash. Things are better, however, than they were at the beginning of the month. The income statement tells us that he had a very good month for generating wealth. Unfortunately, much of the wealth is not in cash but in receivables. The balance sheet tells us that his assets are largely in receivables and equipment. In addition, the retained earnings are largely due to his original investment, not economic growth. The last month, however, has seen his retained earnings due to economic growth increase by $10,700. This is hopeful.

In summary, Dr. McLeod has put the pieces in place to generate wealth. The question now is whether he can convert the wealth that exists in his receivables and equipment into cash and continue to do this in the future. The cash picture is not rosy. He must manage his cash very carefully, stop all spending on equipment unless it is absolutely essential—perhaps use leasing—and motivate his staff to effectively collect on the accounts receivable.

This case illustrates how financial information can help describe the financial status

Exhibit 1–14 October 20XX Financial Statements for Angus McLeod, MD

Cash Flow Statement: October 1–30, 20XX		
Opening Balance	$10	
Cash Received	$10,000	
Cash Collected on Accounts	$38,000	
Insurance Premium	$(6,000)	
Operating Expenses	$(8,000)	
Employee Salaries	$(22,000)	
Computer, Etc.	$(8,000)	
Angus' Salary	$(3,000)	
Closing Balance		$1,010
Income Statement: October 1–30, 20XX		
REVENUES		
Cash	$10,000	
Receivables	$50,000	
Total		$60,000
EXPENSES		
Operating	$8,000	
Salaries	$22,000	
Angus' Salary	$3,000	
Insurance	$800	
Depreciation	$500	
Bad Debts and Write-Offs	$15,000	
Total		$49,300
NET INCOME		$10,700
Balance Sheet: October 30, 20XX		
ASSETS		
Cash	$1,010	
Accounts Receivable	$57,000	
Prepaid Insurance	$6,200	
Equipment	$31,500	
Total		$95,710
LIABILITIES		
Accounts Payable	$2,000	
Total		$2,000
OWNER'S EQUITY		
Capital Contributed	$80,000	
Retained Earnings	$13,710	
Total		$93,710
LIABILITIES AND OWNER'S EQUITY		$95,710

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of an organization. It also illustrates how financial information can be used to guide management decision making. The financial data from the balance sheet, income statement, and cash flow statement tell Dr. McLeod where he needs to focus his attention in his capacity as a physician leader. Finally, they also provide him with some insight into his decision about the health system job offer. This practice clearly needs management attention, specifically Dr. McLeod's attention. If he decides that the management part of being a physician leader is not for him, then he probably will be best off to accept the health system's offer. The use of financial information to aid in making management decisions is further illustrated by the case of Oregon Sports Medicine, which is discussed at the end of this chapter.

Ratio Analysis

Data from the balance sheet and the income statement can be used to assess an organization's liquidity, solvency, and profitability by constructing ratios. Ratios also can be used to help examine an organization's financial performance over time and to observe developing financial trends.

Liquidity is the ability to use assets to meet currently maturing debts. Tests of liquidity evaluate the degree to which an organization's current liabilities can be met using its current assets. *Current liabilities* are defined as obligations or services that a practice owes or will have to fulfill within the next year. Examples include wages payable, income taxes payable, and credit card balances. *Current assets* are resources owned by the organization that are currently in cash form, or could be converted into cash within the next year. Examples include cash savings, shares in publicly traded common stock, and a reasonable (defined as likely to be collected) proportion of accounts receivable. Dr. Arnold Bennett's balance sheet (Exhibit 1–9) and income statement (Exhibit 1–10) will be used to illustrate examples of ratio analysis.

Liquidity Ratios

A commonly used test of liquidity is called the *current ratio*, which is defined as follows:

$$\text{Current Ratio} = \text{Current Assets} \div \text{Current Liabilities} \quad (1\text{–}5)$$

Referring to the data in Exhibit 1–9, the current ratio for Dr. Bennett's practice is:

$$\text{Current Ratio} = \$157{,}040 \div \$125{,}949 = 1.25$$

This indicates that Dr. Bennett has $1.25 of current assets for each dollar of current liabilities. Stated another way, this indicates that Dr. Bennett has a 25 percent "cushion" to deal with his liabilities. This cushion is helpful given that cash may flow unevenly into his practice. If Dr. Bennett's current ratio was 2.00 at this time last year, then he should consider investigating the change.

A more demanding test of a practice's liquidity is called the *quick ratio* or the *acid test ratio*:

$$\text{Quick Ratio} = \text{Quick Assets} \div \text{Current Liabilities} \quad (1\text{–}5)$$

Quick assets are cash or other current assets that can be easily converted into cash, such as stocks, bonds, certificates of deposit, and accounts receivable adjusted for bad debt and write-offs. Dr. Bennett's quick ratio is as follows:

$$\text{Quick Ratio} = \$146{,}126 \div \$125{,}949 = 1.16$$

All Dr. Bennett's current assets, except his inventory and prepaid expenses, are considered quick assets, because they could be readily converted into cash. Dr. Bennett's quick ratio indicates that his practice has $1.16 worth of readily available assets for each dollar of current debt.

An additional perspective on liquidity is gained by considering how quickly a practice's receivables are turned into cash. An index of this can be calculated by examining the average daily billings and the average collection period, which are defined as follows:

$$\text{Average Daily Billings} = \text{Net Billings} \div 365 \text{ Days} \quad (1\text{–}7)$$

$$\text{Average Collection Period} = \text{Accounts Receivable} \div \text{Average Daily Billings} \quad (1\text{–}8)$$

By using the data in Exhibits 1–9 and 1–10, we can calculate these ratios for Dr. Bennett's practice:

$$\text{Average Daily Billings} = \$792{,}619^{15} \div 365 = \$2{,}172$$

$$\text{Average Collection Period} = \$101{,}965^{16} \div \$2{,}171 = 47 \text{ Days}$$

This indicates that, on average, Dr. Bennett collects his receivables in 47 days. This figure can be used in two ways. First, it can help determine whether the collection performance is acceptable. What is required is a qualitative evaluation in which Dr. Bennett examines the 47-day average in the context of his revenue sources. If, for example, he does a large amount of insurance work, then an average collection period of 47 days might indicate acceptable effectiveness. On the other hand, if a large proportion of Dr. Bennett's patients are cash patients and are supposed to pay at the time of service or are prepaid, such as in a concierge practice, then 47 days might indicate a collection problem. Collection assessment and methods will be discussed in Chapter 2.

A second use of the average collection period ratio is as a gauge of liquidity over time. By tracking this ratio over the years, Dr. Bennett can assess how his practice's liquidity is changing and examine whether changes in his clientele, the services he provides, insurance company policies and procedures, and so on may be affecting its liquidity.

Solvency Ratio

An organization's solvency is its ability to meet its debt obligations. A common statistic used to assess solvency is the debt-to-equity ratio (DER). The data used to compute the DER are contained in the balance sheet (Exhibit 1–9). The ratio is computed as follows:

$$\text{DER} = \text{Total Liabilities} \div \text{Owner's Equity} \quad (1\text{–}9)$$

Both current and long-term practice liabilities are included in this ratio. Dr. Bennett's DER is as follows:

$$\text{DER} = \$166{,}449 \div \$204{,}412 = 0.81$$

This means that, for every dollar of equity owned by Dr. Bennett, there are 81cents worth of liabilities. The use of debt may involve risk, because interest will have to be paid on some of it, and eventually the principal must be repaid. Typically, young organizations have high DERs, because large capital expenditures are required for equipment, and revenue levels are relatively low at start-up.

Profitability Ratios

Return on owner's investment (ROI) is a measure of an organization's profitability. It

indicates how well the owner's equity is being used to generate income. Stated another way, the organization's equity could be "cashed in" and invested in other ways, such as in treasury bills or the stock market. Given that this money is invested in your organization (practice, hospital, etc.), what return are you receiving on this investment? In a sense, evaluating your profitability involves taking off your physician's hat and looking at your organization as a stockholder. Are your invested funds being well used? Return on owner's investment is calculated using the following formula:

$$\text{ROI} = (\text{Pretax Income} + \text{Interest Expense}) \div \text{Owner's Equity} \quad (1\text{–}10)$$

$$\text{ROI} = (\$44{,}183 + \$1{,}229) \div \$204{,}412 = 22\%$$

It is important to remember when examining Dr. Bennett's return on investment that his salary and his net income are inversely related. If Dr. Bennett increases his salary, then the net income of his practice will decline and vice versa. To evaluate the profitability of a practice as a *business,* a fair market rate must be paid to the physician/owner for professional and administrative services. Looking at it another way, Dr. Bennett wears two hats. Wearing one hat, he is an employee-physician-administrator; wearing the other, he is a stockholder-investor. To evaluate his success as a stockholder-investor, he must compensate himself fairly as an employee, just as he would fairly compensate any other employee who would perform the same administrative and medical duties with the same level of competence. Dr. Bennett's return on investment of 22 percent is meaningful only to the extent that his compensation as an employee-physician-administrator is equitable. A tax reality is that many physicians will pay their practice's profit to themselves before the end of a tax year to avoid double taxation. To the extent that this occurs, ROI can still be meaningful if the calculations are made taking this tax adjustment into consideration. Once again, to small closely held medical practices tracking this ratio over time may be a meaningful way to track changes and identify relevant financial questions.

Another way of assessing profitability is to examine the relationship between total assets and the income used to generate them. This ratio is called *return on total investment* (ROI-T) and is defined as follows:

$$\text{ROI-T} = (\text{Pretax Income} + \text{Interest Expense}) \div \text{Total Assets} \quad (1\text{–}11)$$

Dr. Bennett's return on total investment is:

$$\text{ROI-T} = (\$44{,}183 + \$1{,}229) \div \$370{,}861 = 12\%$$

Stated another way, Dr. Bennett's practice earned 12 percent on the total resources that it used during the year. Conceptualized in this manner, investment is defined as the total resources provided by both the owner(s) and the creditors.

Another gauge of profitability is the profit margin. The profit margin is defined as follows:

$$\text{Profit Margin} = \text{Net Income} \div \text{Total Net Revenue} \quad (1\text{–}12)$$

Dr. Bennett's profit margin is as follows:

$$\text{Profit Margin} = \$44{,}183 \div \$813{,}861 = 5.4\%$$

This says, in effect, that for each dollar of service provided by Dr. Bennett's practice, the practice makes an average of 5.4 cents profit. It is important to remember when evaluating the profit margin that this statistic does not

take into account the amount of resources invested to generate this profit. Obviously, a practice that has a 5.4 percent profit margin but has required only a $20,000 investment is in one sense performing better than a practice that has the same profit margin but has required a $100,000 investment. Profit margin is a part of the profitability picture, but because it omits the very important investment component, it should be considered in conjunction with return on investment statistics.

USES FOR RATIOS

After examining these ratios, you may well be wondering how to use them. Ratios are useful as screening devices to highlight possible problems and strengths. They are particularly useful for making internal comparisons over time. If you notice, for example, that your profit margin has declined from the previous year, this should stimulate you to investigate why this happened. Have expenses risen without an adjustment to fees? Are insurers' participation contracts forcing revenue down? Is your product mix changing so that you are conducting a greater proportion of lower-profit procedures?

If you find that your quick ratio is more favorable this year than it was last year, then you might give yourself a pat on the back. On the other hand, perhaps your quick ratio is too high! You might conclude that you could be investing your funds in other, more profitable ways, which might make the funds less liquid and could reduce your quick ratio. Ratios, therefore, are useful tools for stimulating thinking. They do not provide answers by themselves. Instead, they allow you to focus and direct your inquiries.

CONTROL AND BUDGETING

Control is the process of measuring, evaluating, and correcting actual performance to ensure that goals and plans are accomplished. The control issues that will affect a physician leader will vary depending on the physician leader's job description. Physician leaders working in larger healthcare organizations will be working on control issues in response to plans and budgets. For example, the financial analysis of the MRI acquisition decision discussed above can be used as a basis to generate a budget and evaluate subsequent performance against that budget. Based on how results compare with projections, the MRI project could be modified to better achieve target net income, NPV, and IRR goals. Oversight can be an ongoing process so that adjustments can be made if the project is getting off track.

Physician leaders working in smaller organizations, such as solo and small group practices, similarly can use plans and budgets to implement controls. In addition, they should also be interested in cash control to deter theft, and to be certain that office operations are complying with practice policy and guidelines.

Using a Postacquisition Analysis to Achieve Control

We will revisit the General Hospital MRI facility case to demonstrate how the financial projections already discussed can be used as the basis of a control process for the project. **Exhibit 1–15** contains a postacquisition analysis performed 1 year after the new MRI machine was put into operation. The data in Exhibit 1–15 indicate that net revenue is 5.07 percent above projections. Examination of the volume level, however, provides some disturbing information. Volume was 242 (7.56 percent) MRI scans *lower* than expected. Fortunately, the average gross charge had a favorable variance of $115, or 18.40 percent above expectations. The bad debts and adjustments rate was 28 percent

Exhibit 1–15 MRI Facility Postaquisition Analysis after Year 1

Executive Summary

A postacquisition analysis was performed for MRI system 2 for the year ended June 30, 1991, after the first year of service. Net income exceeded projections for year 1 by $29,513 and cash generated by operations exceeded plan by $47,513. Volume, however, was 242 MRI scans fewer than projected. Downward revisions for years 2 through 5 result in a corresponding downward revision of the internal rate of return to approximately 6 percent.

GENERAL HOSPITAL
MR Imaging System 2
POSTACQUISITION ANALYSIS for the Year Ended June 30, 1991

	Year 1		Variance Favorable	
	Actual	Projected	(Unfavorable)	Change
Volume	2,958	3,200	−242	−7.56%
Average Charge	$740	$625	$115	18.40%
Gross Revenue	$2,188,920	$2,000,000	$188,920	9.45%
Less Bad Debts and Contractual Adjustment (25%)	$612,898	$500,000	$(112,898)	−22.58%
Net Revenue	$1,576,022	$1,500,000	$76,022	5.07%
Less Variable Expenses				
Supplies and Film	$121,870	$96,000	$(25,870)	−26.95%
Contribution Margin	$1,454,152	$1,404,000	$50,152	3.57%
Less Fixed Expenses				
Salaries	$121,300	$120,000	$(1,300)	−1.08%
Employee Benefits	$33,964	$30,000	$(3,964)	−13.21%
Cryogens	$40,825	$40,000	$(825)	−2.06%
Indirect Expenses	$138,550	$142,000	$3,450	2.43%
Maintenance	$0	$0	$0	
Fixed Expenses Before Depreciation	$334,639	$332,000	$(2,639)	−0.79%
Cash Generated by Operations	$1,119,513	$1,072,000	$47,513	4.43%
Less Depreciation	$578,000	$560,000	$(18,000)	−3.21%
Net Income	$541,513	$512,000	$29,513	5.76%

Revised Projections

	Year 1—Actual	Year 2—Proj.	Year 3—Proj.	Year 4—Proj.	Year 5—Proj
Volume	2,958	2,200	2,420	2,662	2,928
Average Charge	$740	$740	$650	$625	$625
% Collectible	72%	75%	75%	75%	75%
Average Variable Cost	$41.20	$42	$44	$46	$49
Net Revenue	$1,576,022	$1,221,000	$1,179,750	$1,247,813	$1,372,594
Variable Costs	$121,870	$92,400	$106,722	$123,264	$142,370

continues

Exhibit 1–15 continued

Fixed Costs Before Depreciation	$334,639	$353,100	$623,615	$660,045	$698,715	
Cash Generated by Operations	$1,119,513	$775,500	$449,413	$464,504	$531,509	
Discount Rate	12.00%					
Cash Flows	($2,890,000)	$1,119,513	$775,500	$449,413	$464,504	$531,509
IRR		5.98%				
NPV		($355,534.50)				

Notes

1. The cost to acquire and install the equipment was $90,000 more than plan (total cost: $2,890,000). This results in an increase in the annual depreciation charge of $18,000.
2. The rate of growth in volume projections for years 3 through 5 has been revised downward from 15 percent to 10 percent.
3. Projected average charges reflect recent experiences and current expectations. For the year ended June 30, 1991, the bad debt and contractual adjustment were 28 percent of gross revenue.
4. Variable costs for supplies and film averaged $41.20 during the year ended June 30, 1991.

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($612,898 ÷ $2,188,920) versus a projected 25 percent. Variable costs were expected to average $30 per MRI scan, but actually were more than $41 ($121,870 ÷ 2,958 MRIs = $41.20) per scan. Fixed costs were about what was expected.

The fact that the volume estimates were below expectations is very disturbing, because our previous analyses have demonstrated the volume sensitivity of this project. In addition, the unfavorable variable cost variance compounds the problem for a volume-sensitive project. As a result of the first-year experience, the projections for years 2 through 5 were revised. The primary changes are a reduced volume level and an increased variable cost to $40 per MRI scan, plus inflation. The effects of these changes on NPV and IRR are disconcerting. NPV now is negative, which means that we will miss our 12 percent profit goal by $355,534.50. The IRR is now at 5.98 percent. At this point, management has the opportunity to change this unfavorable outcome. The postacquisition analysis pointed out where the problem areas are, and indicates where management must make changes to turn this project around.

A second postacquisition analysis was conducted after the second year of operation. Unfortunately, it contained more bad news. Volume was 1,909 MRI scans, which was well below the original projection of 2,599 scans and also below the revised projection of 2,200 scans. Average variable costs rose to $43.10 and exceeded the revised projection of $42. Fixed costs were almost 30 percent above expectations, due largely to cryogens, which were 293 percent ($123,231) above expectations. The impact on NPV was dramatic. Given the desire for a 12 percent return, the projected NPV was a *negative* $737,294. The IRR was a dismal 0.83 percent—and to make matters worse these number were only achieved *by extending the project out to 7 years*! If they retained the original 5-year payback, the projected NPV would be under the target 12 percent return by $1,058,698.18, with a *negative* IRR of 10.07

percent. After the second post-acquisition analysis the MRI facility was projected to generate net cash of $2,293,306 versus the initial projection of $4,350,629 (Exhibit 1–5). Once again, we can see the volume sensitivity of this project.

At this point management has another opportunity to intervene. One major problem is volume. Devoting more marketing resources and restructuring management positions to emphasize critical parts of the marketing mix (Chapter 7) are options that could increase MRI volume. A second major problem is cost control. Fixed costs are 30 percent above expectations by year 2. Because volume is down, there should be excess capacity, and management needs to think creatively of ways to reduce fixed costs. One strategy would be to try to convert some to variable costs. Perhaps there are some positions that could be changed from full time to part time and ideally part time on-call. The major fixed cost variance has been cryogens. Greater efficiency in purchasing has to be examined. Perhaps General Hospital can form a purchasing alliance with other hospitals to gain purchasing power and a lower price.

The sudden rise in the cost of cryogens was largely due to federal regulation of ozone-depleting chemicals. One must question why this somewhat predictable event was not considered in the original financial analysis. It turns out that radiologists, who might well have been more aware of this issue, were *not* an integral part of the original financial analysis team. This illustrates the importance of having financially literate physicians fully involved in the decision-making process.

Using Budgets for Financial Control

A *budget* is simply a formal statement of your financial plans for a specific time period. It is a statement about what should happen financially to your practice or healthcare organization. You then can compare actual events with the budget to see whether you are behind, matching, or exceeding your expectations. Often, budgets are viewed as constraints. Viewed more positively, however, they can be an important part of a control process to identify when the unexpected has occurred, and to creat an opportunity to proactively deal with it. Budgets are not essential to the operation of a small medical practice. They are a step above the minimum financial cash accounting methods that often characterize small private practices. Budgets, however, can be important for even a small practice if it must demonstrate a degree of financial planning so that a lending institution will lend it money.

The sophistication that budgets can add to the process of identifying financial problems early enough to take effective action must be balanced against the time that they take to construct and utilize. Budgeting is very consistent, however, with the notion that as a physician leader you are a consumer of financial information and will use it to plan and make management decisions. Budgets are most useful when they stimulate you to think ahead, anticipate future conditions, prepare for them, and take action if things are not going according to plan.

Budgets can be established for virtually any quantifiable issue, including cash receipts and disbursements, procedures, DRGs, revenues, and expenses. Some organizations may find the budgeting process useful for tackling very specific financial problems. For example, if an evaluation of office supply expenses indicates substantial waste, then budgeting for office supplies and closely examining variances would be an effective cost-control procedure. Similarly, other expense or revenue items can be selectively targeted and brought into line through the budgeting process.

Let's examine how a budget could be used to help manage a group practice. Dr. Brandon Jones has two colleagues. He is undertaking the budgeting process because he expects that his practice will be growing. He wants to plan for this growth so it takes place in an orderly, efficient manner. As a result, he has decided to construct a budget for the next 3 months.

Because many costs vary with the activity level of a business, the budgeting process often begins with the development of an index of sales. Dr. Jones and his two colleagues each estimated their mix and number of procedures that they believed they would conduct over the next 3 months. They did this by obtaining reports containing historical data from the practice's medical office management system, which they adjusted where appropriate using their judgment. Associated revenues were projected using historical write off and adjustment data. They chose not to consider special consultation fees and speaking fees, because they were minor. The physicians' forecasts are shown in **Exhibit 1–16** in the column headed "Budget January–March."

Next, Dr. Jones projected the following expenses:

- Rent, interest, and insurance expenses were fixed, so he simply carried over the monthly amounts from the previous year.
- Clerical salaries would remain the same for the first 3 months, because all performance appraisals and probable pay raises should occur in the second half of the year.
- Professional compensation would remain proportionally the same, so Dr. Jones took the percentage of revenue paid to physicians in the previous year and multiplied the projected net revenue by this percentage.
- Payroll taxes would remain proportional to compensation.
- Dr. Jones reviewed the expenditures for office supplies for the previous year with the practice business manager. He concluded that supplies were not being wasted. He assumed that supplies would be used at the same rate as last year, so he budgeted for 25 percent (3 months) of the previous annual expenditure. If he thought that there had been waste, he could have used the budget to try to reduce the utilization of supplies by budgeting at a level below the previous year's expenditures.
- Education expenses were calculated by estimating the amount Dr. Jones and his colleagues were likely to spend at the conferences they were planning to attend during the 3-month period.
- Telephone expenses were fairly consistent across the previous year, and Dr. Jones saw no reason for there to be a change. In addition, he reviewed the cell phone "overage" charges and determined that they were reasonable. As a result, he budgeted 25 percent of last year's cell phone and land line bills for each month.
- Advertising consisted of two display ads each month in the "Science and Medicine" section of the daily newspaper plus Yellow Pages listings. Dr. Jones planned to continue this practice for the next 3 months.
- All other expenditure categories were entered into the budget at the rate of 25 percent of the previous year expenditure.

The "Actual" column in Exhibit 1–16 is a performance report comparing first quarter revenues and expenses with the budgeted amounts. The data indicate that the practice had lower net income than had been planned for the first quarter. Fortunately, total expenses were also lower than the budget. Advertising, insurance, and education had

Exhibit 1–16 Static Budget: Dr. Jones

	Budget Jan.–Mar.	Actual	Variance	Direction
REVENUES				
Dr. Jones	$100,000	$95,468	$(4,532)	U
Dr. Warren	$80,000	$85,684	$5,684	F
Dr. Stewart	$90,000	$75,698	$(14,302)	U
Total	$270,000	$256,850	$(13,150)	U
EXPENSES				
Clerical Salaries	$39,057	$39,057	$—	—
Professional Compensation	$118,800	$113,674	$(5,126)	F
Payroll Taxes	$14,207	$13,746	$(461)	F
Rent	$12,000	$12,000	$—	—
Advertising	$2,249	$2,732	$483	U
Office Supplies	$10,500	$9,375	$(1,125)	F
Medical Supplies	$14,138	$14,101	$(37)	F
Interest Expense	$307	$307	$—	—
Local Taxes	$1,575	$1,498	$(77)	F
Insurance	$16,975	$17,250	$275	U
Education	$2,249	$2,800	$551	U
Telephone—Land Lines	$489	$489	$—	—
Telephone—Cellular	$981	$929	$(52)	F
Total	$233,527	$227,958	$(5,569)	F
NET INCOME	$36,473	$28,892	$(7,581)	U

Note:
U = Unfavorable
F = Favorable

unfavorable variances. They were compensated for, however, by favorable variances in professional compensation (although Dr. Jones might not take pleasure in this "favorable" variance) and the related payroll taxes and local taxes, office supplies, medical supplies, and cell phone.

Dr. Jones now could use the performance report to examine the causes of this situation. After talking with Dr. Stewart, Dr. Jones determined that his variance was due to a combination of illness and an unexpected "product mix" in terms of Dr. Stewart's procedures for the quarter. Examination of the unfavorable variances in advertising and education both revealed explanations. The advertising variance resulted from an additional display ad in a local newspaper in a special local high blood pressure awareness week section. Dr. Jones felt, after a review, that advertising in this edition of the paper was well justified. The education variance was explained by Dr. Warren exceeding his budgeted education amount. Dr. Jones concluded that Dr. Warren's actual expenditures were questionable and planned to have a collegial discussion with Dr. Warren.

Dr. Jones may encounter some difficulties, however, in evaluating some of the other variances. For example, office supplies and

medical supplies both show favorable variances. The practice's activity level, however, was below expectations, so it really isn't clear whether the lower utilization of office and medical supplies was due to treating fewer patients or to more efficient operations or for that matter whether they should have been even more favorable than they were! Unfortunately, such questions cannot be easily answered with the static budget used by Dr. Jones. They *can* be addressed, however, with a flexible budget.

A *flexible budget* utilizes a budget formula to express the relationship between variable costs and an index of activity level, such as revenue or number of procedures. Flexible budgets adjust to reflect the *actual* volume as opposed to the *projected* or budgeted volume. Based on the previous year's data, Dr. Jones expected that the following budget items would vary with physician revenues:

- professional compensation, because Dr. Jones and his colleagues pay themselves a percentage of the revenues
- payroll taxes, because these are a function of professional and clerical compensation
- office and medical supplies, because their consumption should vary with the practice's activity level
- local taxes, because these are a direct function of revenue level

Dr. Jones determined the flexible budget amounts by examining the relationship between these variables and clinical revenue for the previous year. Each dollar of clinical service revenue resulted in the generation of 44.0 cents of professional compensation expense, 9.0 cents of payroll tax expense, 3.8 cents of office supply expense, 5.2 cents of medical supply expense, and so forth. These relationships are indicated in the "Flexible Formula" column in **Exhibit 1–17**.

Differences between flexible budgets and static budgets that are due to variance in activity level are an index of *effectiveness*. Differences between flexible budgets and actual results are due to *efficiency*, meaning that the amount of inputs used for a given level of output is less (or more) than expected, and *price efficiency*, if the cost or price per unit of service differs from that expressed in the flexible budget formula.

The relationship between effectiveness and efficiency is important to understand. For example, you may have an objective of generating $30,000 in revenues in a month. You only generate $25,000, but you do this with the inputs specified in the flexible budget. Your production has been ineffective, but it has also been efficient. Alternatively, you could have a $30,000 revenue month but have unfavorable variances on several flexible budget items, in which case you have been effective, but inefficient.

Several conclusions can be reached after examining both Dr. Jones's flexible and static budgets:

- Revenues were $13,150 less than expected. Expenses, however, were $5,569 less than expected, for a net income of $7,581 below expectations. Net variance across both static and flexible budgets was a −$6,553, which was in the favorable direction. Most of this ($5,664) was due to lower professional compensation and associated taxes. However, the flexible budget indicated that an additional $660 was paid to a physician. Dr. Jones determined that he needed to find out how this error occurred.
- Office supplies were efficiently used, because actual consumption was less than that in the flexible budget (−$385).
- The cost of medical supplies was less than what had been statically budgeted, but not as low as would be expected in the flexible

Exhibit 1–17 Flexible Budget: Dr. Jones

	Budget Jan.–Mar.	Actual	Variance	Direction	Flexible Formula	Flexible Budget	Flexible Variance	Flexible Direction
REVENUES								
Dr. Jones	$100,000	$95,468	$(4,532)	U			$(4,532)	
Dr. Warren	$80,000	$85,684	$5,684	F			$5,684	
Dr. Stewart	$90,000	$75,698	$(14,302)	U			$(14,302)	
Total	$270,000	$256,850	$(13,150)	—			$(13,150)	
EXPENSES								
Clerical Salaries	$39,057	$39,057	$—	—				
Professional Compensation	$118,800	$113,674	$(5,126)	F	44% × Total Revenue	$113,014	$660	U
Payroll Taxes	$14,207	$13,746	$(461)	F	9% × (Cler. Sal. + Prof. Comp.)	$13,746	$0	
Rent	$12,000	$12,000	$—	—				
Advertising	$2,249	$2,732	$483	U				
Office Supplies	$10,500	$9,375	$(1,125)	F	3.8% × Total Revenue	$9,760	$(385)	F
Medical Supplies	$14,138	$14,101	$(37)	F	5.2% × Total Revenue	$13,356	$745	U
Interest Expense	$307	$307	$—	—				
Local Taxes	$1,575	$1,498	$(77)	F	.58% × Total Revenue	$1,490	$8	U
Insurance	$16,975	$17,250	$275	U				
Education	$2,249	$2,800	$551	U				
Telephone—Land Lines	$489	$489	$—	U				
Telephone—Cellular	$981	$929	$(52)	F				
Total	$233,527	$227,958	$(5,569)	F				
NET INCOME	$36,473	$28,892	$(7,581)	F			$1,028	U
NET VARIANCE	$(6,553)	F						

Note:
U = Unfavorable
F = Favorable

$(5,664)

budget. This implies inefficient utilization ($14,101 − $13,356 = $745). This also, however, could have resulted from an unexpected change in procedure mix.

- Dr. Jones needs to reevaluate the issue of discipline. Advertising and education had unfavorable variances because someone *chose* to exceed the budget. These choices could have been good decisions or wasteful decisions. A budget should not be viewed as inviolate, because situations change and organizations must have enough flexibility to adapt. On the other hand, a lack of discipline will almost always be clad in the armor of necessity. The effective manager will be able to determine when a variance is truly in the organization's best interest, and when it is simply the result of extravagance.

The concept of flexible budgeting can be applied to the MRI facility year 1 postacquisition analysis (**Exhibit 1–18**). Volume and charge are drivers. One flexible formula evaluates actual average charge to expected average charge ($740 – $625), which indicates a $115 favorable efficiency variance. This results in a gross revenue favorable efficiency of $340,170, meaning that *for the volume achieved,* the facility efficiently generated revenue from the 2,958 MRI scans. Overall effectiveness, however, is unfavorable by $151,250, which is due to lower-than-expected volume. These two effects net to the static favorable gross revenue variance of $188,920.

Of the $112,898 unfavorable static collection variance, $65,668 was due to inefficient collection as a result of exceeding the 25 percent uncollectible target. The remaining $47,230 was due to the higher-than-expected gross revenues. This finding indicates that if management could improve the collection efficiency (i.e., get it back down to a projected 25 percent rate), then about 58 percent of the unfavorable collection variation could be eliminated. Finally, it can be seen that the unfavorable static supply variance (−$25,870) was actually worse than it first appears. There was an inefficiency of −$33,130 that was partially obscured by the positive effectiveness variance ($7,260) of conducting 242 fewer-than-projected MRI scans.

In summary, the budgeting process can be used to help evaluate whether an organization is proceeding according to plan. It comes, however, at a price in both effort and time. This issue is especially relevant for smaller practices. In a practice setting, someone such as Dr. Jones or his business manager or accountant must construct the budget and look for and investigate variances. Only Dr. Jones can determine whether this was or will be worthwhile in his particular situation. Some might believe that the variances that Dr. Jones discovered hardly justify the effort expended. Dr. Jones, however, may feel that the budgeting process was worthwhile, if it gives him some assurance that things are generally going according to plan, and that he has the capability of identifying specific variances as they grow, thereby providing the opportunity to control them before they reach critical levels.

In larger healthcare organizations, the use of budgets and projections as controls are essential. The numbers are simply too large and the consequences too great to "fly by the seat of your pants" in an unforgiving cost-conscious healthcare environment. We have seen how badly a project, such as the MRI facility, can go. To forego the opportunity to change the course of events in midstream would be foolish. Finally, the budgeting process conveys an image of financial competence, if not sophistication. Both large and small healthcare organizations that are seeking financing will have to demonstrate their financial competence to lending institutions.

Exhibit 1–18 MRI Facility Flexible Budget Analysis

	Year 1		Static			Flexible	Flexible
	Actual	Projected	Variance	Change	Flexible Formula	Efficiency	Effectiveness
Volume	2,958	3,200	−242	−7.56%			
Average Charge	$740	$625	$115	18.40%	=740−625	$115	
Gross Revenue	$2,188,920	$2,000,000	$188,920	9.45%		$340,170	$(151,250)
Less Bad Debts and Contractual Adjustment (25%)	$612,898	$500,000	$(112,898)	−22.58%	25% × Gross Revenue	$(65,668)	$(47,230)
Net Revenue	$1,576,022	$1,500,000	$76,022	5.07%			
Less Variable Expenses							
Supplies and Film	$121,870	$96,000	$(25,870)	−26.95%	$30 × Volume	$(33,130)	$7,260
Contribution Margin	$1,454,152	$1,404,000	$50,152	3.57%			

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Almost without exception, this will imply presenting a budget and a management plan to effectively implement it.

ACTIVITY-BASED COSTING

One of the major challenges currently facing healthcare organizations is determining what it costs them to provide a service. It is difficult to knowledgeably or confidently bid on a contract to provide services, for example, unless you know what it costs you to provide the service. Activity-based costing (ABC) is a method for attaching costs to activities, such as a procedure, DRG, diagnosis, or the like. Once you know what it costs to provide the procedure or DRG, then you can negotiate more effectively to provide medical care in a cost-conscious environment. If you know, for example, that it costs you, on average, $18,369 to provide a cardiac artery bypass graft (CABG), then you can add margin over this level to determine a price. Sometimes, the market price for a service may be above your own cost. You then may have to make a decision about whether to provide the service at a negative margin,[17] or to decline the opportunity. You will, however, be making this decision from a point of knowledge as opposed to ignorance.

An effective ABC system captures both direct financial information and behavioral information that has financial consequences. Often in health care, the value that is added is provided by the human, such as when a nurse, laboratory technician, or physician provides a service. It is essential, therefore, to attach a cost to this activity. The difficulty arises when we observe that much of the human behavior that occurs in healthcare systems is quite variable.

For example, think of the activities of a nurse working in an outpatient oncology practice. Much of the activity involves responding to the needs of patients receiving chemotherapy. Some of this activity is quite predictable and easily assessed, such as preparing and administering an infusion. If nurses are paid at $20 per hour, and one nurse prepares and monitors on average six patients over a 2-hour infusion, then the personnel cost per patient per infusion would be $6.67 ($20 × 2 Hours/6 Patients). Adding the cost of variable cost items (infusion drugs, syringes, tubing, etc.), and charges for use of the facility, capital equipment, and so forth for the time involved then provides a cost for the activity. Determining the cost of the activity becomes more problematic, if there is significant "off-the-record" activity. Ms. Smith calls the next day. She is running a fever, doesn't feel well, and wishes to talk to a nurse about her symptoms. Nurse Diaz responds to the call and talks with the patient for 9 minutes. Mr. Jackson calls later that afternoon. He received a similar infusion the previous day. Nurse Li takes the call and talks with him for 26 minutes. Two things of significance just occurred. First, an additional 35 minutes of nursing time needs to be allocated to the cost of the procedure. Second, there was significant variance in the time allocated across patients by nurses. Unless we know enough about the procedure to understand that there will be nursing time consumed in subsequent days as a result of the procedure, and unless we know how much this time can vary, we may fail to capture a significant amount of the procedure's cost.

The process for capturing behavioral cost information utilizes interviews, questionnaires, and sampling methods to determine what activities are performed by particular jobs and how much time it takes to perform the activities. Obviously, this can be an intrusive process. In this example, nurses would fill out activity questionnaires or enter

their time directly into a computer over a period of days or weeks to get an assessment of their activities that would have some statistical stability. In addition, job analysts may observe nurses performing their tasks to be certain that the questionnaires were assessing the full range of activities. The validity of the data will be influenced by the organization's internal climate. If employees perceive that the data will be used to affect their pay, their discretion to act as they see fit, or their ability to provide the quality of care that they feel is appropriate, then the data may be biased. In more extreme cases, employees may resist the measurement process. Generally, this resistance will be covert as opposed to overt, such as when assessment questionnaires aren't completed for a myriad of reasons, all of which are *somewhat* legitimate.

It should be apparent that developing ABC systems can be very expensive and time consuming and may require skills not currently possessed by the healthcare organization. Given the current state of the art, these systems are probably most appropriately applied only to high value procedures and programs. A practice, therefore, might develop ABC models of its most important procedures. A hospital might develop ABC models for the most important parts of its most financially important programs, such as CABG, normal delivery, Caesarian delivery, hip replacement surgery, and so forth.

Exhibit 1–19 shows a case example of an ABC model developed by a gastroenterology practice. This model focuses on the practice's outpatient services.[18] Practice leadership determined that the most appropriate way to organize the ABC analysis was around their most important procedures and procedure codes. These are the columns in Exhibit 1–19. The rows represent medical and business costs. The medical and business cost totals were obtained from the practice's prior year income statement. The ABC task, therefore, was to fully allocate these income statement costs across the procedures. The cost data then can be used by the practice to evaluate insurer proposals, prepare for negotiations, and determine where to provide services.

For example, an insurer provides a physician fee of $300 for a colonoscopy (45378). Alternatively, if the endoscopy is conducted in the hospital, they will pay the physician $200. The ABC data in Exhibit 1–19 indicates that conducting the endoscopy in this office will cost the physician $206.98, so the physician's net income for the office based procedure would be $93.02 (**Exhibit 1–20**). The physician now knows that she has to negotiate a facility fee[19] of at least $106.98 to break even with doing the work in the hospital setting.[20] When preparing to negotiate with the insurer, the physician learned that the insurer pays the hospital "about $700" for a facility fee, so the physician estimates that the insurer's practice delivered costs are $300 and hospital delivered costs are $900 (Exhibit 1–20). The negotiation zone, therefore, is for the insurer to pay the physician a facilities fee somewhere between $106.98 and $600.00.[21] Any negotiated solution within this range mutually benefits both the physician and the insurer (See Chapter 8 on integrative negotiating).

Effectively Using Financial Advisors

The relationship that a physician leader has with financial professionals should be analogous to that between an architect and an informed client who has opinions regarding the qualities and characteristics of his or her home. By having a very clear understanding of your specific financial needs, you will be able to work most effectively with financial advisors. In practices and smaller healthcare organizations, the financial advisor may be

Exhibit 1–19 Gastroenterology Practice: Outpatient ABC Analysis of Procedures

	New Patient Consultation	Follow-Up Office Visit	43235 EGD	43239 EGD Biop.	45330 Flex. Sig.	45331 Flex Sig. Biop.	45333 Flex. Sig. Polyp Rem.	45378 Colon.	45380 Colon. Biopsy	45384 Colon. Polyp Rem.
Number of services rendered in 19XX	967	1,287	9	32	169	66	4	23	17	15
Total time for procedure in minutes			95	110	35	50	50	65	80	80
Physician time spent with patients in min. (see Table 1)	20	10	10	12	5	10	15	25	35	35
Nursing time spent with patient in min. (see Table 1)	20	8	90	105	30	45	45	60	75	75
MEDICAL EXPENSES										
Physician cost per procedure-min./cost per min. (see Table 2)	$30.86	$15.43	$15.43	$18.52	$7.72	$15.43	$23.15	$38.58	$54.01	$54.01
Nursing cost per procedure-min./cost per min. (see Table 2)	$7.47	$2.99	$33.62	$39.22	$11.21	$16.81	$16.81	$22.41	$28.02	$28.02
Medical supplies	$4.32	$3.75	$37.79	$41.47	$21.78	$25.46	$25.46	$35.99	$39.67	$39.67
Equip maint. and rep. - cost per procedure (see Table 7)			$8.06	$8.06	$8.06	$8.06	$8.06	$8.06	$8.06	$8.06
Endo suite space rent-total time rent per proc. min. (see Table 6)			$46.69	$54.06	$17.20	$24.57	$24.57	$31.94	$39.31	$39.31
Exam room rent cost per use (see Table 4)	$2.96	$2.96								
Equipment cost (see Table 7)			$21.95	$21.95	$0.98	$0.98	$0.98	$18.18	$18.18	$18.18
TOTAL	$45.62	$25.13	$163.54	$183.28	$66.94	$91.31	$99.03	$155.17	$187.26	$187.26
BUSINESS EXPENSES										
Administration and Advertising										
Administration-annual salaries (see Table 9)/total number of services rendered	$13.53	$13.53	$13.53	$13.53	$13.53	$13.53	$13.53	$13.53	$13.53	$13.53
Telephone/advertising cost per procedure-cost per year (see Table 8) / total number of services	$5.61	$5.61	$5.61	$5.61	$5.61	$5.61	$5.61	$5.61	$5.61	$5.61
Equipment rental cost per procedure-cost per year (see Table 8) / total number of services	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50
Office space rent (see Table 5)	$10.16	$10.16	$10.16	$10.16	$10.16	$10.16	$10.16	$10.16	$10.16	$10.16
Billing and Collection										
Office supplies-annual cost (see Table 8)/total number of services	$1.64	$1.64	$1.64	$1.64	$1.64	$1.64	$1.64	$1.64	$1.64	$1.64
Postage-annual cost (see Table 8) / total number of services	$1.85	$1.85	$1.85	$1.85	$1.85	$1.85	$1.85	$1.85	$1.85	$1.85
Salary and benefit cost per procedure-cost per procedure (see Table 9)	$5.80	$5.80	$5.80	$5.80	$5.80	$5.80	$5.80	$5.80	$5.80	$5.80

Reception. Scheduling, Med. Records and Transcription										
Minutes per procedure	63	15	37	37	37	37	37	37	37	37
Receptionists' cost per procedure-Reception wage per minute (see Table 8)/minutes per procedure	$9.06	$2.16	$5.32	$5.32	$5.32	$5.32	$5.32	$5.32	$5.32	$5.32
Office supplies-annual cost (see Table 8)/total number of services	$3.28	$3.28	$3.28	$3.28	$3.28	$3.28	$3.28	$3.28	$3.28	$3.28
Postage-annual cost (see Table 8)/total number of services	$0.87	$0.87	$0.87	$0.87	$0.87	$0.87	$0.87	$0.87	$0.87	$0.87
Transcriptionist-annual cost (see Table 8)/total number of services	$2.25	$2.25	$2.25	$2.25	$2.25	$2.25	$2.25	$2.25	$2.25	$2.25
TOTAL	$55.55	$48.65	$51.81	$51.81	$51.81	$51.81	$51.81	$51.81	$51.81	$51.81
Cost per Procedure Rendered	$101.17	$73.79	$215.35	$235.09	$118.75	$143.12	$150.84	$206.98	$239.07	$239.07

Note: Supporting tables are not provided.
Note: The figures contained in this exhibit are specific to one practice at one point in time. They should not be generalized to another practice.

Exhibit 1–20 Negotiation Analysis Using ABC Data

	Location		
	Office	Hospital	Differential
Physician's Analysis			
Physician Revenue	$300.00	$200.00	
Physician's Cost	$206.98	$—	
Net Revenue	$93.02	$200.00	$(106.98)
Insurer's Analysis			
Physician Fee	$300.00	$200.00	
Hospital Facility Fee		$700.00	
Total Costs	$300.00	$900.00	$(600.00)

a consulting accountant or perhaps an employed business manager with an MBA. In larger healthcare organizations financial information and support may come from a finance department headed by a chief financial officer.

Accounting data are to your healthcare organization what current and historical medical test data are to a clinician treating a patient. They indicate the current and past states of the organization and allow you to make rational management decisions about future courses of action. The goal of using financial information is to manage your organization proactively and to make appropriate changes that take into account both financial and medical considerations. A knowledgeable financial professional can further this goal by providing you with the appropriate information that you need to be part of the decision process.

Generally, it will be a misuse of your time and your staff's time to perform specialized financial tasks in which accountants and financial professionals develop efficiency and proficiency over a period of years. For example, use an accountant for tasks that require skilled or timely financial or accounting knowledge, such as the preparation of tax returns or the development of a pension or profit-sharing plan. Use financial professionals to build financial models in spreadsheets and to perform the initial financial analyses for developing a new service line, practice expansion, significant equipment purchase, practice acquisition, and the like. Use financial professionals to get an expert's perspective. Similarly, you will want to use a financial professional to create your financial procedures and set up your cash and accrual accounts, so you produce accounting data in a form that is most useful for tax, reporting, and planning purposes.

Case Analysis: Oregon Sports Medicine

The use of financial information to aid in making management decisions is illustrated by the case of Oregon Sports Medicine. Performance appraisal and compensation issues are central to the concept of control, and these issues are at the heart of the challenge facing the physicians at Oregon Sports Medicine. The data that they will use to help them make the critical decision that they face come from their income statement. The analytical method they will use employs the CVP model. Finally, the projections that they make can be used to develop static and flexible budgets to monitor progress toward financial

goals and to modify management actions to achieve these goals.

Oregon Sports Medicine is composed of three physicians, Drs. Able, Baker, and Cane, along with several nurses, secretaries, and assistants. Drs. Able and Baker are partners; Dr. Cane is an employed associate. **Exhibit 1–21** contains an income statement at the top. Below the income statement is an analysis of each physician's net revenue. Dr. Able has generated 30.58 percent percent of the net revenue, Dr. Baker has generated 41 percent of the net revenue, and Dr. Cane has generated 28.42 percent of the net revenue. Next, they assign 40 percent ($250,822.33) of the total practice expenses ($627,055.22) equally to each physician ($83,607.44). Then, they take the remaining 60 percent of the expenses and divide them based on each physician's percentage of net revenue. Baker, the high producer, therefore takes $154,267.64 of additional expenses based on her volume, Able takes $115,053.26, and Cane, the low producer, takes an additional $106,912.60 of expenses. Each physician's annual salary is the sum of his or her net revenue minus his or her assigned expenses.

This case is not presented as an endorsement of how to structure compensation and incentive arrangements. Rather, it is presented as a case study of how one practice wrestled with the issues of how to tie work to rewards, control expenses, create equity so that those who incurred expenses would pay for them, and create incentives so that physicians would want to work harder and smarter.

As we examine this plan, it does have some logic to it. The sharing of a proportion of the expenses equally recognizes that some expenses are present irrespective of utilization. They are opportunity costs that occur as soon as the door is opened, and they will be there largely irrespective of the number of patients who walk in the door. In effect, these are fixed expenses given the practice's current size (relevant range). Recognition that some expenses are tied to activity level, and that those who use more should pay more, and those who use less should pay less, is also encompassed in their compensation formula. This notion of variable cost is operationalized by the 60 percent of expenses assigned based on physician net revenue. Net revenue in this instance is being used as a surrogate for activity, probably because it is easily measurable. It is a cost driver. Intuitively, the physicians seemed to have had an appreciation of the concepts of fixed and variable expenses. Finally, this system creates an incentive for all to try to reduce both fixed and variable expenses, because each physician will receive some portion of the cost savings back through a higher salary.

Where did the 40 percent and 60 percent numbers in the expense allocation formula come from? Who knows? However, we are not in a position to be critical. If the physicians are happy with this division and if it creates equity in their minds, then that is good enough. An alternative, however, would be to go down the list of expenses and classify each one as fixed or variable (mixed expenses would have to be broken into their fixed and variable components). The difficulty with changing an existing compensation formula such as this is that someone will be a winner and someone will be a loser. For example, if an analysis of the costs indicates that more than 40 percent is fixed, then Dr. Baker, the high producer, would gain at the expense of both Drs. Able and Cane.

Dr. Baker is a partner in the practice. She is young, raising a family, and still paying off education loans, and she has a significant mortgage. Dr. Able is the other partner. He is in his early 60s and he has been reducing his involvement with the practice. Because he would like to retire in 3 to 5 years, Dr. Able

Exhibit 1–21 Oregon Sports Medicine: Income Statement, Revenue Analysis, and Salary Calculation

INCOME STATEMENT JANUARY–DECEMBER 19XX		
NET REVENUE		%
Dr. Able	$390,109.27	30.58
Dr. Baker	$523,072.85	41.00
Dr. Cane	$362,506.86	28.42
Total	$1,275,688.98	100.00
EXPENSES		
Nonphysician Gross Payroll	$151,943.11	11.91
FICA (Includes Physicians)	$26,699.61	2.09
Advertising	$26,601.83	2.09
Maintenance	$6,619.63	0.52
Telephone	$8,415.60	0.66
Radiology	$12,106.81	0.95
Postage	$6,942.50	0.54
Licenses	$175.00	0.01
Janitorial	$3,400.00	0.27
Contributions/Gifts	$16,800.05	1.32
Petty Cash	$3,132.76	0.25
Accounting/Legal	$10,847.10	0.85
Taxes—Corporate	$—	0.00
Personal Property	$2,920.07	0.23
State Unemployment	$76.02	0.01
Fed. Unemployment	$2,288.80	0.18
Gross Receipts	$6,872.54	0.54
Office Supplies	$25,103.24	1.97
Medical Supplies	$35,498.29	2.78
Dues	$10,540.50	0.83
Books	$8,775.59	0.69
Meetings	$18,239.11	1.43
Insurance	$68,138.58	5.34
Rent	$65,832.00	5.16
Christmas Parties	$1,039.01	0.08
Equipment Lease	$50,429.97	3.95
Interest Bank Note	$7,488.87	0.59
Interest to Owners	$10,265.79	0.80
Electricity	$7,150.98	0.56
Depreciation	$25,113.00	1.97
Miscellanous	$954.46	0.07
Transcription Service	$6,645.00	0.52
Total Expenses	$627,055.82	49.15
Net Income Before Physician Salaries	$648,633.16	50.85
PHYSICIAN NET REVENUE ANALYSIS		
Dr. Able—Net Revenue	$390,109.27	30.58
Dr. Baker—Net Revenue	$523,072.85	41.00
Dr. Cane—Net Revenue	$362,506.86	28.42
Total	$1,275,688.98	

continues

Exhibit 1–21 continued

DISTRIBUTION OF EXPENSES		
40% Equally	$250,822.33	
60% Based On Net Revenue	$376,233.49	
Total	$627,055.82	
	Equally	By Revenue
Dr. Able	$83,607.44	$115,053.26
Dr. Baker	$83,607.44	$154,267.64
Dr. Cane	$83,607.44	$106,912.60
	$250,822.32	$376,233.50
PHYSICIANS' INCOMES		% of Net Revenue
Dr. Able	$191,448.57	15.01
Dr. Baker	$285,197.77	22.36
Dr. Cane	$171,986.82	13.48
Total	$648,633.16	50.85

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is concerned about the value of the practice and who will purchase his interest. Dr. Cane has started the fourth year of a 4-year contract. A partnership decision must be made in the next 2 months. Dr. Cane has made it clear that if he is not admitted to partnership, he will leave at the end of his contract. Unfortunately, all is not going well at Oregon Sports Medicine. Drs. Baker and Cane do not get along. Although Baker has expressed concerns about some of Cane's treatment decisions, she is quick to admit that the fundamental problem is a personality conflict. As she put it, "The thought of working together and managing a practice together for the next 20 years with him is truly depressing. He is not collegial. It will be constant conflict. We just look at the world differently." Dr. Able is less critical of Dr. Cane. He describes the situation differently:

> He can be tough to get along with on some days, but his manner doesn't really bother me that much. His technique is good. He has good clinical skills, and he is a competent diagnostician—not a superstar, but well within the bounds of accepted practice. The patients like him. He will do well. I certainly can live with him for a few more years.

Dr. Able commented on the difficulty of replacing Dr. Cane:

> If we decide not to offer partnership, we will have a major problem replacing him in the short run. We are out of synch with the recruitment cycle. It will probably take us at least 18 months to get a replacement in here. In addition, we may have to provide some significant financial incentives and subsidies.

Given the information in Exhibit 1–21 we can see that it would not be too difficult to develop a model to see what would happen if Dr. Cane were to leave. This model is presented in **Exhibit 1–22** and a supporting spreadsheet in **Exhibit 1–23**. The model construction began with the current income statement in Exhibit 1–21. It was assumed that all Dr. Cane's revenues would be lost, because Dr. Baker's schedule already was

Exhibit 1–22 Oregon Sports Medicine: What if Dr. Cane Leaves?

	With Cane	Without Cane	Variance
NET REVENUE			
Dr. Able	$390,109.27	$390,109.27	
Dr. Baker	$523,072.85	$523,072.85	
Dr. Cane	$362,506.86	$—	
Total	$1,275,688.98	$913,182.12	$362,506.86
EXPENSES			
Nonphysician Gross Payroll	$151,943.11	$136,914.32	$15,028.79
FICA (Includes Physicians)	$26,699.61	$21,090.67	$5,608.94
Advertising	$26,601.83	$26,601.83	$—
Maintenance	$6,619.63	$6,619.63	$—
Telephone	$8,415.60	$8,415.60	$—
Radiology	$12,106.81	$8,666.47	$3,440.34
Postage	$6,942.50	$4,969.68	$1,972.82
Licenses	$175.00	$155.00	$20.00
Janitorial	$3,400.00	$3,400.00	$—
Contributions/Gifts	$16,800.05	$10,000.00	$6,800.05
Petty Cash	$3,132.76	$3,132.76	$—
Accounting/Legal	$10,847.10	$10,847.10	$—
Taxes—Corporate	$—	$—	$—
Personal Property	$2,920.07	$2,920.07	$—
State Unemployment	$76.02	$68.50	$7.52
Fed. Unemployment	$2,288.80	$2,062.41	$226.39
Gross Receipts	$6,872.54	$5,296.46	$1,576.08
Office Supplies	$25,103.24	$17,969.76	$7,133.48
Medical Supplies	$35,498.29	$25,410.90	$10,087.39
Dues	$10,540.50	$8,250.50	$2,290.00
Books	$8,775.59	$8,775.59	$—
Meetings	$18,239.11	$16,955.40	$1,283.71
Insurance	$68,138.58	$50,179.44	$17,959.14
Rent	$65,832.00	$65,832.00	$—
Christmas Parties	$1,039.01	$1,039.01	$—
Equipment Lease	$50,429.97	$50,429.97	$—
Interest Bank Note	$7,488.87	$7,488.87	$—
Interest to Owners	$10,265.79	$10,265.79	$—
Electricity	$7,150.98	$7,150.98	$—
Depreciation	$25,113.00	$25,113.00	$—
Miscellanous	$954.46	$954.46	$—
Transcription Service	$6,645.00	$4,756.72	$1,888.28
Total Expenses	$627,055.82	$551,732.90	$75,322.92
Net Income Before Physician Salaries	$648,633.16	$361,449.23	$287,183.94
PHYSICIAN NET REVENUE ANALYSIS			
Dr. Able—Net Revenue	$390,109.27	$390,109.27	
Dr. Baker—Net Revenue	$523,072.85	$523,072.85	
Dr. Cane—Net Revenue	$362,506.86	$—	
Total	$1,275,688.98	$913,182.12	

continues

Exhibit 1–22 continued

DISTRIBUTION OF EXPENSES			
40% Equally	$220,693.16		
60% Based On Net Revenue	$331,039.74		
Total Expenses	$551,732.90		
	Equally	By Revenue	
Dr. Able	$110,346.58	$141,419.40	
Dr. Baker	$110,346.58	$189,620.33	
Dr. Cane	$—	$—	
	$220,693.16	$331,039.74	
PHYSICIANS' INCOMES		% of Net Revenue	
Dr. Able	$138,343.29	15.15%	
Dr. Baker	$223,105.94	24.43%	
Dr. Cane	$—	0.00%	
Total	$361,449.23	39.58%	
	Before	After	Variance
Dr. Able	$191,448.57	$138,343.29	$(53,105.28)
Dr. Baker	$285,197.77	$223,105.94	$(62,091.83)
Dr. Cane	$171,986.82	$—	$(171,986.82)
Total	$648,633.16	$361,449.23	$(287,183.93)

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full and Dr. Able was winding down and not interested in increasing his workload. Variable expenses were adjusted by using a flexible budget formula using total revenue as a cost driver. These adjustments were made on the supporting spreadsheet (Exhibit 1–23). For example, current radiology expense was divided by total net revenue, so that radiology expense could be expressed as a percentage of net revenue; in this case, 0.95 percent. This factor then could be used to project the future radiology expense after Cane's revenues have been removed. Fixed expenses were adjusted by asking: Do we still need it? Could it be eliminated or at least cut back? For example, Irene's position (Exhibit 1–23) was eliminated.

After these adjustments were completed, a projected income statement was produced, which is the "without Cane" column of Exhibit 1–22. The results are sobering. They indicate that Dr. Baker's salary is likely to drop by about $62,000 and Dr. Able is projected to make about $53,000 less. Examination of the projected income statement reveals why the salary decreases are so large. If Cane goes, he will take with him his variable expenses, but he will leave his share of the fixed expenses. Unfortunately, this practice is largely a fixed expense operation. Once a model such as this is produced, it can easily be sensitized to other scenarios. If Drs. Able and Baker don't like the outcome or the assumptions,[22] then they can try other "what-ifs." Perhaps one of the other radiology technician positions could be converted to part time. Perhaps other fixed expenses could be reduced or eliminated. Perhaps they should recruit two new associates instead of one. Perhaps Dr. Baker may conclude that Dr. Cane is not so bad after all! Modeling such as this does not solve the problem. It simply attaches a financial cost to the modeled outcome. It provides an opportunity to explore

Exhibit 1–23 Oregon Sports Medicine: Projection Calculation Worksheet

ADJUSTMENTS		WITH CANE	WITHOUT CANE
Personnel Salaries			
Office Manager	Ann	$23,410.66	$23,410.66
Computer Input	Bryan	$20,207.85	$20,207.85
Receptionist	Charlotte	$18,100.39	$18,100.39
Insurance/Collections	Dean	$17,898.07	$17,898.07
Medical Secretary	Elvira	$14,600.00	$14,600.00
Radiology Technician (Dr. Able)	Georgina	$20,984.24	$20,984.24
Radiology Technician (Dr. Baker)	Harry	$21,713.11	$21,713.11
Radiology Technician (Eliminated)	Irene	$15,028.79	$—
		$151,943.11	$136,914.32
X-RAYS (Percentage of projected net revenue)		0.95%	$8,666.47
POSTAGE (Percentage of projected net revenue)		0.54%	$4,969.68
BUSINESS LICENSES			
Dr. Able		$60.00	$60.00
Dr. Baker		$20.00	$20.00
Dr. Cane		$20.00	$—
Oregon Sports Medicine		$75.00	$75.00
Total		$175.00	$155.00
GROSS RECEIPTS TAX		$7,399.00	$5,296.46
CONTRIBUTIONS/GIFTS (Estimated)		$16,800.05	$10,000.00
OFFICE SUPPLIES (Percentage of projected net revenue)		1.97%	$17,969.76
MEDICAL SUPPLIES (Percentage of projected net revenue)		2.78%	$25,410.90
DUES			
Dr. Able		$4,173.50	$4,173.50
Dr. Baker		$4,077.00	$4,077.00
Dr. Cane		$2,290.00	$—
Total		$10,540.50	$8,250.50
MEETINGS			
Dr. Able		$6,221.58	$6,221.58
Dr. Baker		$9,836.78	$9,836.78
Dr. Cane		$1,283.71	$—
Staff		$897.04	$897.04
Total		$18,239.11	$16,955.40
INSURANCE			
Dr. Able—Dis, OH, Life, HIV		$2,475.34	$2,475.34
Dr. Baker—Dis, OH, Life, HIV		$2,807.50	$2,807.50
Dr. Cane—Dis, OH, Life, HIV		$4,844.14	$—
Business Ins.		$4,657.00	$4,657.00

continues

Exhibit 1–23 continued

Dr. Able -Malpractice	$15,642.00		$15,642.00
Dr. Baker—Malpractice	$15,642.00		$15,642.00
Dr. Cane—Malpractice	$13,115.00		$—
Corporate	$8,955.60		$8,955.60
Total	$68,138.58		$50,179.44
TRANSCRIPTION (Percentage of projected net revenue)		0.52%	$4,756.72

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the financial consequences of alternative outcomes, and attaches a cost to behavioral choices.

If Dr. Cane does depart, there will be little room for financial errors until he can be replaced. The projected income statement can form the basis for static and flexible budgets, so that Drs. Able and Baker can track how they are proceeding against expectations. This may allow them to detect unfavorable trends before they become crises, and manage the practice through a time when there will probably be little margin for error.

Cases such as Oregon Sports Medicine reinforce the importance of a number of other issues discussed in this book. The goal of management should be to prevent a situation such as this from occurring by carefully selecting partners and then guiding their development through a performance appraisal and goal-setting process, so that antagonisms such as have occurred at OSM are managed, if not prevented.

CONCLUSION

The strength of the material discussed in this chapter is that it really does work. The problem, however, is that it can work too well. When leaders who are motivated primarily by financial considerations make critical decisions in an organization with a healthcare mission, it can result in the medical mission being subordinated to the financial mission. The underlying message in this chapter is that financial considerations in healthcare organizations are too important to be left entirely to financial leaders. Physician leaders must intercede and contribute a medically based perspective to decision making. To do this, they must understand the financial mind set, as well as how to use financial data as an aid to decision making.

The current healthcare environment places a premium on creating and operating financially sound healthcare organizations, hospitals, and practices. The financial orientation to managing healthcare organizations is analogous to the camel whose nose was under the tent and who now has every intention of moving in and taking over. Pretending that this is not happening by ignoring it will not work. Simply leaving decisions totally to financial professionals ignores the problem. If a healthcare organization's medical mission is to be well served, financially literate physicians must participate in the decision-making process.

NOTES

1. *Utilization: A guide to reducing variations to improve outcomes*. Irving TX: VHA Inc., (1994) 9–10.
2. Ibid, 13–16.
3. *Net revenue* is being defined as the fee as stated in a fee schedule less contractual write-offs, adjustments, and an average provision for account delinquency. For example, the fee for a panel of laboratory tests might be $200, but the insurance company contract may specify a contractual write-off of 15 percent ($30). If the insurance company and/or the patient paid the $170, it would be called net revenue.
4. This case was written by William T. Geary, Ph.D., Mason School of Business, College of William & Mary, Williamsburg Virginia. Used with permission.
5. *Depreciation* is the accounting term that is used to recognize that assets have a limited useful life. Sometimes, this is due to literally using them until they no longer work, but depreciation can also be used to recognize technological obsolescence.
6. Some physicians really enjoy working with spreadsheets, doing the sensitivity analyses, and modifying the assumptions contained in the spreadsheet formulas. If this is true for you, I am not suggesting that you forgo this activity, only that you consider what is the best use of your time.
7. Note that the Projected Net Revenue in Exhibit 1–3 and Projected Net Income in Exhibit 1–2 are different. Payback analysis is examining actual cash in versus cash out so Net Revenue does not reflect an adjustment for depreciation, which is a noncash expense. If you add the Depreciation and the Projected Net Income in Exhibit 1–2, it will equal the Projected Net Revenue in Exhibit 1–3.
8. The interest rate reflects three components: risk, the rate of inflation, and real profit that is needed to bring money into investment markets. For example, if a company offers a bond at 10%, inflation is 3 percent, and U.S. government securities, which are generally considered risk free, are selling for 5 percent, then the cost of capital is 2 percent.
9. Use the IRR function in Microsoft Excel.
10. If you are following this example by building a spreadsheet and using the spreadsheet formula note the following. In Excel, the NPV formula is NPV = (Rate, Value1, Value2, . . .) . Because the capital investment of $2,800,000 occurs at the beginning of the first period, it is *not* included as a value, but is instead added to NPV, so the appropriate formula is NPV = (Rate, Value1, Value2, . . .) + Capital Investment.
11. Often, this is done as salary at the end of the tax year. One must be careful to justify this distribution based on job content, such as management responsibilities, or to show that the total salary is in line with the amount of clinical work. Otherwise, the Internal Revenue Service (IRS) might consider the distribution a dividend, in which case both the corporation and the recipient would be taxed on the distribution.
12. There are many ways to calculate depreciation. The IRS prescribes some given particular factual circumstances. Often, what is advantageous for tax reasons may not be the most descriptive of economic reality. You might, therefore, want to consider examining different balance sheets for different purposes, such as one required by IRS for tax purposes and another for financial planning purposes.
13. It is likely that you intuitively understand the concept of accrual-based accounting. For example, if during the course of the year you say to yourself "I've got a big malpractice insurance bill due at the end of the year, and I should reserve some cash each month so that I will be able to pay it," then you are making a provision for an expense incurred but not yet paid.
14. This case was prepared in collaboration with William T. Geary, Ph.D., Mason School of Business, College of William & Mary, Williamsburg, Virginia.
15. Exhibit 1–10: Clinical Services—Bad Debt and Adjustments.
16. Exhibit 1–9: Accounts Receivable adjusted for write-offs and bad debt.
17. Justifications for offering a service with a negative margin include ethics, such as perhaps immunizations, free clinic, and "cross fertilization," such as when a negative margin service such as obstetrics in some hospitals creates an affiliation between the hospital and the community, thereby supporting other positive margin procedures in other areas such as cardiology.
18. Additional procedures were performed at hospital's endoscopy facilities.
19. Sometimes this is called a *tray fee.* It is designed to cover facility costs and variable costs.

20. This analysis leaves aside issues of travel time, schedule control, and work satisfaction issues. It also does not address the likelihood of the patient having a lower copayment for the office-based procedure.
21. For a more detailed analysis of a similar case, see Pike, I. (2002). Outpatient endoscopy possibilities for the office. *Gastrointestinal Endoscopy Clinics of North America*. 12: 245–258.
22. Perhaps, for example, given the outcome in Exhibit 1–22 Drs. Able and Baker decide that they each will take on more patients after all. The model then can be sensitized to the new volume levels.