Cost Accounting – The Foundation of Management Control

Management Activities

One can view the management activities of all healthcare organizations, from the largest tertiary hospital system to the smallest health clinic, in three broad categories – strategic planning, management control and operational control. Depending on the size and complexity of the organization, these management activities may be quite formal and involved, or informal and ad hoc.

While this chapter will focus on management control, it is important to understand the definitions of strategic planning and operational control to place management control into context. Professor Robert Anthony from Harvard Business School, the father of modern cost accounting, viewed the three management activities in terms of a pyramid, with strategic planning at the top, management control in the middle and operational control at the bottom.

At the top of that pyramid, strategic planning is the process of a) deciding on the goals for the organization in relation to its mission, b) determining the level of resources necessary to attain those goals, and c) defining the policies and procedures required to govern the acquisition and proper use of those resources.

Strategic planning is a process that involves senior management and support staff and typically looks out over a three to five year period. It combines both creative and analytical thinking, involves a significant amount of judgment, and is difficult to appraise in terms of success until time has passed.

In contrast, at the bottom of the pyramid, operational control is the process of assuring that specific operational, day-to-day tasks are carried out efficiently and effectively. Efficiency measures the relationship between inputs (labor, materials, capital) and outputs (goods

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and services). An organization or department is more efficient if it uses fewer inputs to achieve the same output, or generates a greater output with the same level of inputs.

But efficiency doesn't measure how well the tasks are being accomplished, effectiveness does. A laboratory may be efficient at meeting labor standards for doing lab tests, but create a lot of false positive results because of a lack of attention to quality. Effectiveness measures the relationship between outputs and the goals of the organization. Optimally an organization or department should be both efficient and effective - meeting the labor standard for production while at the same time producing high quality output that furthers the goals of the department and organization.

Operational control focuses on day-to-days tasks and involves a large number of people throughout the organization, typically at the supervisor or middle manager level. Because it relates to relatively routine activities and involves following procedures, it is comparatively easy to evaluate how good a job is being done and to do so using a limited amount of judgment or subjectivity.

Management control fits in between strategic planning and operational control. It is the process by which managers assure that the resources needed to attain the stated goals are obtained and used efficiently and effectively. It takes the goals as a given from strategic planning and applies the lens of efficiency and effectiveness from operational planning at the department level, rather than the task level. There are not hard and fast lines between strategic planning and management control or management control and operational control as to where one stops and the other starts.

Very importantly, management control involves managers, not just numbers and analytics. Accordingly, concepts from behavioral economics and social psychology become quite relevant to management control in understanding how people behave as a result of the management structure and processes in place at an organization. The time horizon of management control is typically monthly and involves senior management and line managers throughout the entire organization. The thought process tends to be administrative and persuasive. It is less subjective than strategic planning and more straightforward in determining how good a job is being done.

An organization may do a good job of strategic planning and operational control, but without strong management control, it is unlikely to be successful as an organization. This chapter will explore what it takes to achieve that success in management control.

Cost Accounting as the Foundation of Management Control

In order to understand management control, one needs to understand the basics of cost accounting and then examine an organization's management control structure and process. This understanding will enable a health care professional to be more effective in internal discussions with senior operational leadership and with the chief financial officer and others in the finance department.

We will explore the key topics of full costing, differential costing and alternative choice decisions to build a familiarity with costing accounting concepts and uses.

Full Costing – Uses and Misuses

When performing cost analysis for management decisions, most healthcare organizations use an approach called full costing. Full costing attempts to determine the cost of a particular cost object, either in total or on a per unit basis. That cost object may be very narrow such as the cost of a complete blood count performed in the hematology laboratory or much broader such as the cost of treating a patient for congestive heart failure for an entire year.

Full cost is measured as a combination of the direct costs for the cost object plus a "fair share" of the overhead of the institution. Direct costs are directly traceable to or caused by the cost object, such as the chemicals and reagents used to perform a complete blood count. Direct costs may include labor expenses, supply costs or specialized equipment utilized related to the cost object.

In contrast, indirect costs are not directly traceable to only one cost object and thus must be allocated to multiple cost objects. That allocation occurs using a reasonable allocation method such as square feet, salary dollars or hours of service. Typical indirect costs in a healthcare institution include administration, finance and information services. While it is easy to set the goal of a "fair share" for the allocation of indirect costs, achieving it often becomes contentious in reality.

An organization typically allocates these indirect costs to other departments using a selected allocation basis and related statistics for each department employing a step-down method. In the step-down approach, a department can allocate costs only to the departments below it in a hierarchical structure. Accordingly, back and forth or up and down allocations are not allowed in the step-down method.

To address this limitation, some organizations may use the reciprocal method that employs simultaneous equations to allow departments to allocate costs to one another. Because of the difficulty in explaining reciprocal allocations, most organizations relay on the simpler step-down approach.

A straightforward example of full costing using the step-down approach will help illustrate how full costs are calculated. As shown in the table below, our hypothetical medical practice, Bolton Medical Associates, has 6 departments – three support departments for Building, Administration and Information Services and three clinical departments for Internal Medicine, Pediatrics and Sports Medicine.

Department	Salary Costs	Non-Salary Costs	Total Direct Costs	Square Feet	Salary Dollars	# of Staff
Building Expenses	$100,000	$100,000	$200,000			
Administration	300,000	50,000	350,000	1,000		
Information Services	180,000	150,000	330,000	1,000	180,000	

Internal Medicine	720,000	300,000	1,020,000	8,000	720,000	10
Pediatrics	360,000	176,000	536,000	6,000	360,000	6
Sports Medicine	360,000	204,000	564,000	4,000	360,000	4
Total	$2,020,000	$980,000	$3,000,000	20,000	$1,620,000	20

The direct costs of these departments are broken into salary and non-salary components and total $3 million for the organization. In order to determine the full cost for a visit in each of our clinical departments, we need to allocate the costs of the support departments using a reasonable allocation method for each support department. We will use square feet to allocate the building expenses, $ of direct salary to allocate the administration cost and number of staff to allocate the cost of information services.

In a step-down approach, the order of allocation will make a difference numerically in the allocations. The general rule of thumb is to allocate the department first that uses the fewest services from other departments, second that uses the next fewest services from other departments, etc. In this example, we will allocate the building expense department first, then administration and finally information services.

Department	Total Direct Costs	Allocate Building	Allocate Admin	Allocate Info Services	Total Full Cost
Building Expenses	200,000	-200,000			0
Administration	350,000	10,000	-360,000		0
Information Services	330,000	10,000	40,000	-380,000	0
Internal Medicine	1,020,000	80,000	160,000	190,000	1,450,000
Pediatrics	536,000	60,000	80,000	114,000	790,000
Sports Medicine	564,000	40,000	80,000	76,000	760,000
Total	$3,000,000	$0	$0	$0	$3,000,000

In our example, the Building Expenses Department is allocated to the remaining five departments based on square feet. Since Administration has 1,000 of the 20,000 square feet in the organization, it receives 5% (1,000/20,000) of the buildings expense of $200,000 or $20,000. Likewise, Internal Medicine receives 40% (8,000/20,000) or an allocation of $80,000.

All the direct and previously allocated costs for a support department need to be allocated to other departments below it in the step-down sequence such that the department has no

costs remaining. Since Administration has been allocated $10,000 from Buildings, its cost to be allocated is now $350,000 of direct plus the $10,000 or $360,000. Information Services, which is below Administration in the step-down, receives 11.1% ($180,000/$1,620,000) of $360,000 or $40,000. The same process is repeated for Information Services with its costs to be allocated totaling $380,000 ($330,000 own direct + $10,000 from Building + $40,000 from Administration).

As shown in the table below, at the end of the allocation process all costs should reside in the clinical departments at Bolton Medical Associates as total full cost.

Department	Total Full Cost	# Visits	Full Cost per Visit
Building Expenses	0		
Administration	0		
Information Services	0		
Internal Medicine	$1,450,000	15,000	$96.67
Pediatrics	790,000	10,000	79.00
Sports Medicine	760,000	5,000	152.00
Total	$3,000,000	30,000	$100.00

By incorporating number of visits for each clinical department, we can now calculate the full cost per visit for each, ranging from $79 per visit for Pediatrics to $152 per visit for Sports Medicine at Bolton Medical Associates.

Full costs are useful for managers for specific purposes. First, full costing allows one to answer the question of what did it cost us last year for a chest x-ray on a fully loaded basis or in our example an Internal Medicine visit. Second, it enables the institution to fulfill its reporting obligations to external agencies or regulatory groups such as to the Centers for Medicare and Medicaid Services or grantor agencies. Third, it provides appropriate cost information for financial statement preparation. Finally, full cost can be a useful input into pricing decisions.

Full cost is not appropriate and can give highly misleading results for expand/contract, add/drop, make/buy and other alternative choice decisions. Full cost is also problematic when used in evaluating the performance of departments and their managers.

The following examples regarding Bolton Medical Associates indicate the dangers of using full costing for certain management decisions:

Situation #1: We expect our volume for Sports Medicine visits to go up by 10% next year because our growing reputation. How much more will we expect to spend in the sports

medicine department? Since our full cost per visit for Sports Medicine is $152, won't we have to spend $152 * 500 new visits (10% of 5,000) or $76,000 more? No, because not all of our direct costs (salary and non-salary) will go up proportionately to the visit increase and our expenditures on building, admin and information services will not likely increase at all. How much will our expenditures go up then? We need to understand differential analysis to find out.

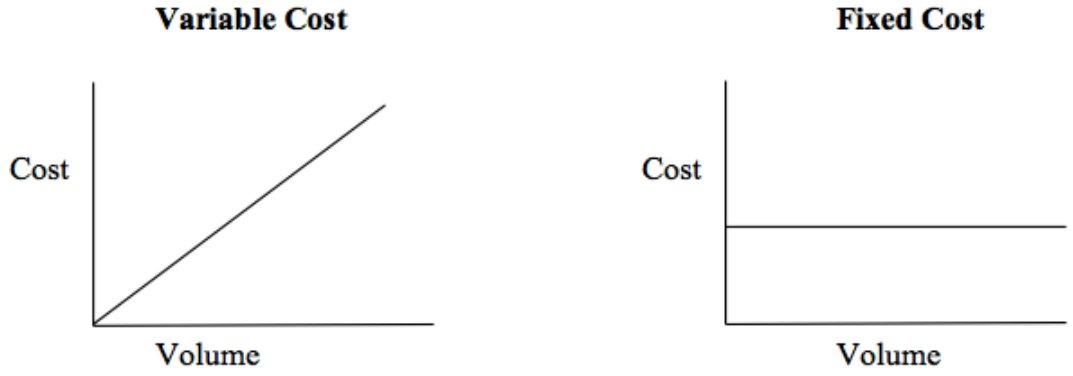
Situation #2: A local employer would like us to offer wellness visits for its employees, but is only willing to pay us $85 per internal medicine visit. Because our full cost for an Internal Medicine visit is $96.67, should we turn down the deal? Again, we won't have the right information to make that decision until we look at our differential cost (instead of our full cost).

Differential Costing – The Right Approach for Most Management Decisions

In differential costing, we want to look at what costs would be different under one set of circumstances vs. another set of circumstances. In other words, what would change from alternative A to alternative B to alternative C. Alternative A is often simply sticking with the status quo.

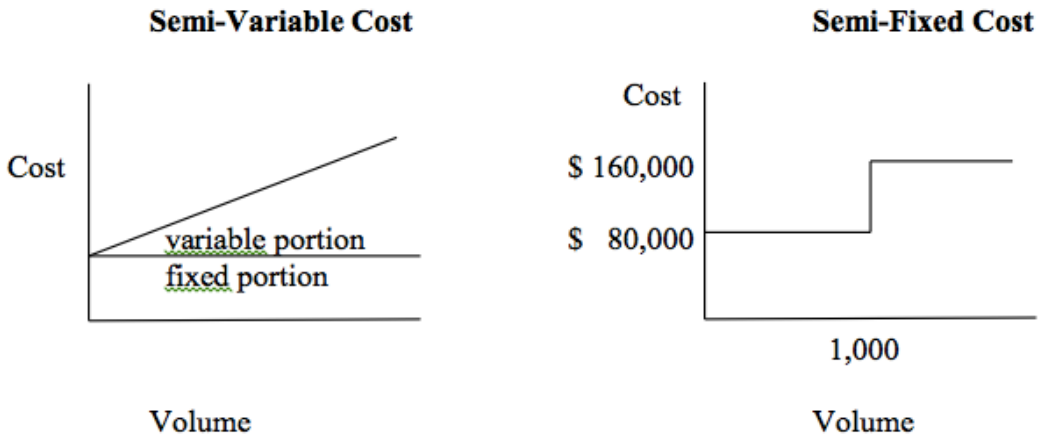
Under differential costing, we need to understand how costs will behave. For our purposes, we will classify costs into four categories – variable, fixed, semi-variable and semi-fixed. As the graph below shows, variable costs vary proportionately based on volume. If volume goes up by 10%, variable costs in total will go up by 10%. Very importantly, variable cost per unit will not change. Medical supplies is a typical variable cost.

Fixed costs behave in the opposite way from variable costs. Within a relevant range, fixed costs remain the same regardless of volume. In other words, if volume goes up by 10%, fixed costs will not change in total. Fixed cost per unit will decline but what is most relevant for our purposes is that fixed costs in total will not change. Rent is a typical fixed cost.



There are two in-between types of cost – semi-variable and semi-fixed. As shown in the graph below, semi-variable costs have a fixed component and a variable component. For analytical purposes those two components are typically separated. A phone bill is an example of a semi-variable cost – a fixed monthly fee for service plus a variable fee based on number of minutes exceeding the plan limit.

A semi-fixed cost is also referred to as a step cost. It is fixed for a range of volume, but then jumps up to a new level when a volume threshold is exceeded. For example, an organization might need 1 supervisor at $80,000 per year until monthly customer volume exceeds 1,000 at which point 2 supervisors are needed.



Let's take a closer look at Bolton Medical Associates to better understand cost classification into variable versus fixed.

Bolton Medical Associates - Cost Classification

# of Visits	30,000					
Account	# of Staff	Salary per Person	Total Amount	Variable Costs	Fixed Costs
Physicians	4	$150,000	$600,000	$0	$600,000
Nurses	8	70,000	560,000	560,000	0
Medical Assistants	4	40,000	160,000	160,000	0
Front Desk Staff	4	30,000	120,000	0	120,000
Total Salary Cost	20		$1,440,000	$720,000	$720,000
Medical Supplies			180,000	180,000	

Insurance	140,000		140,000
Office Expenses	160,000		160,000
Other Expenses	200,000		200,000
Non-Salary Cost	$680,000	$180,000	$500,000
Total Direct Cost	$2,120,000	$900,000	$1,220,000
Indirect Costs	880,000		880,000
Total Cost	$3,000,000	$900,000	$2,100,000

As indicated above, Bolton has 20 employees in total working in Internal Medicine, Pediatrics, and Sports Medicine. The salaries for the 8 nurses and 4 medical assistants are considered variable because the departments adjust the staffing of those employees based on expected patient volume on a weekly or sometimes daily basis. In contrast, the 4 physicians and 4 front desk staff are considered fixed because their full time services are required regardless of patient volume. Different organizations may have different approaches to what is considered variable versus fixed for personnel costs.

For non-salary costs, medical supplies are classified as variable because they vary proportionally based on patient volume. Insurance, general office expenses and other expenses are classified as fixed because they are not significantly influenced by fluctuations in patient volume. Again there may be some judgment involved in this classification distinction.

Breakeven Analysis

Now that we have classified our costs into variable and fixed categories, we can use that information to make better management decisions than we could with full cost. Breakeven is a simple yet powerful tool to gain a general understanding of the financial situation facing an organization using this knowledge.

The breakeven equation is:

$px = a + bx$

where **p** is price per unit, **x** is volume of units sold or provided, **a** is fixed cost in total and **b** is variable cost per unit.

The left side of the equation is revenue (**px**) and the right side is cost (**a + bx**). By solving the equation, we can determine how many units we need to sell or provide to breakeven.

To solve this equation for Bolton Medical Associates, we first need to determine the value of **b** – variable cost per unit. We know that Bolton Medical Associates has classified $900,000 in costs as variable in order to provide 30,000 visits from the table above. That

results in a variable cost per unit or visit of $30 ($900,000/30,000 visits). This is a very important figure for differential costing because it says if we provide 1 more average visit for Bolton, we will spend $30 more. This is exactly how variable costs behave. In contrast, we would not expect to spend any more on fixed costs because they do not depend on volume.

Let's assume our average price, **p**, for an average Bolton Medical Associates patient visit is $98. We can now solve the breakeven equation for **x** (number of visits to breakeven) as follows:

px = a + bx

$98x = $2,100,000 (our total fixed costs)+ $30x

$68x = $2,100,000

x = **30,882.35,** or rounding up, **30,883**

In other words, if we provide 30,833 visits, we will breakeven and cover all our costs. Since our visit volume is currently 30,000, we are slightly below breakeven by 883 visits, indicating we are operating at a loss.

The breakeven equation is most commonly used to solve for x, our breakeven volume. But what if we do not have the demand to increase volume? We could alternatively determine the price at which we would breakeven assuming our volume (x) is 30,000 visits. In that case:

px = a + bx

p * 30,000 = $2,100,000 +($30 * 30,000)

p = $100

In other words, if we can raise our price to $100 from $98 and not lose any current visits, we would breakeven. Similarly, if if we can reduce our fixed costs in total by making some expense cuts or decrease our variable cost per unit by negotiating a better medical supply contract, we could also reach breakeven. As we can see, the breakeven equation is a simple but powerful equation that let's us get an initial understanding of the real economics of our business.

<u>Contribution Margin Analysis</u>

Contribution margin analysis allows us to develop a different kind of income statement for Bolton Medical Associates as a whole and for each of our three clinical departments. This income statement focuses on how costs behave and contribution, rather than financial accounting rules. It also avoids a limitation of the breakeven analysis that all visits are treated the same, when we know that Internal Medicine, Pediatrics and Sports Medicine visits are likely to have different prices and costs.

Here is the contribution margin analysis for Bolton and its three clinical departments:

Bolton Medical Associates - Contribution Margin Analysis

	Bolton Medical	Internal Medicine	Pediatrics	Sports Medicine
# of Visits	30,000	15,000	10,000	5,000
Price per Visit	$98.00	$90.00	$80.00	$158.00
Variable Cost per Visit	30.00	30.00	20.00	50.00
Variable Contribution per Visit	$68.00	$60.00	$60.00	$108.00
Revenues	$2,940,000	$1,350,000	$800,000	$790,000
Variable Direct Costs	900,000	450,000	200,000	250,000
Variable Contribution	$2,040,000	$900,000	$600,000	$540,000
Fixed Direct Costs	1,220,000	570,000	336,000	314,000
Direct Contribution	$820,000	$330,000	$264,000	$226,000
Indirect Costs	880,000	430,000	254,000	196,000
Net Margin	-$60,000	-$100,000	$10,000	$30,000

The statement presents four different contribution margins for use for different management decisions:

Margin Type	Calculation	Description	Uses
Variable Contribution per Unit	Revenue per Unit – Variable Cost per Unit	Marginal contribution to profit of one additional unit	Marginal contribution analysis
Variable Contribution Margin	Revenues – Variable Costs	Contribution remaining after variable costs to cover fixed direct and indirect costs.	Differential analysis when fixed costs don't change
Direct Contribution Margin	Variable Contribution Margin – Fixed Direct Costs	Contribution remaining after direct costs to cover indirect costs.	Differential analysis when indirect costs don't change

Net Margin or Bottom Line Profit	Direct Contribution Margin – Indirect Costs	Net profit after covering all costs.	Full cost analysis and overall profitability

How can we interpret the contribution margin analysis results for Bolton Medical Associates? First, we can see that Sports Medicine visits are the most profitable on a per unit basis, with a variable contribution of $108 per visit vs. $60 for Internal Medicine and for Pediatrics. If we provide 100 more Sports Medicine visits, our profit should increase by $10,800 (100 visits * $108), assuming our fixed costs do not change.

Second, when we look at the variable contribution margin, we see that Internal Medicine's is the largest at $900,000, followed by Pediatrics at $600,000 and then Sports Medicine at $540,000. If the variable contribution margin for a department is negative, then that department should likely be closed down from a pure financial perspective because it is not even covering its variable or marginal costs.

Third, we look at the direct contribution margin. Again, all three departments have positive direct contribution margins, meaning that their revenues cover all their variable and fixed direct costs and each department contributes to covering allocated indirect costs. Internal Medicine has the highest direct contribution margin of $330,000 followed by Pediatrics at $264,000 and Sports Medicine at $226,000.

If a department's direct contribution margin is negative, then the organization may want to consider whether to discontinue that service if all the fixed direct costs could be eliminated. However, it may be best for the organization to expand the volume of that department if its variable contribution per unit is positive because each addition unit sold would improve the overall direct contribution margin.

Finally, we can examine the net margin or bottom line after allocated indirect costs are subtracted. Bolton Medical Associates overall has a negative net margin of $60,000. Internal Medicine has a loss of $100,000, which is partly offset by slight profits in Pediatrics of $10,000 and Sports Medicine of $30,000.

What guidance should this information provide to us? The natural inclination is to think that we would be better off eliminating Internal Medicine because it is losing money while Pediatrics and Sports Medicine are making money. As we will shortly see, this approach would be counter productive because the indirect costs for the organization would not likely decrease, while the contribution to cover those indirect costs made by Internal Medicine would disappear. This highlights the fallacy of full cost analysis upon which the net margin by department is based. Instead, we should use differential analysis as represented by the variable contribution and direct contribution margins to understand what the impact would really be.

Alternative Choice Decisions

In any alternative choice decision, it is important to consider the following five steps in order to make the best choice:

1) Define the problem.
2) Identify the likely alternatives (usually including the status quo).
3) Evaluate the quantitative factors (how will costs and/or revenues change).
4) Evaluate the non-quantitative or qualitative factors.
5) Make a decision.

Defining the problem is a critical starting point for the analysis. How narrow or broad the definition determines the scope and accordingly what will be relevant for the analysis.

The second step of identifying alternatives involves choosing a reasonable number of realistic alternatives to compare. For better or worse, the status quo is the most frequently selected alternative so it should be explicitly considered in most situations.

For the third step, a common approach is to look at the specific differences between alternatives as follows:

Change in revenues (positive for increase, negative for decreases)

+/- Change in variable costs (positive for decreases, negative for increases)

+/- Change in fixed direct costs (positive for decreases, negative for increases)

+/- Change in indirect costs (positive for decreases, negative for increases)

= Net Benefit/Loss (positive for net benefit, negative for net loss)

This simple approach enables clinical and financial managers to analyze what impact a variety of changes would have on the organization.

The next step is to evaluate factors that can't be quantified in financial terms or are qualitative in nature. This step may be the most important step in the analysis, especially if the quantitative difference among alternatives is relatively small.

The final step is to reach a decision. That decision may simply be staying with the status quo, but that should be recognized as the decision. Too frequently organizations postpone decisions due to the lack of perfect information (e.g., more study needed), frequently missing future opportunities or responding too late to upcoming challenges.

Alternative choice decision-making clearly involves a number of quantitative and qualitative assumptions about what will happen if changes are made. These assumptions should be reasonable, but do not have to be perfect in order to make informed decisions. Each assumption can be testing using sensitivity analysis as follows:

- Would your decision change if you changed the assumption by 10%? If so, you would need to investigate that assumption in more detail.
- Would your decision change if you changed the assumption by 50%? If not, you don't need to spend any more time fine-tuning that assumption.

Let's now apply alternative choice decision approach to whether we should continue offering Internal Medicine visits or simply shut the Internal Medicine Department down.

Change in Revenues (15,000 visits * - $90/visit)	-$1,350,000
Change in Variable Costs (15,000 visits * $30/visit)	450,000
Change in Fixed Direct Costs	570,000
Change in Indirect Costs	0
Net Change	-$330,000

As indicated, we would be $330,000 worse off if we close down Internal Medicine. This result occurs because the indirect costs would not decrease for Bolton as a whole - they would simply be reallocated to Pediatrics and Sports Medicine if Internal Medicine closes. It is important to note that the $330,000 is the direct contribution margin for Internal Medicine from our previously shown Contribution Margin Analysis.

The decision to keep Internal Medicine open for financial reasons is even more strongly supported for non-financial or qualitative reasons. Bolton Medical Associates would likely lose its reputation as a full service provider for families and consequently experience a drop in both Pediatric and Sports Medicine business if Internal Medicine were closed or scaled back.