Financial Management

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Overview

The evolution of perioperative services from an acceptable revenue-producing department to the largest revenue source for an organization has made financial management an essential competency for perioperative services leaders and managers. Today, a manager must demonstrate sound financial management skills and must be the driving force behind efforts to optimize the financial performance of the operating room (OR) suite.

The purpose of this continuing education activity is to provide a review of the key aspects of financial management as they relate to perioperative services departments. This module focuses on (a) preparing operating and capital budgets, (b) managing budgets, (c) examining the factors that affect the budget process, and (d) processes for improving the financial effectiveness of perioperative services including examples.

TASK STATEMENTS

The task statements for this domain were identified from a comprehensive job analysis on the role of perioperative service managers:

1. Prepare and/or manage perioperative budgets (e.g., capital, operations, staffing).
2. Identify, develop, and/or implement cost containment strategies.
3. Develop and/or present perioperative financial reports.
4. Analyze variances and outcomes and create action plans.
5. Manage inventory requirements for the perioperative organization.
6. Analyze per case margins considering costs and revenue (e.g., return on investment).
7. Audit and manage the revenue stream.
8. Negotiate and/or manage contracts (e.g., vendors, supplies, staffing, inventory, outside services, insurance).
9. Compute cost–benefit ratios and develop pro forma (e.g., new technology, new service lines, hybrid ORs).
10. Implement environmental actions (e.g., go green).
11. Establish performance indicators/efficiencies based on data (e.g., start times, turnover time, OR utilization, block management).
OBJECTIVES

After completing this module, the learner will be able to:

1. Identify the basics of developing an operating budget.
2. Identify methods to control costs while preserving the quality of care for surgical patients.
3. Discuss methods of monitoring the productivity of perioperative services.
4. Define successful practices for managing resources in the operating room.
Municipal, state, and federal governments, as well as regulatory agencies and third-party payers, pressure healthcare facilities for more cost-effective care (Penner, 2013, pp. 10–12). Also, the consumer movement pushes for competitive pricing in the marketplace (Penner, 2013, p. 11). As a result, the perioperative services manager must provide sound fiscal management by reducing supply costs, reducing variations in clinical practice, increasing efficiency, ensuring prudent use of capital monies, and ensuring optimal revenue opportunities. All of these strategies must be successfully applied across the perioperative continuum while providing safe care and maintaining consistent quality outcomes. In addition, the manager must know how to develop a budget.

BUDGETS
Definition

Typically, the term budget refers to the operating budget (Penner, 2013, p. 98), which is a statement of estimated revenues and expenses for a specific period, such as a fiscal year. The capital budget, which is distinct from the operating budget, is a plan for long-term capital investments, such as equipment and buildings. Capital items are usually defined as exceeding a minimum dollar threshold and are intended to be durable for a specified number of years.

A fiscal year (Penner, 2013, p. 75) is a 12-month period starting at a point determined by the institution. Common fiscal year budget cycles run from (a) January through December, (b) July through the following June, or (c) October through the following September. It is important to understand the institution’s budget cycle in order to anticipate and provide timely input into the budgeting process.

The operating budget is developed to reflect the business plan and translates departmental goals and objectives into quantitative measures. The budget process includes preparing the budget plan as well as monitoring and controlling aspects of the budget. Each cost center develops its own budget. Although each organization utilizes a different hierarchy for defining cost centers, commonly the operating rooms (ORs), the preoperative area, and the postanesthesia care unit (PACU) are designated as separate cost centers.
The operating budget is typically divided into two categories, that is, direct expenses and indirect expenses. Direct expenses are costs directly attributed to patient care and include salaries, medical supplies, implants, medications, office supplies, and charges from other departments. Direct operating expenses usually fluctuate with the number of surgical hours or cases.

Hospital-based OR expenses, such as the cost of utilities, maintenance, human resources, information technology, and engineering are difficult to assign to a specific area or department. These indirect expenses are usually prorated to a department based on the number of square feet it occupies, the value of its capital equipment, or the number of employees in the department. Direct expenses in freestanding ambulatory surgery centers may include the cost of utilities, building leases or mortgages, insurance, contract labor, attorney fees, human resource consultation, and pharmacy contracts.

Expenses may also be categorized as fixed or variable. Fixed expenses are static costs incurred even if the facility has no cases. Examples include rent or mortgage payments, minimal maintenance, environmental services, and utilities. Variable expenses, such as paying salaries and purchasing medical–surgical products, for example, sutures, dressings, and bandages, fluctuate with volume.

The operating budget is further divided into expense codes for groups of similar services and supplies. You can find the identifying number for each cost center and each type of revenue or expense in an accounting tool called the Chart of Accounts (Penner, 2013, pp. 162–163). See Table 1.

**Budget Types**

The three most common budget types associated with healthcare are (a) personnel or staffing, (b) supply or materials and inventory, and (c) capital budgets. Although all budgets must be understood and are dependent on one another, each is separate and has different measures, reporting requirements, monitoring and management opportunities, and calendar related processes. Each budget type is addressed in following units of this module.

<table>
<thead>
<tr>
<th>Expense Code</th>
<th>Classification</th>
<th>Direct/Indirect Cost</th>
<th>Fixed/Variable Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>131</td>
<td>RN salaries</td>
<td>Direct</td>
<td>Variable</td>
</tr>
<tr>
<td>141</td>
<td>External RN salaries</td>
<td>Direct</td>
<td>Variable</td>
</tr>
<tr>
<td>202</td>
<td>Taxes &amp; benefits</td>
<td>Direct</td>
<td>Variable</td>
</tr>
<tr>
<td>203</td>
<td>Administration salaries</td>
<td>Indirect</td>
<td>Fixed</td>
</tr>
<tr>
<td>337</td>
<td>Disposable packs</td>
<td>Direct</td>
<td>Variable</td>
</tr>
<tr>
<td>351</td>
<td>Dressings/bandages</td>
<td>Direct</td>
<td>Variable</td>
</tr>
<tr>
<td>353</td>
<td>Sutures</td>
<td>Direct</td>
<td>Variable</td>
</tr>
</tbody>
</table>

**Table 1**  
Example Chart of Accounts With Expense Codes
METHODS OF BUDGETING

Although there are several methods used to create budgets, the two most commonly used methods of developing an operating budget are zero-based budgeting and historical-trend budgeting (Global FS Consulting, 2014; Penner, 2013, p. 127). Zero-based budgeting is the more accurate method of preparing the budget; however, it is the more labor-intensive method. Using a combination of these two budgeting methods will result in a robust budget that will withstand the scrutiny of accounting analysis and facilitate budget management.

Zero-based budgeting requires that expenses start at zero and that all costs are justified. This method effectively analyzes how money is being spent in a department or within an expense code. Allocations for new programs, existing programs, or specific supply expense categories can be justified using this method.

The historical-trend budgeting process uses expense codes. In example, if your budget year runs from January to December of each year you might begin budget planning in July. Thus, in July you would begin with year-to-date expenses and then project expenses for the remainder of the year to arrive at a calculation of the total expenses for the current year. This result is then adjusted with your best calculations for any increase or a decrease in volume and for the anticipated inflation rate for the next year.

The inherent weakness in historical-trend budgeting is evident. The nurse leader must develop a keen awareness of practice changes that may affect volume and quantify the effect of the changes in their calculations. This method does not require the intensive analysis that zero-based budgeting does. One concern is that it can result in the budget becoming inflated year after year without appropriate analysis and justification.

BUDGET PROCESS

The budget development process is collaborative and may be described as continuous and iterative. In some organizations, the annual budget process is episodic whereas, in other organizations, a more consistent and persistent process is utilized.

Finance, business development, and strategic planning departments should be included in the preliminary steps of the budget process. Personnel in these departments can provide:

- projections for patient days,
- the projected number of procedures,
- anticipated patient admissions, and
- the case mix of inpatient to outpatient surgical visits.

These departments can also provide the strategic financial plan defined by the board of directors and the chief executive officer (CEO) that can significantly affect planning in perioperative services.
The finance department can give you information on:

- changing reimbursement strategies,
- procedural profitability, and
- negotiated third-party-payer information that affects surgical volume.

To validate the financial effect on line items in the expense budget, the manager will need detailed trends of surgical volume by service, procedure, and surgeon.
Unit 2
Personnel Budget

The personnel budget consists of salaries and benefits and is expressed in full-time equivalents (FTEs). One FTE is paid for 2,080 hours a year, which includes productive and nonproductive hours. **Productive time** is defined as worked hours specifically aligned with patient care whereas **nonproductive time** includes educational conferences, mandatory competency activities, and other professional development efforts.

**ASSESSING THE WORKLOAD**

The manager is responsible for developing a staffing pattern that accurately reflects the projected workload. The next step in the budget process is collaborating with leadership, physicians and staff to develop a departmental business plan (Kaye, 2012, p. 111; Penner, 2013, p. 210) based on the strategic priorities for the facility. Decisions regarding the operating budget depend on the projection of workload in relative value units (RVUs; Kaye, 2012, p. 169; Penner, 2013, p. 179). For the OR, measure the RVUs in hours or minutes or use the accounting method selected by your organization. Using measures based on actual activities, for example, patient in-room minutes, is preferred because the number of cases may not reflect the resources the department needs to function effectively. For example, in a fiscal year, the number of cases may decrease, but if case complexity increases, the number of patient minutes, that is, the workload, may increase.

The director of perioperative services, the chief of anesthesia, surgeons, and other leaders should discuss the anticipated workload for the next fiscal year. This discussion should include a review of surgical hours and cases by surgeon and by surgical specialty to assess trends in volume. The discussion should include anticipated changes in each department’s workload. An example is the anticipated impact on the instrumentation and sterile processing workload when a new surgeon is added to the current department’s volume. New procedures requiring additional supplies or instruments, new surgeons, and surgeon retirements should be included in this discussion. Also, anticipated high-cost procedures should be projected for the coming year because they may have a significant impact on workload.

If surgeon data indicate additional hours of surgery, new procedures, or new equipment are needed, managers and the chief of anesthesia need to develop further details about these needs and then discuss their ability to meet the projected
increase in demands. This discussion helps determine the level of staffing needed for the preoperative area, the ORs, the PACU, and the sterile processing department.

If new surgeons are recruited to join the staff, determine their projected workloads and requirements for new or additional equipment and medical–surgical supplies, including instrumentation. If new surgical specialties or new procedures are anticipated, include staff training or recruitment and the hiring of additional staff in the budget projections.

These data must be translated into projected hours of surgery by surgical service and by surgeon. The number of ORs and the number of hours per day required to meet the caseload can then be determined. The chief of anesthesia and the nurse manager must agree to provide the resources required to staff the ORs by day of the week and by hour of the day before informing other key stakeholders. If nursing has the resources to run more ORs than the anesthesia team, or vice versa, conflict will occur; and the opportunity to achieve high levels of productivity and efficiency will be lost. Also, underestimating the volume of resource-intensive procedures will create significant challenges when managing day-to-day activities within the approved budget.

Management is responsible for allocating the staff resources needed to establish an environment that attracts highly competent people and for investing in the training of staff, providing motivating challenges, ensuring continued professional growth and development, and recognizing and rewarding positive performance.

Other areas for discussion should include (and are not limited to) the following:

- Clinical practice changes affecting patient care
- Safety improvements for the work environment
- Improvements in efficiency and effectiveness of patient care
- New regulatory requirements affecting resources
- Staff recruitment and retention
- In-service training and education for staff members

**BUDGET DEVELOPMENT**

As part of the personnel budget process, the manager and the chiefs of surgery and anesthesia must determine the number of ORs that will be available by day of the week and by hour of the day. Before this discussion, the manager should prepare a productivity report that identifies the number of hours available versus the total number of hours separated by elective and emergency surgical procedures. The manager should analyze available trended data of the emergency workload by day of the week and by shift.

Compare these data to a predefined measure of productivity. A 75% utilization of elective (prime) time that includes case turnover may be considered optimal (OR Manager, 2013). Other benchmark utilization targets (Penner, 2013, p. 77) may be used to establish productivity targets and monitors. For a staffing formula that will help determine the direct-care-provider staffing requirements for a 10-room OR suite, see Tables 2 and 3.
Analyze the productive versus the nonproductive hours per work unit. Nonproductive time includes orientation, staff meetings, in-service sessions, on-call hours, and time off for vacation, educational leave, and sick leave. A facility-specific determination must be made about whether committee and work-group meetings are managed as productive or nonproductive work time. Labor organization agreements often clarify types of hours.

Within each cost center, review previous years’ trends for paid time off, medical leave, and employee turnover. This information will help you forecast nonproductive time in the budget and justify additional resources. More staff members may be needed based on staff orientation and training, patient needs, and staffing in other clinical areas. For example, an OR suite scheduled with local anesthesia procedures may require a second circulator, or cardiac cases may require two scrub assistants per case. Calculate relief coverage for weekends, holidays, vacations, and other nonproductive hours. The direct-care-provider staffing plan includes the required staffing mix and the number of staff members per day, by day of the week, and by shift. Table 4 represents a zero-based budget formula that may be used to validate core staffing.

Using surgical technologists (STs) can help control costs while preserving quality patient care. The ratio of RNs to STs depends on individual facility factors such as case mix, patient acuity, number of rooms, hours of operation, and the availability of a well-trained workforce. A 2:1 ratio of RNs to STs can effectively control costs and maintain quality care (Association of periOperative Registered Nurses [AORN], 2014, p. 4). See Table 5.
A staffing plan should include part-time, short-hour, and per-diem personnel to cover core staffing needs resulting from vacations, absenteeism, educational leave, and other nonproductive time. Per-diem personnel should not be routinely used to fill position vacancies because they may not be available for unexpected staffing needs.

Shifts should be flexible with staggered start times and must be designed to meet the needs of the OR schedule. For example, consider using 4-hour shifts to cover breaks and cases running past the regular shift. These short-hour shifts also may be an effective recruitment tool for retired nurses and for nurses nearing retirement.

Examine the effects of call requirements or stand-by staffing on patient care, employee health and safety, and cost-effectiveness. Fatigue results from continuous physical or mental activity, inadequate rest, sleep loss, and nonstandard work schedules, such as call schedules that result in more than 12 work hours in a 24-hour period or more than 60 work hours in a 7-day period (AORN, 2014). The results of working such hours include increased errors in documentation, transcription, procedures, and medication administration (Rogers et al., 2004). The position statement: *Perioperative Safe Staffing and On-call Practices* provides strategies for developing policies and procedures for safe call practices (AORN, 2014).

To assess the cost-effectiveness of call patterns, review the patterns of how callback has been used. For example, if staff members are called in every Saturday to participate in urgent cases, then scheduling staff for a Saturday shift may be more cost-effective. However, this approach should be taken only if the Monday-through-Friday (prime-time) surgery schedule meets or exceeds a predefined utilization rate and a cost–benefit analysis indicates that a regular Saturday shift would be cost-effective.
Other indirect care providers must be included in the budget planning. These may include managers, team leaders, charge nurses, and educators. Additional indirect care providers may include OR schedulers, clerical staff, support staff to prepare cases or assist with OR room turnover, materials management staff members who order and restock supplies, billing personnel, and patient transportation personnel.

The number of additional unlicensed assistive personnel needed may depend on the level of assistance the department receives from support departments, such as environmental services, materials services, central sterile processing, and patient transportation.

**LABOR COSTS**

Labor costs represent a substantial portion of the budget for perioperative services. Human resources or labor management agreements frequently define the appropriate use of nonproductive time and describe unacceptable situations. One area of unacceptable labor expense that should be monitored is the use of nonproductive benefited time. Examples of abuse include using sick time consistently before or after days off, on holidays, on the same day each month, and the day after payday. If you identify abuse of nonproductive benefited time, implement appropriate measures.
Employee injuries and illnesses covered by workers’ compensation are costly to institutions (The Joint Commission, 2011). One key to containing these costs is prevention through education. However, if an injury does occur, providing a well-managed modified work program may help the organization maintain the employee’s productivity. Modified work often includes performing non-patient-care duties, for example, clerical duties or working on department projects.

If the surgical schedule does not require all the scheduled staff members, use of per-diem staff members should be reduced or avoided unless they can be assigned to projects that will help achieve department goals. On days when the surgical schedule is finished early, offer employees the opportunity to go home early. If no one volunteers, use a selection method that everyone perceives as fair and that is approved within the human resources and labor management agreements. If overtime or cancellations occur frequently, adjust the core staff to reflect changes in the workload.

All overtime should require the approval of a manager or be justified in writing for future analysis. Monitoring the daily hours worked per surgical case against the budget will help you analyze the workload and staff productivity. See Figures 1 and 2 for formulas for and an example of, respectively, measuring financial performance related to staffing.

FIGURE 2
Example of Weekly Staffing Report for Perioperative Services
The surgical services manager should develop an annual productivity plan for each unit in the perioperative department, including the OR, the ambulatory surgery unit, the PACU, and the preoperative area. The anticipated number of cases that will be provided care in the preoperative and postanesthesia care units is used to estimate the workload in those areas. OR productivity is more accurately measured by actual activities, for example, patient in-room minutes, because the number of cases may not reflect the resources the department needs to function effectively. The OR committee sets the goals for OR utilization by specific periods, and the results are frequently reported to the committee and to the administration. The language used to communicate these results is found in Table 6.

DEVELOPING AND USING PRODUCTIVITY MEASURES

The method used to monitor productivity should be credible, timely, and easily understood by all members of the surgical team (Kaye, 2012, p. 46; Penner, 2013, p. 84). Building multiple communication links and using a multidisciplinary team to address this issue will enhance the department’s potential for success. Building productivity into the department budgets requires that all team members understand the organization’s strategic plan and the way the department is organized and uses existing resources. These discussions should include an assessment of current strengths, identified areas for improvement, and the acquisition of new resources to meet the department’s goals.

<table>
<thead>
<tr>
<th><strong>OR utilization</strong></th>
<th>Patient-in to patient-out as a percent of the available OR time.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turnaround time</strong></td>
<td>One patient out to next patient in; use only on to-follow cases.</td>
</tr>
<tr>
<td><strong>Clean-up time</strong></td>
<td>Patient out to room ready for set-up of next case.</td>
</tr>
<tr>
<td><strong>Set-up time</strong></td>
<td>Patient out to room ready for next patient.</td>
</tr>
<tr>
<td><strong>Anesthesia turnaround time</strong></td>
<td>Anesthesia start to turnover of patient to next member of the surgical team.</td>
</tr>
<tr>
<td><strong>Surgeon turnaround time</strong></td>
<td>Incision close on one patient to prepping or draping next patient.</td>
</tr>
<tr>
<td><strong>Cancellation</strong></td>
<td>Percent of cases canceled after the final schedule is printed.</td>
</tr>
<tr>
<td><strong>First-case start</strong></td>
<td>Percent of first cases starting at scheduled time.</td>
</tr>
</tbody>
</table>

TABLE 6
OR Productivity Measures
Improving productivity requires an objective comparison of current operations with established standards. Several techniques can be used to develop standards. One method uses base-period data as the standard; all future activity is compared with these data. Obtaining the data is quick and inexpensive, but the method can produce undesirable standards because it uses the inefficiencies or inequities of the current system.

Standards can also be developed by a work group that represents all stakeholders. The advantage of this method is that the team develops the standards, thus establishing ownership. The work group develops the standards with facility-specific information regarding the type of surgeries, patient acuity, sociocultural variables, and patient demographics.

Each perioperative service department is unique, therefore making it difficult to align with productivity standards that are readily available or agreed on by the healthcare industry. Managers can obtain benchmarking or best-practice data by networking with other perioperative departments or by reviewing the literature for specific pieces of information (Kaye, 2012, p. 46; Penner, 2013, p. 84). Some organizations subscribe to benchmarking statistics that compare “like” hospitals and rank the performance of separate departments within perioperative services. Examples are Thompson Reuters or Mecon. A sample list of generally accepted metrics is available in Appendix A.

Developed by the Association of Anesthesia Clinical Directors (2014) and endorsed by AORN, the Glossary of Times Used for Scheduling and Monitoring of Diagnostic and Therapeutic Procedures provides a universal lexicon for data collection (AORN, 2010). This glossary has four sections:

- Procedural times
- Procedural and scheduling definitions and time periods
- Utilization and efficiency indices
- Patient categories

Using this glossary, a work group can agree on definitions, establish goals for specific periods, measure productivity against these goals, and obtain an objective assessment of departmental efficiency. After the work group establishes productivity goals and obtains the stakeholders’ agreement, the group should monitor resource utilization and report the results daily and monthly to the stakeholders. The manager can use the measurements to evaluate departmental performance and to support specific requests for additional resource allocations or adjustments to the productivity goals.

FACTORS THAT INFLUENCE PRODUCTIVITY

Factors influencing OR productivity include the type or the method of scheduling, patient preparation, and case-day schedule delays and cancellations.

Type of Scheduling

Block scheduling has various definitions; however, in its simplest definition, a “block” is an agreement between physician and organization that identifies agreed-on times
for procedural cases. This agreement is intended to align surgeon cases (volume) and organizational resources (specialty staff, capital equipment, support staff). A well-defined and fully implemented block schedule results in the best utilization of the OR. Utilization must be frequently monitored. Frequently, a subcommittee of the OR committee will determine definitions for a block, establish standards for the block’s eligibility, and utilization thresholds for retaining the block.

Procedures should be established that allow for transparency in managing block schedules. A number of varied parameters are commonly used to define and manage block (Kaye, 2012, p. 229). Some of the following are commonly included in block definitions and policy:

- The minimal length for an uninterrupted block should be either a full day or a half day.
- A predetermined percentage—frequently 65%—of all available time is “blocked,” and the remaining time is defined as “open” or as “first-come-first-serve” so that services or physicians who have requested more time can be more easily accommodated or so that there is sufficient time available for urgent cases.
- The release of block time should be addressed and may be service specific. For example, the cardiac surgery service may have a “zero-release” provision. That is, this service, due to the nature of its patients is not subject to penalties for releasing unscheduled block time. In contrast, the total joint service of orthopedics may have a 7-day release or longer as these patients are seldom booked on an emergent basis. Blocks should be released 72 to 96 hours before the surgery date so that released time can be used.
- There should be consequences for low utilization, for example, a loss or a reduction of block privileges.

A list of requests for an additional or a new block should be maintained and reviewed at frequent intervals to ensure that access to the schedule is optimal and that OR utilization is at the highest possible level.

Organizations with high volumes of add-on, or urgent, cases may consider staffing one room each day to prevent disrupting scheduled cases. This room is sometimes called the add-on or urgent room. Some organizations create block agreements based on trauma coverage; for example, ortho trauma has a block the following day for managing any emergency department patients who have been evaluated or admitted within the previous 24 hours. Although some patients must be cared for urgently, the availability of a next-day block can provide for a needed access to and a reduced disruption of an otherwise busy surgical schedule.

All team members must observe the definitions of emergency, urgent, and add-on cases established by the OR committee. For example, the committee may define emergency cases as those requiring surgery in 8 to 16 hours, urgent cases as those requiring surgery in 24 to 48 hours, and add-on cases as those that can be performed on an elective basis when time is available. If the facility is a trauma center, cases coming from the emergency department should be performed in the first available room or as soon as deemed clinically necessary.
The amount of time allocated to each procedure should be specific to the procedure and the surgeon. Base the allocation on the time the surgeon needed to complete the procedure in the past. Calculate the time from patient in to patient out with setup and cleanup time added, as appropriate. The best tool for capturing this information is an automated system for scheduling surgery, entering real-time data/timestamps, and generating reports with clearly documented data based on approved definitions. Many organizations, in an attempt to determine a more normal case duration, average the surgeon’s time on the most recent 10 similar cases after deleting the shortest and longest times. This may not be accurate for some services or specialties, so clinical oversight of booked case durations is critical and ensures a more efficient flow on case day.

**Patient Preparation**

Patient preparation also affects efficiency and, therefore, the financial performance of the OR. In many facilities, more than 80% of patients are admitted on the day of surgery. This process decreases the contact time staff with the patient prior to surgery and makes the adequacy of preoperative preparation take on increased importance. This reliance on preoperative assessment and preparation and the shortened window of time the patient is in the facility increases the chance for delays. Efficient patient flow depends upon good coordination and communication between all the phases of care.

Patient education should begin in the surgeon’s office when the procedure is scheduled. The patient and the family should receive information about the logistics of the preoperative preparation as well as the date, time, and location of the procedure. Educational booklets and videotapes should be available to augment the patient’s understanding of the surgical experience and the recovery phase, including pain management. Also, the patient should understand his or her responsibilities for a successful outcome and should take part in discussions regarding an altered lifestyle or changes in health and wellness behaviors related to the surgical procedure.

Additional professionals needed to achieve desired patient outcomes, for example, a social worker, a clinical dietician, or a physical therapist, may participate in patient preparation. The intent is to begin discharge planning before the surgery and to achieve a seamless approach for the patient’s surgical experience with minimized resources and optimized outcomes.

Surgical patients’ charts should be checked sufficiently the day before surgery for completeness to ensure remediation activities can address any identified gaps. When preoperative laboratory and diagnostic tests must be performed, the results must be available 24 to 48 hours before surgery to ensure that complete, accurate data are available. The preoperative preparation team must ensure the patient understands important details about the day of surgery, including the arrival time, the need for nothing by mouth (NPO) status, the need for a preoperative shower with antimicrobial soap (if appropriate), the items the patient should bring to the facility, the need for a list of the patient’s current medications, the patient’s discharge status after the procedure, and the importance of having an adult to accompany the patient home.

Devising a productivity tool to project or forecast the next day’s staffing needs is essential for maintaining productivity measures established by the perioperative
team. This tool should be utilized by the nurse manager or by the charge nurse to plan for the next day’s workload.

The first step is to identify the number of worked hours that are fixed, which are placed in the overhead category. These hours are constant regardless of the numbers of surgical hours scheduled. Examples include hours for the manager, the director, housekeeping, orderlies, schedulers, clerical staff, and transporters. The next step is to identify the number of RN and tech hours allotted for the scheduled procedures of each day. The number of surgical hours scheduled is needed for productivity calculations. Most of this information may be obtained from the perioperative information system and from the staff schedule.

A formula for calculating the productivity index or PI is as follows:

\[
\text{Productivity Index (PI)} = \frac{\text{Worked hours}}{\text{Surgical hours}}
\]

**Case-Day Schedule Delays and Cancellations**

The start of the first case of the day is essential to the effective, efficient running of the surgery schedule. All stakeholders should agree on the definition of delays. Having a clearly defined and well-communicated process for documenting and reporting delays may decrease conflict among team members and disagreement regarding the accuracy of the data. Delays should be categorized and reported monthly to the OR committee. Table 7 suggests some major reasons for delays and interruptions.

| ✓ Anesthesia late or unavailable |
| ✓ Difficulty with anesthesia |
| ✓ Surgeon late or unavailable |
| ✓ Delays with the procedure (specify) |
| ✓ Case not scheduled properly (wrong side or site; supplies or equipment not requested) |
| ✓ Nursing staff late or unavailable |
| ✓ Wrong equipment or supplies |
| ✓ Equipment or supplies not available |
| ✓ Transportation to OR delayed |
| ✓ Clean up not available or extensive |
| ✓ Patient late in arriving |
| ✓ Patient preoperative workup not complete |
| ✓ Communication error (specify) |

**TABLE 7**

Common Reasons for OR Delays
The OR committee should establish the times for when patients should be in the OR, when anesthesia providers should arrive and begin working with patients, and when surgeons should arrive and make the first incision. Variations in these times, as well as other delays throughout the day should be tracked and routinely reported. The consequences of delays should be related to lost opportunities for access or volume (revenue) as well as to expenses (staff salary, overhead, etc.). The manager should identify trends and assign a relative dollar figure to each delay. This additional information will assist in identifying where resources should be used and in processing the improvement plans developed to eliminate delays.

Consequences for physician performance may be established by the OR committee and may include removing block privilege, reducing block time allocation, or removing a first-case start time. Anesthesia consequences are often addressed through performance counseling and may have consequences in the group contract agreement or in medical staff privileges.

To refine room turnover times, analyze the setup and cleanup time by individual staff members and compare to best practices in the department. This information can help identify where gains can be achieved and where delays are associated with staff inefficiencies. The manager can include this information in performance appraisals and individual goal setting for the next year. See Figure 3.

To improve overall efficiency, simultaneous or parallel processing steps should be considered. For example, while the anesthesia provider completes the preoperative assessment, inserts an IV line, administers a regional block, and prepares the patient, the scrub tech and the circulating nurse can assemble the equipment for the procedure and set up the sterile field.

<table>
<thead>
<tr>
<th>Operating Room Usage Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Room:</td>
</tr>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Surgeon</td>
</tr>
<tr>
<td>_______</td>
</tr>
<tr>
<td>_______</td>
</tr>
<tr>
<td>_______</td>
</tr>
<tr>
<td>Pt In</td>
</tr>
<tr>
<td>_______</td>
</tr>
<tr>
<td>_______</td>
</tr>
<tr>
<td>_______</td>
</tr>
</tbody>
</table>

**FIGURE 3**
Example of an OR Usage Report

Pt = Patient S = Scheduled E = Emergency U = Urgent Nsg = Nursing Anes = Anesthesia
A team approach that includes nursing and anesthesia should be defined and developed to ensure a smooth coordination of care and processes within the surgical environment. This team manages processes on a shift basis and often will consist of a charge nurse and a physician (Kaye, 2012, p. 229). These leaders should be empowered to manage all aspects of coordinating the daily schedule. Together they are responsible for troubleshooting and making sure the plan, which is reviewed frequently throughout the day, is executed effectively and efficiently. This responsibility may include moving a case into another room, scheduling additional cases, and communicating with staff members regarding the activities that will affect the implementation of the surgical cases assigned to a team.

Cancellations should be tracked, and reports to the OR committee should include sufficient details, including the surgeon and the anesthesiologist for the case, the reason for the cancellation, the time of the cancellation, and the original date and time for which the case was scheduled. Analyzing cancellations and reporting them to the OR committee may address and circumvent “ghost scheduling” and inappropriate patient workups. Late cancellations may result in gaps in the schedule that cannot be filled on short notice and thus may contribute to inefficiency.

The responsibility for turnover activities and the associated efficiency is recognized as a team effort. Metrics for turnover time may be established as a unit-based target or by each surgical specialty; for example, ophthalmology may have a 7-minute turnover, but neurosurgery may need 25 minutes.

Frequently the circulating RN is given responsibility to coordinate these activities within each OR suite. Although environmental cleaning is frequently delegated to ancillary staff members, if they are not available, other team members must assume this work to prevent delays.

Appropriate case scheduling and up-to-date preference cards expedite turnover time, as do the standardization of supplies, medications, and equipment by surgical specialty or groups of physicians. Materials management and OR management should review the OR schedule at least 5 days in advance to determine if all the appropriate implants, supplies, and equipment are available. Double-booking equipment can cause delays, so equipment booking should be monitored to determine the need for duplicate pieces of equipment.

Staff members must be oriented and competent in performing assigned services. Staff members who are unfamiliar with the equipment or the procedure pose a risk to patients’ outcomes and reduce the efficiency of the entire team. On-call staff must be skilled in the types of cases performed during call hours, so all patients receive the same level of care.
Projections for the coming fiscal year’s supply and materials budgets begin with an assessment of the previous year’s budget by cost center and expense code. Analyzing expenses that did not meet budget projections is necessary to reduce risk of creating inaccurate budget projections. Next, assess the current year’s budget by cost center and expense code. Analyze the budget variances and determine the causes. Estimate current-end-of-year results by expense code and develop a plan to correct the variances.

Then, using this analysis, prepare the budget for the coming fiscal year: Ensure that the analysis includes a thorough assessment of procedure volumes for high-cost resources, such as implants and robotic surgery instrumentation and supplies.

To project inflation rates by expense category, obtain information from the group purchasing organization (GPO) affiliated with the hospital (Penner, 2013, p. 134). The GPO will be able to provide projected inflation rates associated with specific supply categories. Solicit information regarding the instruments or equipment requiring duplication or replacement. Items such as the jaws-of-needle holders and fiber-optic cords have a projected life span; plan to replace them at the appropriate intervals. Before ordering a duplicate piece of equipment, determine how often it is requested but not available and consider if an alternative method of scheduling would solve the problem.

Analyzing the amount and kind of supplies by surgical procedure will help accurately project supply costs. Many OR information systems can provide you with a cost per procedure, and many financial departments have a decision-support system that provides costs per procedure and reimbursement by the International Classification of Diseases (ICD)-9 (to eventually be replaced by the oft-delayed ICD-10) codes. With this information, you can identify operating contribution margins (Kaye, 2012, p. 50; Penner, 2013, p. 174) by surgical procedure and payer mix. See Table 8.

Contribution margin (CM) is defined as, “The dollar amount available from revenues to first cover fixed costs (including overhead), then contribute to profits...” (Penner, 2013, p. 366). Contribution margin is calculated as total revenue minus total variable cost.

If the OR information system cannot provide cost per procedure, the procedural pick list for a specific case is one source of information. A form requiring the circulator to list all the supplies used for a specific case can capture sample data. Using a form, such as the one in the Figure 4, the circulating nurse can capture...
supply utilization information per patient event. Then, the materials management department can provide the cost of the supplies, and the payroll department can add the labor costs. Maintaining a reference file of completed forms and updating these as supply costs are changed may help validate the kind and number of supplies utilized for specific procedures. Furthermore, this tool may be used to project the cost of supplies for a new surgical procedure.

You can also complete a case-cost analysis to compare physician cost per procedure. After reviewing patient outcomes, you can then communicate the best-demonstrated, cost-effective practice by procedure to all surgeons performing the procedure. There is no need to disclose the name of the most cost-effective surgeon but be prepared to discuss the detail of the cost per procedure for each surgeon with that surgeon to facilitate their comparison against others. This tactic provides data that support a conversation with the surgeons about changing their practices to align with the best-demonstrated practice. Changes may include standardizing supplies, using generic drugs, reducing laboratory and radiology procedures, using less expensive implants, reducing the length of time in the OR and the PACU, and reducing the average length of stay in the hospital.

Analyze any new clinical practices and regulatory changes for their budgetary impact. For example, if the department plans to purchase a new piece of equipment, include the cost of the associated supplies, the ongoing warranty or maintenance costs, and the initial education of staff members in the operating budget.

### Table 8

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Average Charges per Case</th>
<th>Average Payment</th>
<th>Average Cost</th>
<th>Contribution Margin *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laparoscopic cholecystectomy</td>
<td>$4,896</td>
<td>$3,430</td>
<td>$2,203</td>
<td>$1,227</td>
</tr>
<tr>
<td>Aorta-femoral bypass</td>
<td>$21,436</td>
<td>$11,734</td>
<td>$11,172</td>
<td>$562</td>
</tr>
</tbody>
</table>

* Not fully loaded with fixed costs
Supply and Material Budgets

MANAGING SUPPLIES AND MATERIALS

In partnership with materials management, surgical services management controls expenses by managing the inventory of OR supplies and materials. Many strategies are used today; however, they consistently focus on keeping inventory levels as low as possible without jeopardizing patient care.

After materials management and the OR staff agree on inventory levels, materials management should implement an inventory management method, for example, the just-in-time, the low-unit-of-measure (LUM), or the continuous replenishment method. Materials management should be responsible for assessing the inventory, ordering, and restocking the majority of the OR supplies to maximize the inventory turns, that is, the number of times inventory is used in a certain period.

### FIGURE 4
Example of Case-Cost Analysis

<table>
<thead>
<tr>
<th>Surgical procedure:</th>
<th>Surgeon:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROOM SET-UP</td>
<td></td>
</tr>
<tr>
<td>Start:</td>
<td>Complete:</td>
</tr>
<tr>
<td>Patient in OR:</td>
<td>Patient out of OR:</td>
</tr>
<tr>
<td>ROOM CLEAN-UP</td>
<td></td>
</tr>
<tr>
<td>Start:</td>
<td>Complete:</td>
</tr>
<tr>
<td>PROCESSING OF INSTRUMENTS</td>
<td></td>
</tr>
<tr>
<td>Start:</td>
<td>Complete:</td>
</tr>
<tr>
<td>LABOR ANALYSIS*</td>
<td></td>
</tr>
<tr>
<td>Total Time</td>
<td>Classification of Personnel</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Includes benefits

### SUPPLY COSTS*

<table>
<thead>
<tr>
<th>Supply Item</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Includes time in the PACU and preoperative area and supplies used

---

### Table

<table>
<thead>
<tr>
<th>Supply Item</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Supply inventory represents cash that could be earning interest or that could be applied to capital investments. Therefore, materials management and OR management should assess the inventory at least quarterly and adjust inventory levels as appropriate. An optimal number of inventory turns for routine supplies is 8 to 10 per year (“Inventory Turnover,” 2014). The inventory turn rate is calculated by dividing the total annual supply expense by the value of the inventory on hand. If inventory turns occur 10 times a year, supplies are on the shelf for 36 days before being used (365 days divided by 10 turns).

**SUPPLY-ASSOCIATED COSTS**

The seven categories of supply-associated costs are the following:

1. Cost of the product
2. Cost of a quality product
3. Ordering costs
4. Carrying costs
5. Stock-out costs
6. Obsolescence costs
7. Cost of pilferage

One approach for determining the best balance between ordering costs and carrying costs is called economic order quantity. See Table 9.

Effective inventory management requires establishing safe stocking levels. To determine these levels, consider these questions:

- Will a stock-out have a negative impact on patient care?
- Can the item be obtained quickly?
- Is it available on the retail market?

<table>
<thead>
<tr>
<th>Item</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand per year</td>
<td>5,000</td>
<td>5,000**</td>
<td>5,000</td>
</tr>
<tr>
<td>Order size*</td>
<td>50</td>
<td>316</td>
<td>5,000</td>
</tr>
<tr>
<td>Average inventory</td>
<td>25</td>
<td>158</td>
<td>2,500</td>
</tr>
<tr>
<td>Number of purchase orders</td>
<td>100</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Annual ordering costs @ $5.00</td>
<td>$500</td>
<td>$80</td>
<td>$5</td>
</tr>
<tr>
<td>Annual carrying costs @ $0.50</td>
<td>$13</td>
<td>$79</td>
<td>$1,250</td>
</tr>
<tr>
<td>Total annual relevant cash</td>
<td>$513</td>
<td>$159**</td>
<td>$1,255</td>
</tr>
</tbody>
</table>

* Does not account for quantity discounts.
** Represents best alternative.
• How critical is a stock out?
• Can the item be borrowed?
• Which substitutes can be used?

Frequently, supplies are stocked at multiple sites in a facility, such as the storeroom, sterile processing area, and ORs. To reduce inventory redundancies and improve cash flow, reduce the number of stocking areas and maintain the levels needed to provide safe patient care.

Economic order quantity is a formula for determining the size of an order that strikes the most economical balance between ordering costs and carrying costs. Row 2 of Table 9 shows the implications of ordering 5,000 closed wound drainage systems using three different order sizes: 50, 316, and 5,000. As shown, these implications include average inventory, number of purchase orders, annual ordering costs, annual carrying costs, and total annual relevant cash. The approach using an order size of 316 is the most economical because the total annual relevant cash (ordering costs and carrying costs) is $159, compared with $513 for an order size of 50 and $1,225 for an order size of 5,000.

A perpetual inventory system for implants helps control expenses and obsolescence. Using this system, each use of implants is recorded, and a running balance of stock is maintained. The system allows the stock on hand to be kept at an economical level. When negotiating contracts for implants, the following considerations should be included: rental of the instruments required for the procedure, shipping fees, express delivery, restocking charges, and consignment of the implants.

Developing partnerships and alliances with manufacturers and distributors of healthcare supplies is an important management responsibility. Such collaboration may include risk sharing, cost reductions, volume discounts, and long-term relationships and contracts to achieve significant cost savings.

PERIOPERATIVE SERVICES VALUE ANALYSIS COMMITTEE

The value analysis committee should evaluate the cost-effectiveness of supplies used in the department, monitor the use of high-cost supplies, and verify the appropriate use of such supplies. The goals of a value analysis committee are to select products and equipment that:

• meet evidence-based performance standards,
• meet product-specific performance criteria,
• demonstrate clinical effectiveness,
• are cost-effective, and
• are safe for patients and end users.

A perioperative services value analysis committee can assist with standardization by reviewing requests for new supplies, implants, and necessary instruments. This
committee should meet at least monthly. A surgeon “champion” is critical to the success of the committee for sharing information with colleagues on surgeon preference items. The following list provides essential representatives or key stakeholders:

- Staff nurses
- Surgical technologists
- Surgeons
- Anesthesia providers
- Finance department personnel
- Infection control nurses
- Materials management personnel

Figure 5 provides a sample product request form for a value analysis committee.

---

**FIGURE 5**

Example of a Value Analysis Product Request Form
Using standardized supplies helps improve cost control and efficient room turnover. Because the facility can purchase standardized supplies in large quantities, the vendor can reduce the price. The value analysis committee should establish a procedure for standardization and communicate the procedure to all surgeons. Materials management should implement the procedure, and the value analysis committee must enforce the procedure. Special orders should be discouraged because they often cost 3 to 4 times as much as routine products do. However, the value analysis committee should develop a process for accepting variances to the standards. This process should be communicated to the surgeons. The value analysis committee is responsible for the approval process.

After every case, surgeon preference cards must be reviewed and changes made so only the appropriate supplies are opened for each case. Surgeon preference cards may serve as the basis for supply comparison and costs among surgeons for the same or similar procedures. These costs, as well as the cost of labor for the procedure (as identified by the average length of time per surgical procedure), complete the case-cost analysis and can be used to discuss resource consumption with the surgeons.

Physician involvement is essential to improve supply utilization and OR productivity. The chief of surgery or the medical director of perioperative services must develop an effective approach to engaging the medical staff. Involvement may begin with discussions of the role of physicians in resource consumption. Along with cost-per-case information, the formulas in Appendix B can provide data-related information to facilitate these discussions. Ideally, they will lead to the development of standard procedure cards that replace individual physician preference cards.

Organizations that are successful in standardizing supplies frequently develop a supply formula that identifies the medical and surgical supplies available in the facility. This tool is similar to a pharmacy formulary. Processes to request a supply “off-formula” are similar to those used for drugs and medications. Supply items are cross-referenced, and a brief description of each provides the information needed to make decisions regarding the supplies.

**ENVIRONMENTAL MANAGEMENT—“GREENING THE OR”**

Concerns over the environment and hazardous waste have primarily focused on recycling to avoid increased waste. Recently, however, reprocessing and repurposing have played a major role in the operating room. Reprocessing is a technique utilized by ORs for rendering items with multiple uses to a sterile state or terminally cleaning them (U.S. Food and Drug Administration [FDA], 2013a). Examples of these items include sequential compression devices (SCDs) or reusable blood pressure cuffs that may be labeled as onetime-use items by the manufacturer. These items are cleaned, inspected, and repackaged for additional use by a variety of vendors.

Taking the concept a step further is “reprocessing,” during which the bio-burden is removed from the device, the device is fully inspected and is sharpened or repurposed for multiple uses. Companies that have entered this business require
a 510(k) clearance through the FDA (2013b) for every device that they repurpose. Once a company has received the appropriate clearance, it may repurpose and resell the device. Purchasing these items can lead to as much as a 60% cost savings, having the potential for organizations to substantially save on supply costs.

MARK-UP FORMULAS AND CONSIGNMENT

Consignment is a supply method in which the inventory remains the property of the vendor until used. Implants having a high dollar value and/or multiple sizes or those prone to obsolescence should be evaluated for consignment rather than being purchased and placed into inventory. Because the inventory remains the property of the vendor, implants are paid for once implanted in the patient using “bill only” processes through a supply chain. Prior to the consignment implants being placed on the shelf, an accurate recording of all implants with the supply chain and the vendor should be performed and recorded via a consignment record. The value of these consignment implants should not be included in the OR inventory.

Arrangements should be made with the vendor to determine which party will be responsible for inventorying and keeping adequate quantities on the shelf. Safeguards are needed for protecting both the organization and the vendor from potential inventory discrepancies. Processes for resolution need to be agreed on in writing. Although these systems are intended to ensure the supply is available when needed, inventoring and accounting must be done consistently to guarantee optimal and timely access.

Most finance departments within an organization are responsible for developing a mark-up methodology for supply items that are charged to the patient. Common methodologies utilize a percentage mark-up for a supply item depending on its cost. For example, an item costing $1 to $100 dollars may have a mark-up of 200%; items costing $100 to $1,000, a mark-up of 100%; and items costing $1,000 to $5,000, a mark-up of 50%. These formulas should be hard-coded into the revenue capture system, thereby reducing erroneous billing created by human error.

Other organizations may use a level system, which incorporates all basic supplies in the cost of the procedure with only implants and drugs billed separately. Some organizations use an acuity-level system that incorporates variable mark-up based on patient acuity and other defined attributes of service.
Unit 5
Capital Budget

Each organization establishes the minimum dollar amount for items to be included in the capital budget process. Items in the capital budget usually cost more than $5,000 and have a life span beyond the year they are put into use. Requests for these capital items may come from clinical staff, physicians, biomedical engineers, and maintenance departments. See Figure 6 for an example of a capital equipment request form.

The capital budget is divided into new and replacement items. Each item—whether a replacement or new—must be justified and approved prior to acquisition. Justification may require the following information:

- documentation of excessive repairs
- age of equipment
- normal life span of equipment
- asset value of equipment, if not fully depreciated
- increased use of an item
- costs of using the equipment, including supply costs, personnel cost, and cost of preventive maintenance agreement
- reason for purchase, such as new procedures
- regulatory requirements

Capital budget requests from perioperative services often represent a significant portion of the total capital allowance for the organization. Alternatives to purchasing equipment, such as leasing or renting, should be thoroughly investigated before purchasing capital items. Extensive research and collaboration with key stakeholders and vendors are essential for verifying item appropriateness and, thereby, obtaining approval.

A software application that documents the cost of repairs and provides the expected life of equipment can help with repair cost analysis. Appropriate review of repair causes must be conducted to ensure that the need for repairs is understood. Some repairs are related to improper use. In these instances, new equipment will not solve the problem.

A cost–benefit analysis, a list of benefits derived from a proposed solution compared with the costs of other solutions, will assist with decision making. Some benefits and costs, such as increased patient safety and decreased staff frustration, may be intangible. Consider these questions while evaluating capital equipment purchases:

- Have all the related expenses been identified?
- Are the quoted prices subject to change; if so, when?
<table>
<thead>
<tr>
<th><strong>FIGURE 6</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Equipment Request Form</strong></td>
</tr>
</tbody>
</table>

- What is the impact of not purchasing the equipment?
- What are the alternatives to purchasing the equipment?
- Will a less expensive model meet the basic need?
- Will cost savings or increased revenue result from the purchase?
- What documentation will verify that the equipment is needed to support an increased workload?
- If the equipment is a replacement, what were the repair costs and associated downtime for the current equipment?
Has the feasibility of lease financing been explored? As changes occur, will the equipment be upgraded at no cost?

What is the service and repair response time?

What is the life expectancy of the technology?

Will the technology be superseded by new technology? If so, when?

**FINANCIAL RETURN**

An important factor in capital budgeting is maximizing the value of a piece of equipment by getting the best financial return for the dollar invested. Two metrics, payback period and return on investment (ROI), can help in determining this value and making an objective decision about purchasing new equipment. See Figure 7 for an example of an ROI assessment for a capital purchase.

---

**Return on Investment for Capital Purchase**

**Initial Expense**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser</td>
<td>$80,000</td>
</tr>
<tr>
<td>Smoke evacuator</td>
<td>5,000</td>
</tr>
<tr>
<td>Instruments</td>
<td>3,000</td>
</tr>
<tr>
<td>Training</td>
<td>3,000</td>
</tr>
</tbody>
</table>

**Total Cost** $91,000

**Projected Revenues**

<table>
<thead>
<tr>
<th>Service Area</th>
<th>Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urology (150 cases @ $400/case)</td>
<td>$60,000</td>
</tr>
<tr>
<td>Endoscopy (52 cases @ $300/case)</td>
<td>15,600</td>
</tr>
<tr>
<td>Gynecology (100 cases @ $400/case)</td>
<td>40,000</td>
</tr>
<tr>
<td>General (20 cases @ $400/case)</td>
<td>8,000</td>
</tr>
</tbody>
</table>

**Total Projected Revenues** $123,600

**Annual Operating Expenses**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>$5,000</td>
</tr>
<tr>
<td>Disposable supplies</td>
<td>6,500</td>
</tr>
<tr>
<td>Filters</td>
<td>5,000</td>
</tr>
<tr>
<td>Fibers</td>
<td>12,000</td>
</tr>
</tbody>
</table>

**Total Cost** $28,500

**Net Cash Flow — Year 1**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$123,600</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>28,500</td>
</tr>
</tbody>
</table>

**Net Cash Flow** $95,100

**ROI Formulas**

Annual revenue ÷ 12 months = Income/month

Average yearly income - Annual depreciation = Initial investment expense

Initial investment + Income/month = Payback period

---

**FIGURE 7**

Example of a Return on Investment Assessment for a Capital Purchase
Payback Period

The payback period is the amount of time needed for the equipment to return the original investment. The first step in determining this period is to calculate the initial cost. This cost includes actual costs as well as costs of ancillary equipment and other required supportive devices, installation, and personnel training. Note that all costs associated with the installation of the equipment or construction needed to install the equipment should be capitalized into the cost of the equipment.

To forecast the income the equipment will generate, estimate the number of procedures annually and calculate the revenue per procedure. Identify expenses incurred by the procedure or the capital item on the operating budget. Using the same approach, estimate the rate of revenue for the period over which the equipment will depreciate. In these calculations, increased usage will include new procedures or new surgical services using the equipment.

Return on Investment

Calculate ROI using this formula:

\[
\text{Return on Investment} = \frac{\left( \frac{\text{Average Yearly Revenue}}{\text{Annual Depreciation}} \right) - \frac{\text{Initial Investment Cost}}{\text{Annual Depreciation}}}{\text{Initial Investment Cost}}
\]

The annual depreciation is the initial cost divided by the number of years over which the equipment will provide useful benefits. The average yearly revenue is the projected revenue for the depreciation period divided by the same number of years.

The final phase of capital budget preparation consists of establishing priorities and defining the timing of purchase. Included in the purchase order of all capital equipment should be a request for the operating manual, the conditions of warranty, the specific details related to shipping and delivery, and the initial and ongoing in-service training for team members, including engineering and/or biomedical engineering personnel, if appropriate.
Managing budgets requires familiarity with accounting terminology and an understanding of financial statements, including the balance sheet, the income statement, the cash flow statement, the cost center report, and the productivity report.

The balance sheet (Penner, 2013, p. 315) presents the financial position of the organization by reporting its assets, liabilities, and equity. Assets are what the company owns, including cash, inventories, accounts receivable, prepaid expense, property, and investments. Liabilities (Kaye, 2012, p. 69) are what the company owes, including accounts payable, salaries, benefits, tax liability, and mortgage bonds. Assets minus liabilities equal equity (Kaye, 2012, p. 71). In for-profit organizations, the owners may be sole proprietors, partners, or stockholders, and the equity belongs to them. A not-for-profit organization does not have an owner, so this equity is referred to as the net assets. Equity or net assets can be increased by generating income or reducing liabilities. Strategies for generating income include increasing the cost of services, increasing volume, and changing the payer mix. Strategies for reducing liabilities include lowering overhead, improving efficiency, reducing inventories, and implementing standardization.

The income (or operating) statement (Kaye, 2012, p. 69) lists revenues and expenses and compares them for a given period. This statement shows whether an institution is making money (revenue exceeds expenses) or losing money (expenses exceed revenue).

The cash flow statement (Kaye, 2012, p. 69) identifies the amount of cash received or disbursed over a period.

The cost center report identifies the expenditures for each cost center by category for a specific period compared with the budget. Department managers use this report to analyze budget variances and develop an action plan for addressing variances and resolving their impact prior to the next reporting period.

A productivity report shows the measure of output to any given measure of input over a specific period and is commonly used to evaluate staff utilization against expected resource use.

**MONITORING KEY BUDGET VARIANCES**

The manager must use budget reports to analyze key variances effectively. Variance analysis compares the budgeted hours or dollars with the actual hours or dollars and explains differences. The manager calculates variances for three main reasons:
1. To compare the performance of the unit with the budget
2. To compare the performance of the unit with established goals and objectives
3. To assist in preparing the budget for the next year

Figure 8 provides an example of a monthly variance report.

After identifying budget variances, the manager should take any required corrective action as soon as possible. Reviewing analytical reports throughout the month and the year helps the manager identify, evaluate, and justify variances. A variance analysis provides an opportunity for the manager to examine the operations of the department by reviewing the workload, identifying payroll and non-payroll

---

**FIGURE 8**
An Example of a Perioperative Monthly Variance Report
costs associated with the workload, monitoring supply expenses in relation to the workload, and taking action on the findings. For example, if variances result from inefficiencies, the manager should implement a process improvement plan to correct them. The greatest benefit of variance analysis is that it helps the manager identify how to improve future outcomes.

The primary perioperative service areas to analyze are OR utilization (routine and emergency), room turnover; labor costs per hour; supply costs per hour; and cost per case by specific surgeon. As resources become more limited, perioperative managers must manage these variables to gain efficiency. Efficiency means providing the same amount and quality of care at a reduced cost.

**CREATING A PRO FORMA**

Once a project has been identified, a pro forma may be created. Pro forma financial statements are a business development and project-focused tool. A pro forma consists of predictions for what the financial outcomes for the project or program will look like at some point in the future (Penner, 2013, p. 214). The completed pro forma is used to inform decisions of the viability of the project in question.

Certain financial performance thresholds are usually established by finance and accounting policy. The manager may not create the pro forma but will be instrumental in assisting finance staff as they compile the various data and assumptions used in the pro forma. Depending on the project’s size, complexity, and needed capital investment, a more thorough business plan may need to be developed.

Commonly encountered questions or assumptions that need to be answered while developing a pro forma include the following:

- What is the patient volume associated with this project?
- What is the revenue associated with this project?
- What will the reimbursement be by payer?
- What are the operational costs associated with the project, staffing, supplies, and so on?
- What capital equipment will need to be purchased?
- Will finance determine the tools to be used to create the pro forma, such as sensitivity analysis or regression analysis?

**REIMBURSEMENT CONCERNS**

**Pay for Performance**

Pay for performance is a method whereby payers reimburse providers for services delivered based on the provider’s ability to document certain quality-of-care performance outcomes. There are several quality initiatives underway at the Centers for Medicare and Medicaid Services (CMS) to improve the care of Medicare patients. In all cases, data on evidence-based quality measures are
gathered for reporting purposes and, in some cases, payment purposes. Because pay-for-performance measures are tied to payment, there is increasing pressure on hospitals to be efficient and effective in care delivery to maximize revenues and quality outcomes. An example of this method includes Surgical Care Improvement Project (SCIP) measures.

**Coding and Compliance**

Coding is the process by which a service is translated into numeric or financial classifications. There are three coding strategies needed for correct reimbursement. Current Procedure Terminology (CPT) was established by the American Medical Association (AMA) and is the approved method that describes services performed by providers (Kaye, 2012, p. 168). These codes describe diagnostic and therapeutic services as well as modifiers that further clarify services. Modifiers help providers identify specific attributes of care and the acuity of services provided.

The ICD was established by the World Health Organization and is currently in its ninth version (ICD-9). The CPT and the ICD must match in order for medical necessity to be determined. Failure to have the correct ICD may prevent reimbursement for care.

The third set of codes used for identifying supplies, drugs, and products that may be reimbursed by insurance or third-party payers is the Healthcare Common Procedure Coding System (HCPCS).

**Hospital Consumer Assessment of Healthcare Providers and Systems**

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) is the first national, standardized, publicly reported survey of patients’ perspectives of hospital care. It is a 27-item survey instrument and data collection methodology for measuring patients’ perceptions of their hospital experience (Kaye, 2012, p. 169).

**Value-Based Purchasing**

The Hospital Value-Based Purchasing (Hospital VBP) program links a portion of a hospital’s payment from CMS to performance on a set of quality measures. The Hospital VBP Total Performance Score (TPS) for fiscal year (FY) 2013 has two components: the Clinical Process of Care Domain, which accounts for 70% of the TPS; and the Patient Experience of Care Domain, 30% of the TPS. The HCAHPS Survey is the basis of the Patient Experience of Care Domain (Kaye, 2012, p. 169).

Eight HCAHPS measures—termed “dimensions” in Hospital VBP—are used. There are six HCAHPS composites: Communication with Nurses, Communication with Doctors, Staff Responsiveness, Pain Management, Communication about Medicines, and Discharge Information; one new composite that combines the hospital Cleanliness and Quietness survey items; and one global item, Overall Rating of Hospital Readmissions (Kaye, 2012, p. 169).
Current Reimbursement Regulations

The Affordable Care Act (ACA) contains a number of provisions intended to improve quality and reduce spending in the Medicare program. These were included with the intent of reducing preventable readmissions. One provision established the Hospital Readmissions Reduction Program (HRRP) to provide a financial incentive for hospitals to reduce preventable readmissions. Beginning in fiscal year 2013, the HRRP imposed a financial penalty on hospitals with excess Medicare readmissions. The HRRP applies to all general hospitals paid under the Medicare inpatient prospective payment system (IPPS).

The HRRP defines readmission as a Medicare patient who is readmitted to the same or to another acute care hospital within 30 days of discharge (James, 2013). Although there are challenges to the methodology and the monitoring, the intent—and the working focus for healthcare leaders—is preventing occurrences that could potentially result in a zero-reimbursement situation. In the perioperative setting, these could be potentially devastating to a revenue center. One example is the circumstances surrounding a patient who receives implants, develops a postoperative infection requiring readmission, and is determined to be a preventable readmission. The HRRP and the CMS have indicated that they will not reimburse for the original care; that is, the total cost of implants and all other services is then an expense for the organization, generating no revenue.
The process of evaluating the financial performance of perioperative services must be well planned. Broad-based and organization-wide efforts, well-conceived systems, a commitment to the goal shared by all stakeholders, and the appropriate amount of time to achieve the results are needed to improve performance.

Select a work group committed to improving departmental productivity and create test scenarios for the financial analysis work. Success in testing the program will build credibility. When the department commits itself to a productivity enhancement program, mechanisms to monitor the results and to hold the gains must be defined and established before the program is implemented.

Perioperative managers must seize every opportunity to improve productivity, to manage staff and supplies, and to communicate the results to stakeholders, administrators, surgeons, and staff. Regardless of how small the improvements may seem, implementing improved resource management is a gain, and holding that gain is essential for financial success. All team members must commit themselves to the financial performance program and to incorporating it into their daily work in order to realize sustainable success.
The following case studies are provided for your review and will allow you to synthesize and apply the concepts discussed in the module. Read the scenarios carefully, evaluating the needed information for the points-to-consider discussion that follows.

CASE STUDY 1: SPORTS MEDICINE CENTER

The board of directors has decided to create a center for sports medicine. A physician has been recruited to be the director and chief of the service. The CEO tells you that the program should start in 4 months.

Points to Consider

1. Who should you include in your planning, and for each individual, why should he or she be included?
2. How will you determine which supplies and instruments the new service needs?
3. How will you ensure staff competency?
CASE STUDY 2: BUDGET OUT OF CONTROL

D. Glass, MSN, RN, CNOR, recently accepted a position as director of perioperative services at a medical center. During a meeting with the chief financial officer (CFO) and the certified nurse educator (CNE), she learns that the department is over budget in salary and supply expenses. The CFO requests an action plan to get the budget under control. Ms. Glass says she will need to complete an analysis of the budget variances before she can develop an action plan.

Points to Consider

1. What information does Ms. Glass need for the variance analysis?
2. How will she analyze the variances in salaries?
3. How will she analyze the variances in supplies?
Case Studies: Points to Consider

CASE STUDY 1: SPORTS MEDICINE CENTER

1. Who should you include in your planning, and for each individual, why should they be included?

You should include the following:

a) The CEO and CFO to determine the allocation for the operating and capital budgets
b) The chief of surgery to determine the hours and rooms allocated for this new service
c) The chief of anesthesia to learn if additional staff members can be provided if new rooms are opened
d) Perioperative staff to find out if anyone is interested in being the lead for the new service and if the PACU will have to address any special patient needs
e) Materials management personnel to learn who can work with you on supply and equipment orders
f) Equipment vendors to determine who should be involved and when they should be involved
g) Inpatient nursing colleagues to determine which unit will care for patients postoperatively and whether training is needed
h) Central sterile processing personnel to find out who will care for the equipment and instruments
i) Marketing personnel to learn how the service will be marketed and how you can ensure that information provided to prospective patients is correct
j) Patient educators to learn about appropriate preoperative education
k) New surgeons to find out the types of cases and volume anticipated
l) Radiology and laboratory personnel to tell them about the new service and the anticipated volume

2. How will you determine which supplies and instruments the new service needs?

Call the new surgeon to set up a meeting on his or her next visit to your facility. Ask the surgeon to submit copies of preference cards and instrument lists. Before the meeting, compare them with the supplies available in your
department. Identify similar supplies and be prepared to discuss them. To identify capital items needed to start the new service, call the OR manager at the facility where the physician currently works.

3. **How will you ensure staff competency?**
   If the service will require new staff members, recruit professionals experienced in sports medicine. Also, identify a facility that performs sports medicine surgeries and call the OR manager to discuss whether your staff members can be trained there. Contact vendors to discuss training and ask if they have laboratory facilities where staff members can be trained.

**CASE STUDY 2: BUDGET OUT OF CONTROL**

1. **What information does Ms. Glass need for the variance analysis?**
   She needs the following:
   
   - End-of-the-year budget reports for the past 2 years
   - Year-to-date budget report
   - Departmental business plan
   - Payroll reports
   - Workload reports (actual vs. budget by surgical specialty)
   - Staffing formula for the OR
   - Productivity reports
   - Daily assignment sheets
   - Number of open positions by classification
   - Policies on monitoring sick leave, approving overtime, and granting benefited time off

2. **How will she analyze the variances in salaries?**
   She will review salary expenses by classification, noting positive and negative variances. She will also determine whether trends in the budget variances exist. For example, do the same months reflect the variances each year? When analyzing the monthly payroll reports, she will focus on productive and nonproductive time. She will review salary expenses related to the following:

   - The ratio of RN to ST
   - The use of registry and per diem personnel
   - Overtime
   - On call and call back
   - Sick leave
   - Vacation hours
   - Educational leave
3. *How will she analyze the variances in supplies?*

Ms. Glass will review the budgets by expense code, noting positive and negative variances. She will also determine whether trends in the budget variances exist. To understand the method of supply management for the ORs, she will meet with materials management and determine if an unanticipated increase in products has occurred, if the facility receives discounts related to volume, and if all orders and payments are being captured. Ms. Glass will also tour the facility to see where supplies are stocked. To identify potential areas of standardization, she will discuss the budget variances with the appropriate team leaders and managers.
Glossary

Accounting: System for keeping track of the financial status of an organization and the financial results of its activities.

Accounts receivable: Money owed to an organization or to an individual in exchange for goods and services provided.

Annual depreciation: The initial cost divided by the number of years over which the equipment will provide useful benefits.

Assets: Valuable resources such as equipment and inventories.

Average yearly revenue: The projected revenue for the depreciation period divided by the same number of years.

Balance sheet: Financial report that indicates the financial position of the organization at a point in time.

Block scheduling: A “block” is an agreement between physician and organization that identifies agreed-on times for procedural cases.

Breakeven analysis: Technique used to determine the minimum volume of surgical hours necessary for a procedure or a service to begin generating revenue.

Budget: Statement of estimated expenses and revenues for a specific period.

Budget cycle: The period addressed by the budget, usually the facility’s fiscal year.

Business plan: A detailed plan for programs, projects, and services to be implemented by a facility that are consistent with its mission.

Capital budget: Budget for the acquisition of equipment and buildings.

Carrying costs of inventory: Expenses related to holding inventory. These expenses represent lost interest because the money is tied up in inventory. Costs include
expenses, such as insurance on the value of the inventory, personnel hours related to managing the inventory, and obsolescence of the supplies.

**Cash flow statement:** Identifies the amount of cash received or disbursed over a period of time.

**Chart of accounts:** An accounting form that assigns an identifying number to each cost center and each type of revenue and expense.

**Coding:** The process by which a service is translated into numeric or financial classifications.

**Core staffing:** The minimum number of staff members required to provide care for a specific patient population.

**Cost–benefit analysis:** Measurement of the relative costs and benefits associated with a particular project or task.

**Cost center:** A unit or department in a facility that has been designated to accumulate costs.

**Depreciation:** Allocation of a portion of the cost of a capital asset into each year of the expected useful life.

**Direct expenses:** Expenses for products or services directly related to patient care, such as salaries, implants, and medical surgical supplies.

**Economic order quantity (EOQ):** Formula for determining the balance between ordering costs and carrying costs.

**Efficiency:** A measure of the resources required for a specific output.

**Equity:** Assets minus liabilities.

**Expense:** Cost of supplies or services provided.

**Expense budget:** An annual financial plan outlining anticipated expenditures to provide services based on projected workload.

**Expense codes:** Codes that specify the correct placement of expenses.

**Fiscal year:** A 12-month period starting at a point determined by the institution.

**Fixed expenses:** Expenses that do not vary with volume, that is, taxes and mortgage.
Flexible budget: A budget that can be adjusted for volume changes based on a specific relationship between volume and costs.

Full-time equivalent (FTE): Represents an employee’s worked and paid hours. One FTE represents 2,080 hours a year. Any percentage of an FTE will equal prorated paid hours of 2,080.

Historical-trend budgeting: A method of budgeting that adds an additional percentage or amount to the prior year’s budget allocation without analyzing the expenses.

Indirect expenses: Expenses that cannot be specifically traced to an individual service or procedure. These costs continue even if the service is no longer provided.

Income statement: Also known as an operating statement. Lists revenues and expenses and compares them for a given time period.

Just-in-time inventory: Method of inventory management that calls for the arrival of inventory as it is needed, resulting in zero inventory levels.

Liabilities: What the company owes, including accounts payable, salaries, benefits, tax liability, and mortgage bonds.

Nonproductive time: Paid time during which the employee is not providing services to patients. This includes vacation, holiday, sick, jury duty, and educational leave.

Operating budget: The allocation of dollars used to accomplish anticipated activities. It includes revenue and expense dollars.

Overhead expenses: See Indirect expenses.

Owners’ equity: Residual value after the liabilities of an organization are subtracted from its assets. It represents the portion of the assets owned by the organization or its owners.

Payback period: The amount of time needed for the equipment to return the original investment.

Pay for performance: A method whereby payers reimburse providers for services delivered based on the provider’s ability to document certain quality of care performance outcomes.

Productive time: The time an employee spends performing the required job responsibilities.
**Productivity:** Ratio of a given measure of output to a given measure of input over a specified period.

**Relative value units (RVUs):** Measurement of workload.

**Return on investment:** The average yearly revenue minus the annual depreciation, divided by the initial investment cost.

**Revenue:** Dollars received by a facility for goods and services provided.

**Revenue budget:** An annual financial plan outlining anticipated income from various sources based on projected activity.

**Safety stock:** Minimum inventory that an organization always tries to maintain.

**Statistical budget:** Planned levels of activities, such as the number of surgical cases, surgical hours, or surgical minutes.

**Stock-out costs:** Costs incurred when a supply is needed but not in inventory. These costs may result when a needed item is purchased at a higher price from a local vendor.

**Unit of service (UOS):** The level of customer demand for health care services, also known as volume or utilization. Procedures and patient days or visits are often used as measurements.

**Variable expenses:** Expenses that vary directly and proportionately with volume.

**Variance analysis:** Comparison of actual results against the original budget, followed by an investigation to determine why variances occurred.

**Workload:** Volume of work for a unit or department. A direct relationship should exist between the workload and the required resources.

**Year to date:** Sum of the budget or actual values for all months from the start of the fiscal year through the most recent period for which data are available.

**Zero-based budgeting:** Program budgeting approach that requires an examination and justification of all costs.
Suggested Reading


References


OR Manager. (2013). The right strategies can help increase OR utilization. OR Manager, 29(5), 21–22.


# Appendix A: Productivity Metrics

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Flow</td>
<td>First case delay &lt; 5%</td>
</tr>
<tr>
<td></td>
<td>Cancellation rate &lt; 5%</td>
</tr>
<tr>
<td></td>
<td>Turnaround time &lt; 25 minutes*</td>
</tr>
<tr>
<td>Schedule Optimization</td>
<td>OR utilization</td>
</tr>
<tr>
<td></td>
<td>Inpatient 85%</td>
</tr>
<tr>
<td></td>
<td>Outpatient 80%</td>
</tr>
<tr>
<td>Surgical Staff</td>
<td>2:1 Ratio of RNs to surgical techs</td>
</tr>
<tr>
<td>Materials Management</td>
<td>Inventory</td>
</tr>
<tr>
<td></td>
<td>Standardization of supplies</td>
</tr>
<tr>
<td></td>
<td>Just-in-time inventory</td>
</tr>
<tr>
<td></td>
<td>Inventory turns: 8-10 per year</td>
</tr>
</tbody>
</table>

*Time between one patient’s exit and next patient’s entrance; cases not booked to follow should not be included in the calculation.*
Appendix B: Formulas for Measuring Financial Performance

Hours per Surgical Hour (HPSH) Formulas

Total HPSH

\[
\frac{\text{Total FTEs} \times 2080}{\text{Surgical Hours}} = \text{Total HPSH}
\]

* FTE = full time equivalent

Direct HPSH

\[
\frac{\text{Worked Hours}}{\text{Surgical Hours}} = \text{Direct HPSH}
\]

Indirect HPSH

\[
\frac{\text{Worked Hours}^*}{\text{Surgical Hours}} = \text{Indirect HPSH}
\]

* Managers, schedulers, clerical staff

Productive HPSH

\[
\frac{\text{Total Hours Worked} - \text{Nonproductive Hours}}{\text{Surgical Hours}} = \text{Productive HPSH}
\]

Operating Room Utilization

Operating Room Utilization

\[
\frac{\text{Time Utilized}^*}{\text{Time Available}^{**}} = \text{Utilization Percent}
\]

* Actual operating room time plus clean-up and set-up

** Time available and staffed for surgery

Percent Change in Operating Room Utilization

\[
\left( \frac{\text{Change in Average Number of OR Hours}^*}{\text{Projected Average Number of OR Hours}^{**}} \right) \times 100 = \text{Percent Change in OR Utilization}
\]

* Actual operating room time plus clean-up and set-up

** Time available and staffed for surgery
**Surgical Supply Formulas**

**Cost per Surgical Hour**

\[
\frac{Supply\ Expenses}{Number\ of\ Surgery\ Hours} = Cost\ per\ Surgical\ Hour
\]

**Expense to Income Ratio**

\[
\frac{Average\ Expense\ per\ Surgical\ Procedure}{Average\ Revenue\ per\ Surgical\ Procedure} = Expense\ to\ Income\ Ratio
\]

**Revenue per Minute**

\[
\frac{Total\ Revenue}{Total\ Number\ of\ Surgical\ Minutes} = Revenue\ per\ Minute
\]

**Inventory Turns**

\[
\frac{Annual\ Usage\ of\ Supplies}{Value\ of\ Inventory} = Inventory\ Turns
\]

**Human Resource Formulas**

**Cost per RN Hired**

\[
\frac{Total\ Expense\ of\ Hiring^{*}}{Total\ Number\ of\ RNs\ Hired} = Cost\ per\ RN\ Hired
\]

* Includes orientation, training, & preceptor hours

**Payroll Dollars per Surgical Hour or Case**

\[
\frac{Total\ Payroll\ Costs}{Surgical\ Hours\ or\ Cases} = Payroll\ Dollars\ per\ Surgical\ Hour\ or\ Case
\]

**Profitability Ratios**

**Operating Margin**

\[
\left(\frac{Operating\ Income}{Total\ Revenue}\right) \times 100 = Operating\ Margin
\]
Appendix B: Formulas for Measuring Financial Performance

**Profit Margin**
\[
\left( \frac{\text{Change in Net Assets}}{\text{Total Revenue}} \right) \times 100 = \text{Profit Margin}
\]

**Return on Net Assets**
\[
\left( \frac{\text{Change in Net Assets}}{\text{Net Assets}} \right) \times 100 = \text{Return on Net Assets}
\]