

NURSE WORKLOAD, STAFFING, AND MEASUREMENT

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Learning Objectives

After completing this chapter, the reader should be able to

- list the factors that affect nurse workload and staffing;
- discuss the influence of nursing shortages on the deployment of nursing staff and on the ability of a healthcare organization to deliver quality patient care;
- compare and contrast the terms nurse workload and nurse staffing;
- recognize the types of licensed and unlicensed nursing personnel employed in patient care delivery, and describe how different types of personnel affect nurse workload and staffing decisions;
- identify three primary reasons for measuring nurse workload;
- explain how an organization's philosophy influences nurse workload and staffing decisions, and be aware of various stakeholder perspectives on staffing and workload issues;
- understand how patient classification systems are used in calculating nurse workload, and discuss the strengths and weaknesses of these systems;
- be familiar with the types of information needed to calculate nursing full-time equivalents and the process for acquiring and using this information; and
- address the impact of nurse workload and staffing on nurse stress and burnout and on the quality of patient care.

Introduction

Nurses are the constant in healthcare organizations. They are on the front-line and at the point of care, 24 hours a day, 7 days a week. They are the most visible faces in these highly complex organizations, where outcomes are critical and where services often are provided under difficult and unpredictable conditions. Nurses provide a critical surveillance function in healthcare organizations, particularly in hospitals, by monitoring care and safeguarding patients; thus, the

availability and work of nurses affect quality of care and patient safety (Aiken et al. 2003a). Nurses are a primary determinant of patient satisfaction (Abramowitz, Cote, and Berry 1987; Greeneich 1993; Vahey et al. 2004)—an outcome that takes high priority in a competitive healthcare environment. Clearly, a well-trained, motivated, and appropriately deployed nursing staff have a strong influence on a healthcare organization's ability to provide effective and efficient patient care.

A critical problem for healthcare administrators is deciding how best to deploy nursing staff while considering the quality and costs of care delivered. This challenge is complicated by recurring nursing shortages and by the fierce competition for these professionals. During shortages, healthcare administrators often must take extraordinary steps (such as closing beds or hiring temporary nurses) to ensure that sufficient numbers of nurses are available to care for patients, and these steps are often taken under constrained budgets and without knowing the specific impact on patient outcomes. Managers must be aware of the implications of nurse workload and staffing decisions, particularly during times of nurse shortages, because such decisions may affect staff morale and increase turnover. A basic understanding of nurse workload and staffing issues allows managers to meet day-to-day patient care requirements as well as changing patient care demands, personnel, reimbursement, and regulations.

This chapter provides an overview of nurse staffing, workload, and measurement and the issues that pertain to nurse workload. An understanding of these issues and how to address them is essential for managers who oversee the planning, staffing, budgeting, and evaluation of patient care delivery on units and in departments. Also, in this chapter, the types of nursing professionals are discussed, the terms nurse workload and nurse staffing are defined, the approaches used in different healthcare settings to measure nurse workload are examined, the perspectives of different stakeholders on workload measurement are provided, and nurse staffing metrics are presented along with examples of staffing calculations.

Types of Nursing Personnel

In the United States, licensed and unlicensed nursing personnel differ in terms of education; knowledge, skills, and abilities; and patient care responsibilities. These differences must be taken into account when planning nurse workloads and staffing.

Licensed nursing personnel include those who work under a specific scope of practice set by state and/or national regulatory requirements (Bureau of Labor Statistics 2008). There are two types of licensed nurses: registered nurses (RNs) and licensed practical nurses (LPNs)¹; the educational, licensure, and practice requirements for one group differ from those of the other. Healthcare organizations require proof of licensure from both types of nurses. Unlicensed

nursing personnel, such as nursing assistants, provide support services to licensed nurses and other healthcare professionals. Characteristics of licensed and unlicensed nursing personnel are summarized in Table 15.1.

TABLE 15.1 Description of Licensed and Unlicensed Nursing Staff

	Licensed Nursing Personnel		Unlicensed Nursing Personnel
	RN	LPN	NA*
Educational Preparation	3-year diploma (hospital-based program ^a); 2-year associate degree; 4-year baccalaureate degree ^b Some master's and doctoral programs also exist for entry-level preparation	1–2 years of training at a technical or vocational school	Varies; some healthcare organizations have mandatory training requirements and certification requirements; some states have a registry of those certified
Licensure Required	Issued by states; examination required	Issued by states; examination required	Certification by an accrediting body may or may not be required
Duties	Provide complex nursing care to promote patient health, prevent disease, and help patients cope with illness Observe, assess, and evaluate patient conditions Work with patients, families, and other healthcare professionals to develop and manage patient plans of care May function independently, often work in collaboration with physicians and other healthcare professionals	Provide routine nursing care, which may include taking patient vital signs, administering medications as regulated by the state and/or agency of practice, monitoring patient reactions to routine medications and treatments, assisting with personal hygiene and activities of daily living, collecting patient samples, performing routine lab tests, teaching simple tasks to patients and families, and performing some clerical duties	Provide support services to licensed nurses and other healthcare professionals Provide routine assistive care to patients, such as answering call lights, serving meals, assisting in patient feeding and hygiene care, taking patient vital signs, preparing equipment for patient procedures and treatment, assisting with certain procedures, stocking patient supplies, and performing some clerical duties

(Continued)

TABLE 15.1 Continued

	RN	LPN	NA*
Duties (continued)	May supervise other licensed and unlicensed nursing personnel	In skilled nursing facilities, may evaluate patient needs	In skilled nursing facilities, develop relationships with patients and families
Supervised by	May function independently within scope of practice, or may be supervised by other RNs and in some cases physicians	RN and/or physician, may also supervise other LPNs and/or unlicensed nursing personnel	RN and/or physician, sometimes by LPN

*NA represents nursing aides, nursing assistants, patient care assistants, and orderlies.

a. The number of these programs has been in decline in the last three decades.

b. Advanced practice nurses (i.e., clinical nurse specialist, nurse practitioner, nurse midwife, nurse anesthetist) require a master's or higher-level degree and/or certification in nursing.

SOURCE: Bureau of Labor Statistics (2008)

Healthcare organizations employ a mix of nursing personnel to meet patient care needs. Decisions about the numbers and types of nursing personnel to hire reflect an organization's philosophy about the role and importance of nursing; patient safety and satisfaction; quality of care; and the job satisfaction, perceived value, and safety of nurses and other nursing staff. In short, nurse staffing decisions represent the value that the unit, department, or organization places on nursing practice and on patient care delivery (Van Slyck 1991). This value then is the foundation on which nurse workload and resource allocation decisions are based.

Definitions and Measurement

The terms "nurse workload" and "nurse staffing" are often used interchangeably and inconsistently. For the purposes of this chapter, the following definitions will be used:

- *Nurse workload* means (1) the number of patients or patient days for which nursing care is required on a unit or within a department or organization or (2) the number of patients cared for by an individual nurse (i.e., often referred to as the patient-to-nurse ratio).
- *Nurse staffing* means (1) the number of nurses deployed (also called staffing level) or (2) the process by which the appropriate number and type of nursing personnel are deployed to satisfy nurse workload requirements.

Nurse workload thus refers to a quantity of nursing services, while nurse staffing comprises the planning, budgeting, and costing aspects of providing nursing services.

A review of the literature reveals that researchers define and measure nurse staffing in different ways. These include (1) the number of nursing personnel, by type of nurse; (2) the type of nursing personnel hours (e.g., RN hours) as a percentage of total nursing care hours; (3) the number of personnel (i.e., head count) as a percentage of total nursing staff; (4) the number of FTEs (full-time equivalent) for specific nursing personnel; and (5) the percentage of total nursing FTEs, by type of nurse (e.g., RN FTEs) (Mark, Hughes, and Jones 2004; Seago 2001). As discussed later in this chapter, the relationship between nurse staffing and adverse patient events has been documented in various studies (see, for example, integrative reviews conducted by Kane et al. 2007; Lankshear, Sheldon, and Maynard 2005; and Thungjaroenkul, Cummings, and Embleton 2007). However, comparing the findings from these studies is difficult because of the inconsistencies and variation in the definition and measurement used.

In addition, disagreement abounds in the nursing field about how to best ensure that staffing levels are adequate to meet patient care demands and to keep patients safe. According to the American Nurses Association (ANA 2008), three general approaches have been used to address the appropriateness of nurse staffing levels. The first is a regulatory approach that holds healthcare organizations accountable for establishing and implementing staffing plans based on patient need and other nursing-related criteria, and with input from frontline staff nurses. The second is a legislative approach, whereby specific nurse staffing ratios are mandated by state law. The third is a combination approach that requires organizational nurse staffing plans to be in accordance with specific, legislated nurse staffing ratios.

In 1999, California was the first state to pass nurse staffing legislation for hospitals, setting a minimum nurse-to-patient ratio of 1:6 beginning in 2004, with the ratio declining to 1:5 in 2005. These ratios were established on the assumption that higher nurse staffing levels would lead to improved patient care. However, little or no evidence exists to support the specific ratios selected, and disagreement about whether or not nurse staffing levels should be legislated still exists. Recognizing these arguments, California followed the 1999 staffing legislation with other bills that call for the evaluation of the mandated ratios and the development of staffing plans in hospitals. In 2005, California's governor attempted to halt implementation of the legislated nurse-to-patient ratio of 1:5, but this suspension was later overturned by the courts. Other states have taken similar actions by introducing legislation to mandate the development and implementation of specific nurse staffing plans, minimum staffing ratios, or some combination of both (ANA 2008).

Although nurse staffing legislation influences administrative decision making in some states, these laws do not cover all nursing personnel or patient care situations. In most states, nurse staffing legislation does not exist at all. As a result, administrators still struggle with several important questions:

- What numbers of nursing staff are needed to provide care for patients?
- What types of nursing staff are needed to provide care for patients?
- What mix of nursing staff is needed to provide quality care and ensure patient safety?
- What numbers, types, and mix of nursing staff can the organization afford?
- How does the mix of nursing staff vary by patient care area?

Finkler, Kovner, and Jones (2007) define nurse workload as the volume of work required to deliver nursing care for a patient care unit or department.² To facilitate the calculation of nurse workload, unidimensional metrics such as patients or patient days are used. However, in using this approach, the manager should appreciate that these metrics do not capture the complexity of nursing “work,” which is multifaceted, requires specialized knowledge and skills, and entails more than the amount of time spent with patients. Unfortunately, we currently lack adequate quantitative tools to capture the complexities of nursing work. This deficiency necessitates that the unit manager take this complexity into account when determining nurse staffing and strive for a “balance of [nursing] job demands with sufficient resources (adequate staffing, time available) to plan and carry out work” (Koe-hoorn et al. 2002, 6).

Table 15.2 presents four scenarios to illustrate the basic components of average nurse workload. Scenario 1 shows that, given a constant nurse workload (number of patients), a decrease in nurse staffing (the number of nurses) increases the average workload (the number of patients per nurse). Scenario 2 shows that, given a constant nurse staffing, an increase in nurse workload also increases the average workload. Scenario 3 shows that average nurse workload does not change if the number of patients and the number of staff change at the same rate. Scenario 4 shows that the average nurse workload increases if the number of patients increases at a rate faster than the number of staff. These scenarios illustrate the following points: (1) an increase in the average nurse workload may be the result of more patients, fewer nurses, or both and (2) the average nurse workload is not reduced by an increase in nurse staffing if the workload (number of patients) increases at a faster rate. Of course, in the real world, nurse workload is seldom constant and the work of an individual nurse usually fluctuates as patients’ numbers and conditions change. Nevertheless, the average nurse workload may be considered a crude measure of the adequacy of nurse staffing.

TABLE 15.2 Basic Components of the Average Nursing Workload

Scenario	Nurse Workload (No. of Patients)	Nurse Staffing (No. of Nurses)	Average Nurse Workload (No. of Patients per Nurse)
1. Constant number of patients, decreasing number of nurses	25	6	4.2
	25	5	5.0
2. Increasing number of patients, constant number of nurses	25	4	6.3
	20	5	4.0
	25	5	5.0
	30	5	6.0
3. Increasing number of patients and nurses with same rate of change	20	4	5.0
	25	5	5.0
	30	6	5.0
4. Increasing number of patients and nurses with different rates of change	20	4	5.0
	25	4.5	5.6
	30	5	6.0

Most healthcare organizations use formal nurse staffing processes to reasonably, fairly, and safely address nurse workload issues. These processes include the use of committees with nursing representatives, such as quality of care and patient safety; the development and implementation of staffing policies and procedures, including standards for the number and skill mix of nursing staff; and the determination of hours-of-care requirements for different types of patients. In addition, nurse staffing issues are usually part of the collective bargaining agreement between employers and nurse unions.

Use of Measures

Nurse workload is measured for three primary reasons: (1) to inform the budgeting process; (2) to meet regulatory and accreditation standards; and (3) to inform the development, implementation, and evaluation of staffing plans. The budgeting process necessitates the calculation of nurse workload to prepare an organization's operating budget and, specifically, to determine nursing personnel requirements and costs (Finkler, Kovner, and Jones 2007). The budgeting process involves decision making about the level and mix of nurse staffing, the workload that nurses will assume, and the allocation of resources. Regulatory requirements and accreditation standards necessitate that healthcare organizations comply with regulations of the Centers for Medicare & Medicaid Services and with the standards of the Joint Commission (2006). For example, in 2002, the Joint Commission instituted a

staffing effectiveness requirement for hospital accreditation. Nurse workload systems may be used to gather staffing and outcomes data to document compliance with this requirement.

Nurse staffing plans, on the other hand, are blueprints for meeting specific patient care and regulatory requirements and for deploying nursing personnel efficiently and effectively. Staffing plans also enable managers to develop policies for reasonable work schedules, which promote a positive work environment, and for accommodating operational uncertainties and contingencies.

Nurse workload measures differ across types of healthcare settings. For example, nurse workload can be measured in terms of the number of patients or number of patient days in hospitals, the number of residents or resident days in long-term-care facilities, the number of clinic visits in ambulatory clinics, the number of home visits in home health care services, the number of deliveries in maternity wards, and the number of procedures in day surgery or operating rooms (Finkler, Kovner, and Jones 2007). Measurement systems have been developed to assess nurse workload in these different settings. These systems (usually electronic) capture the variable nature of nursing care requirements across different types of patients and healthcare settings, and they are used to determine the number of nurses required to care for different types of patients (Edwardson and Giovannetti 1994). In short, these systems provide critical information that aids in decision making and in nursing resource allocation (O'Brien et al. 2002).

Perspectives of Stakeholders

Obviously, patients and their families want to be assured that a sufficient number of nurses is available and appropriate patient–nurse ratios are in place so that they can receive individualized care and timely, relevant communications about their condition and treatment (O'Brien et al. 2002). Patients' perceptions are therefore important to healthcare organizations. However, nurse workload measures or systems do not take into account consumers' preferences and desires.

Healthcare administrators, including patient care unit or nursing managers, are concerned about nurse workload measurement for several reasons. First, they are responsible for allocating nursing resources—a decision that ensures patient care needs are met. For example, on a day-to-day basis, nurse managers³ must modify staffing levels as necessary to meet nurse workload requirements. This may mean using agency or per diem nursing staff to cover for permanent staff who call in sick or are on vacation, to cover ongoing position vacancies that result from turnover or the development of new staffing plans or programs, and/or to respond to unexpected variations in patient care requirements. Second, they have to balance the costs of delivering nursing care with organizational reimbursements. If the nursing staff is too large (i.e.,

too few patients per nurse), the costs of providing nursing services may be unnecessarily high. On the other hand, if the nursing staff is too small (i.e., too many patients per nurse), costs may be lower in the short run; however, the work under this condition may increase nursing errors, stress, burnout, dissatisfaction, absenteeism, and turnover, which likely will lead to higher costs over the long run. Thus, administrators must ensure that nurse workloads are reasonable and fair, allowing nurses to deliver the level of nursing care needed by patients.

Insurer and payer perspectives have a financial basis as well. In some cases, an increase in charges as a result of nurse workload and staffing can hike up reimbursements. An increase in overall healthcare costs because of workload and staffing also increases the costs of coverage, which are then passed along to consumers. In turn, employers and consumers need to make a decision about whether or not to retain coverage with the insurer, and if so, whether to keep the same level of coverage.

Policymakers view nurse workload in terms of ensuring that nursing resources are sufficient in providing safe, effective care to communities and in meeting changing patient care demands. For example, the aging U.S. population means that, in the future, more nursing resources will be needed to care for the elderly and long-standing nursing shortages in many geographic areas will increase the gap between supply and demand. Policymakers must see to it that government and industry workforce policies recognize changing demographics and support human resources adjustment, such as providing incentives to nurses and other healthcare providers to enter the geriatric care field and educating nurses and other caregivers about long-term care. In addition, policymakers must develop guidelines to ensure that nurse staffing levels are safe and do not place patients at risk of harm or injury.

Nurses view many aspects of workload and staffing in terms of how they are directly affected. These include volume of work; responsibility to their patients, themselves, and their unit; multiple, concurrent, and often competing demands on their time; their feelings of overload and inability to complete work; having to deal with unexpected events or with interruptions; their familiarity with and support of work requirements; the abilities of other caregivers with whom they work; the degree to which the workload spills into their personal lives; their level of emotional and physical exhaustion from work; and their lack of control over workload (Gaudine 2000).

Measurement of Nurse Staffing

Nurse staffing involves determining the numbers and types of nursing personnel employed on a patient care unit in a hospital, long-term-care facility, emergency department, ambulatory clinic, or community health center. Decisions

about the numbers and types of nurses employed on a patient care unit are based on (1) the patient population, (2) the nurses' education and skills, and (3) the organization's philosophy about nursing and patient care delivery.

Full-Time Equivalent

The metric for determining the numbers and types of nurses is the full-time equivalent or FTE. Nursing FTE calculations are used to determine unit and departmental staffing needs and are the key input to the budgeting process. An FTE is based on the concept of one individual working full time for a year—or 40 hours a week, 2,080 hours for a 52-week period (Finkler, Kovner, and Jones 2007).⁴ FTE calculations include both productive and nonproductive time. Strasen (1987) defines *productive time* as time spent on providing care to patients and *nonproductive time* as time spent not giving care. Nonproductive time includes sick, vacation, holiday, and professional development days as well as other paid time off that is part of the employment benefit. The amount of nonproductive time for different types of personnel is based on organizational policy and may be associated with the individual's length of service to the organization. Although the amount of nonproductive time paid varies by organization, only productive time is used in calculating the amount of nurse workload available to deliver care to patients. For example, if organizational policy indicates that 90 percent of nurses' paid time is considered productive, and 10 percent is vacation, sick time, professional development, and non-patient-care time, then there is $0.90 \times 2,080$ hours paid/FTE = 1,872 productive hours/FTE.

Today, 12-hour shifts and other flexible schedules are commonplace. Under these arrangements, nurses may actually work less or more than 40 hours per week (Strasen 1987). Thus, the number of hours worked must be considered along with the policy regarding paid hours (i.e., productive and nonproductive, or total hours), and the number of productive hours per FTE must be taken into account when calculating unit FTEs (Finkler, Kovner, and Jones 2007). Nurse staffing calculations must take into account the fact that not all nursing personnel work full time. Many nurses work part time, providing managers with some degree of flexibility in staffing a patient care unit. On any particular patient care unit, FTEs may be composed of full-time staff only, part-time staff only, or most likely a mix of full-time and part-time staff. For example, on a patient care unit where full-time nurses work 7 days of 12-hour shifts in a 2-week pay period, the time per position exceeds 1 FTE:

$$\begin{aligned} 12 \text{ hours/day} \times 7 \text{ days} &= 84 \text{ hours in 2 weeks} / 80 \text{ hours in 2 weeks} \\ &= 1.05 \text{ FTE.} \end{aligned}$$

Alternatively, if full-time nurses on a patient care unit work 6 days of 12-hour shifts in a 2-week pay period, the time per position is less than 1 FTE:

$$\begin{aligned} 12 \text{ hours/day} \times 6 \text{ days} &= 72 \text{ hours in 2 weeks} / 80 \text{ hours in 2 weeks} \\ &= 0.90 \text{ FTE.} \end{aligned}$$

Various data are needed to determine nursing FTEs and staffing (Finler, Kovner, and Jones 2007):

- *Projected patient days.* A patient day is an accounting term that represents the concept of 1 patient that is cared for during a 24-hour period. Projected patient days are an estimate of future workload needs.
- *Nursing care hours (productive time) per patient day.* This is time spent delivering care to patients during a 24-hour period and is generally reported as a monthly average.
- *Staffing mix.* This is the proportion of RNs, LPNs, and unlicensed nursing personnel used to provide care in a 24-hour period.

For illustration purposes, consider this example: A patient care unit that averages 25 patients per day during a 30-day month pays for 6,000 RN hours. Of these 6,000 RN hours, 90 percent are considered productive. What are the paid nursing hours per day and per patient day? How many nursing care hours per patient day are involved? Here are the calculations:

- *Paid nursing hours*

$$\begin{aligned} 6,000 \text{ nursing hours paid per month} / 30 \text{ days in the month} &= \\ 200 \text{ paid nursing hours per day} \end{aligned}$$

$$\begin{aligned} 200 \text{ hours of nursing care per day} / 25 \text{ patients per day} &= \\ 8.0 \text{ nursing hours paid per patient per day} \end{aligned}$$

- *Nursing care hours*

$$\begin{aligned} 6,000 \text{ nursing hours paid per month} \times 90 \text{ percent productive} &= \\ 5,400 \text{ nursing care hours per month} \end{aligned}$$

$$\begin{aligned} 5,400 \text{ nursing care hours per month} / 30 \text{ days in the month} &= \\ 180 \text{ nursing care hours per day} \end{aligned}$$

$$\begin{aligned} 180 \text{ hours of nursing care per day} / 25 \text{ patients per day} &= \\ 7.2 \text{ nursing care hours per patient per day} \end{aligned}$$

Patient Classification System

Another important source of workload data is the patient classification or acuity system. Patient classification systems (either a manual, paper-and-pencil tool or an electronic system) categorize individual patient demands and nursing care requirements (Huckabay 1984) based on patient acuity or severity of illness,⁵ not on diagnostic category. These systems provide a standard measure of nursing care for classes of patients (generally measured in hours of nursing care required per patient day) and provide a way of matching patient needs

with nursing requirements. Commercial patient classification systems include GRASP, Medicus, and Quadramed, and some of these products can be customized by organizations to meet their needs and integrate with other management information systems. Individual organizations also create their own patient classification systems.

The potential for patient classification systems is great because they can be used to project nurse staffing needs, develop unit budgets, establish costs for nursing services, and inform risk management and quality improvement initiatives (DeGroot 1989; Seago 2001; Van Slyck 2000). Unfortunately, patient classification systems are often not used to their potential, are generally distrusted by nurses and administrators as not reliable or valid, and consequently are often not employed in decision making. More specifically, patient classification scores are based on nurses' ratings of patients' characteristics, severity of illness, and required number and complexity of treatment interventions (Van Ruiswyk et al. 1992). Because of the way in which patient scores are obtained, some claim that nurses may actually inflate patient ratings (which is also known as *acuity* or *classification creep*) to increase unit staffing (hence reducing nurse workload) or to prevent staff from being pulled⁶ to work on another unit that may be understaffed (Malloch and Conovaloff 1999). On the other hand, some nurses believe that managers are not responsive and do not increase the number of staff when ratings suggest that more nurses are needed. Patient classification systems generally do not take into account the nurses' educational level, years of experience, or knowledge and cannot match the skills of individual nurses with the needs of individual patients. Thus, while these systems may be commonly used to estimate staffing and workload, they do not replace a manager's judgment and staff input for day-to-day or shift-to-shift staffing (Seago 2001).

Historical Data

Other information is needed to inform staffing assessment and measurement. Historical data help to understand variations in patient care on a unit, such as the following:

- *Utilization data*

- Average daily census (the average number of patients cared for per day over a defined time period) helps in determining a staffing standard on numbers and mix of nursing personnel by shift.
- Occupancy rate (average daily census or average number of patient days divided by the number of beds on the unit) aids in examining the extent to which unit capacity is reached.
- Admissions, discharges, and transfers and information on short-stay patients provide insight into patient turnover and work requirements.
- Temporal variations in care reveal factors that may affect patient admissions and requirements. For example, the flu season may

increase admissions on certain units, especially on units that provide geriatric care.

- *Payroll data*

- Productive and nonproductive time paid data assist in determining paid hours per patient day.

- *Human resources data*

- Staffing vacancies or the number of open positions help in estimating future staffing needs.
 - Nurse turnover rates, or the number of nursing staff who leave over a defined time period, facilitate the estimates of the percentage of productive hours and determine budget adjustments for the time period.
 - Collective agreements account for personnel contract changes.
 - Numbers of new versus experienced nurses aid in identifying productivity differences between new and experienced staff.

Unit and Organizational Knowledge

Efficient nurse staffing hinges on unit and organizational knowledge. First, knowledge of clinical policies is critical. For example, a manager who is staffing an oncology unit must be aware of the unit's clinical policy about patients on certain chemotherapeutic agents, the type of nursing personnel required to observe patients during treatment, the number of patients who typically receive these medications and treatments during a period of time, and the associated risks of the treatment. Second, knowledge of internal organizational changes in care delivery is needed to estimate the effect of changes in programs, procedures, or treatment protocols on staffing requirements. For example, if a new clinical guideline is developed regarding treatment of a particular type of oncology patient, the manager must understand the implications of guideline implementation on the numbers and types of staff required as well as their educational needs.

Third, knowledge of collective agreements is needed to ensure that staffing is in compliance with provisions agreed upon. For example, if staff on the oncology unit can work no more than 60 hours per week and if there are staffing vacancies, the manager will need to develop a plan in accordance with policy that covers shifts when unit needs exceed the supply and availability of existing staff. Fourth, knowledge of the internal and external organizational environment, such as anticipated structural changes or policy developments, is important. For example, if a second oncology unit will be opening to provide care to a specific group of patients, a plan must be in place to transition relevant existing staff to the new unit, cover the original unit, and hire additional staff as needed. Each of these pieces of information should be taken into account when calculating nurse staffing needs. Appendix B (see the end of the chapter) provides a detailed example of FTE and nurse staffing calculations.

Key Issues in Managing Nurse Staffing and Workload

When organizational revenues fall short of expenditures or when healthcare costs rise, labor—a large expense for healthcare organizations—often becomes a target of budget cuts. Organizations have engaged in such strategies as implementing nurse staffing plans that reduce the number of nurses, increase nurse workloads, or increase the number of hours worked by nurses (including overtime). In the long run, these strategies may be counterproductive and may negatively affect a manager's ability to appropriately staff a unit.

Managers should consider several issues as they reconcile budgetary and staffing issues, which are outlined in Figure 15.1 and discussed in greater detail in the following sections. Healthcare administrators, especially first-line patient care unit or nurse managers, should be aware of such issues and the impact of staffing decisions on nurses and nurse perceptions as well as on patients, care delivery, and overall organizational performance.

Workload Stress and Burnout

Workload is one of the most significant predictors of negative health outcomes, stress, decreased job satisfaction, and burnout. Burke (2003) studied the relationship between changing nurse–patient ratios and nurse perceptions of workload, job satisfaction, psychological well-being, and effectiveness of their institutions. According to this study, nurses who are assigned high patient–nurse ratios report heavier workloads, lower job satisfaction, poorer psychological health, and decreased view of hospital effectiveness. This study suggests that when nurses perceive excessive workloads (that is, they feel they have too much work to complete during work hours), they become stressed and burned out, which, in turn, lead to feelings of anger. Nurses in this situation may be more likely to call in sick or leave the organization altogether. High nurse workloads also have been associated with higher 30-day patient mortality and increased levels of nurse burnout and dissatisfaction (Aiken et al. 2002); high levels of nurse burnout and emotional exhaustion have been linked to low levels of patient satisfaction (Vahey et al. 2004).

FIGURE 15.1
Key Issues in
Managing
Nurse Staffing

- Workload stress and staff burnout
- Staff turnover, recruitment, and retention
- Aging of the nursing workforce
- The nature of nursing work
- Union versus nonunion environment
- Nurse–physician relationship
- Workforce diversity
- Balancing quality and costs of care

Healthcare managers must be sensitive to the potential effects of nurse workload stress and burnout. They must design staffing strategies that minimize potential lapses in patient care quality and patient satisfaction. Following are a few simple approaches to address staff concerns about workload and overload (Gaudine 2000; Prescott and Soeken 1996):

- Involve nurses in unit decision making, including the establishment of appropriate workloads.
- Engage nurses in contingency planning on how to deal with sudden changes in patient care needs or conditions and to manage fluctuations in staffing (e.g., call outs, vacations, educational leaves).
- Be aware of changes in clinical practice policies and providers that can affect nurse workload.
- Examine workload and quality data to help make a case for adequate nursing resource allocation.
- Provide adequate and less costly support staff (e.g., clerks) who can assist nursing personnel in carrying out non-nursing tasks and thus relieve nurses to care for patients.
- Develop strategies to give nurses as much control as possible over their workload to reduce their perception of overload. For example, ask nurses for input on the timing of patient admissions, the temporary closing of beds, and approaches to staffing and scheduling.

Staff Turnover, Recruitment, and Retention

Staff retention and turnover become a primary concern for unit managers during times of staff shortages. When staff are in short supply, more job-change opportunities are available within and outside the organization. But if turnover becomes excessive, it may bring about additional turnover, as staff lose their valued friends and colleagues, work teams become disrupted, and staff reflect more on their work environment and wages relative to those provided by competitors in the market (Jones 2004). High levels of turnover can also make recruiting new staff into a work unit difficult, because when there are so many vacancies, working conditions suffer; this information then gets communicated into the market through social and professional networks.

More importantly, however, turnover is costly, with some estimates indicating that the cost per nurse turnover is more than \$60,000 (Advisory Board Company 1999) or 1.3 times a departing nurse's salary (Jones 2005). In addition to its quantifiable costs, turnover also presents qualitative costs, such as those that affect quality of care and patient safety as staff leave and enter patient care teams. For example, a nurse who leaves takes with him or her valuable human capital in the form of knowledge, skills, and experiences that are specific to the work unit and the patient populations served by the organization. This loss then affects the work of the entire team until or unless a

comparable replacement is hired. While aspects of this human capital loss are quantifiable (e.g., the costs of advertising for a replacement), other elements are harder to put a dollar-figure on—that is, we cannot measure the cost of losing an individual's knowledge, skills, and experiences.

Following are several steps that healthcare administrators can take to deal with staff turnover:

- *Become familiar with organizational systems for tracking nurse turnover.* These systems are often monitored by the human resources department, but line managers typically receive ongoing reports that compare their unit's turnover rate with that of other units and even other organizations.
- *Establish a unit-level database with more detailed nurse turnover information that can be used in managing existing staff, looking for appropriate replacements, and identifying opportunities for growth.* Organizational systems to monitor staff turnover rarely contain fine-grained data, such as the level of expertise that is lost when a particular staff member leaves.
- *Create a process for tracking retention and determining a retention rate.* This is a different process than tracking turnover. Examining retention requires that the manager follow individuals (or cohorts of individuals) over time, beginning at their initial employment date (Waldman and Arora 2004).
- *Establish a mechanism for gathering ongoing feedback about why nurses leave, why they stay, and their perceptions of the work environment.* This will help the manager understand staff concerns, examine trends over time, and identify areas for future improvement.

Aging of the Nursing Workforce

A great deal has been written about the aging of the nursing workforce, highlighting the fact that the current number of younger nurses is insufficient to replace those who will retire over the next 20 years. According to a nationally representative sample of U.S. nurses in a 2004 study, the average age of RNs was 47, with 41 percent older than age 50 and only 8 percent under age 30 (Bureau of Health Professions 2006). These numbers reflect a dramatic shift in the nursing workforce since 1980, when only 25 percent of the workforce were older than 50 years and 25 percent were younger than 30 years. In fact, aging of the nursing workforce has been cited as a reason that the current nursing shortage is different and perhaps more severe than past shortages (Buerhaus, Staiger, and Auerbach 2000, 2004).

For the first time in nursing history, four different generations of nurses are working side-by-side: Gen Yers (or Nexters), born before 1980; Generation Xers, born between 1960 and 1980; baby boomers, born between 1943 and 1960; and veterans, born between 1922 and 1943 (Swearingen and

Lieberman 2004). Members of each generation pose different needs and desires that drive their expectations about work and the workplace. They also have different perspectives on and degree of comfort with technology. Some simply use e-mail or other electronic systems during the process of routine activities, while others tote personal digital assistants and specific pieces of equipment in caring for patients. In turn, these generational differences in needs, desires, and expectations may create conditions that bring out intergenerational conflicts (Greene 2005; Swearingen and Lieberman 2004).

Age and generational issues, combined with changes in healthcare organizations and patient populations, require special attention from the manager. For example, patients today are sicker, have shorter lengths of stay, and require more intensive nursing care than patients in the past. This change in patient needs is the result of many factors, including technological capabilities that enable the delivery of more complex care; an increase in obesity rate, which leads to health problems; and a longer life expectancy, which typically means additional health concerns. These and other factors combine to exert more physical stress and strain on nurses and put them at risk for physical injury.

Creating a positive work environment for nurses requires sensitivity to generational needs. Following are some strategies toward that end (Greene 2005; Swearingen and Lieberman 2004):

- Conduct an ergonomic evaluation of the work environment and address necessary concerns.
- Give adequate support in terms of patient transportation, lifting, and moving.
- Offer adequate training on the multitude of technological devices and equipment used on the unit.
- Provide adequate staffing so that meals and “mental” breaks can be taken from the sometimes relentless bombardment of cognitive and physical demands.
- Put a process in place to stay in touch with generational perceptions and expectations of nurses pertaining to such issues as types of rewards and recognition, job satisfaction, and organizational commitment (Kovner et al. 2006).

The Nature of Nursing Work

Nurses' work has been characterized as complex, fragmented, and unpredictable (Tucker and Spear 2006); ambiguous and dangerous (Philbin 2007); and physically demanding. Potter and colleagues (2004) combined qualitative and human factors methods to examine the work of nursing. They reported that nurses often traverse long and repetitive distances, even when based on a single patient care unit. Nurses' work is also intellectually, emotionally, and psychologically demanding because of its composition and context. For

example, the work environment is often chaotic, requiring nurses to perform at an intense cognitive level and to make numerous judgments about patients' conditions, many of which are of an urgent nature and must be made under pressure. Some nursing judgments entail actions that must be taken on behalf of patients, while other judgments involve contacting and interacting with physicians and other care providers to respond to changing patient conditions. According to Potter and colleagues, nurses' work is non-linear and is plagued with numerous interruptions, which these researchers determined through the use of cognitive mapping. Nurses juggle numerous competing priorities during a shift, and the order of priorities can change quickly as patients' conditions change. In fact, Wolf and colleagues (2006) used human factors engineering and qualitative methods to study the nature of nursing work and reported that nurses often "stack" up to ten or more tasks at one time and experience more than three interruptions per hour. Such practices create conditions that are conducive to mistakes and omissions in care.

Others studies report on the effects of work strains that prevent nurses from recovering from work and gaining sufficient rest. Winwood and Lushington (2006) found that the high-paced work environment exacerbates nurses' psychological strains, which inhibit their ability to sleep and potentially lead to long-term health problems and withdrawal from the workforce. Other studies observed that nurses' work hours (frequently 12-hour shifts or longer) and the subsequent fatigue jeopardize quality of care and patient safety (Dean, Scott, and Rogers 2006; Rogers et al. 2004; Scott et al. 2006).

To address the complexity of nurses' work, managers can engage nurses in a dialogue to gain insights into current processes and systems that support or impede nurses' ability to do their job. This dialogue can be used to identify strategies to reduce the number of interruptions that nurses experience and to give nurses the tools to minimize the cognitive stacking of a great number of tasks and priorities. Many nurses do not get meal or short breaks during their shift or skip breaks to complete their work. Strategies can be developed to ensure that a sufficient number of staff is available to cover breaks and mealtimes so that nurses can get a mental respite and better focus on meeting patient needs.

Union Versus Nonunion Environment

Approximately 19 percent of the U.S. nursing labor market is covered by a union agreement, and 38 percent of hospitals operate under a union contract (Center for American Nurses 2005; Lovell 2006). Nursing unions are not without detractors, who claim that nurses' participation in union activities is unprofessional and associated with decreased job satisfaction and morale (Seago and Ash 2002; Fitzpatrick 2001). However, the following concerns converged in the late 1990s and early 2000s to bring about nurses' renewed

interest in unions: declining nurse staffing levels, growing nursing shortage, increasing patient acuity, decreasing patient lengths of stay, proliferation of managed care, decreasing reimbursements, and widespread layoffs (Lovell 2006; Forman and Davis 2002; Schraeder and Friedman 2002; Steltzer 2001). For a detailed discussion of unionization in healthcare, see Chapter 14.

Several interesting observations have been made about unionization of nursing. Lovell (2006) reported that unions increase wages for both union and nonunion nurses in certain geographic markets. Lovell's study indicated that nurses who work in the most unionized states earn roughly 28 percent more than nurses who work in the least unionized states. Similarly, Lovell suggested that the presence of unions increases nurse staffing: Approximately 18 percent more nurses work in the most unionized cities than in the least unionized cities, which in turn improves the quality of care. Another study has found this same correlation. Seago and Ash (2002) examined the relationship between the presence of a union and the outcomes of hospitalized patients with acute myocardial infarction in California. According to that study, patients cared for in unionized hospitals had a 5.7 percent lower mortality rate than patients cared for in nonunion hospitals, after controlling for risk factors. The authors further suggested that the mechanisms through which patient outcomes may be affected include staff stability, staff autonomy, and nurse-physician relationships, all of which improve the work environment and ultimately care delivery.

Unionization is typically viewed as the result of an adversarial relationship or irreconcilable differences between management and staff. Unfortunately, as Forman and Davis (2002, 377) report, nurses have "identified their manager as their greatest source of stress—even greater than heavy patient loads." Managers, whether in a union organization or not, should realize that nurses typically seek out unions when they believe that they do not have a voice in issues that pertain directly to their work and the delivery of patient care (Schraeder and Friedman 2002; Forman and Davis 2002). In fact, many staffing concerns are focused on issues that pertain to communication, such as lack of input into decision making, feeling undervalued, and perceptions of fear and intimidation from organizational leaders (Fitzpatrick 2001).

Managers in unionized hospitals must obviously understand the collective bargaining process and the terms and conditions of the specific agreement at their organization. They also need to develop a strong relationship with the human resources department and consult with its personnel to address staff questions that pertain to the agreement. Managers must also be knowledgeable about dispute resolution and grievance and disciplinary processes, and they must be comfortable with addressing disagreements that may arise between the organization and the union (Forman and Davis 2002). In the worst case, or if disputes cannot be resolved and a strike ensues, managers should have a contingency staffing plan in place.

Time and again, frontline managers have been found to play a critical role in shaping nurse satisfaction and retention. The most important step that frontline managers can take, regardless of whether or not their hospital is under a union agreement, is to maintain open, honest, and consistent dialogue with the nursing staff (Schraeder and Friedman 2002). This simple strategy alone may divert union disagreements, strikes, or union-organizing activities. Managers who do not work in unionized hospitals should be aware of organizing activities in the event that nurses initiate a union campaign within the institution (Forman and Powell 2003). The bottom line is to keep the lines of communication open; to focus on patient care, protecting the safety, security, and well-being of patients and nurses; and to always take the high road by using factual data and acting in a professional manner (Block and Jamerson 2005). Porter-O'Grady (2001) recommends that managers view the union as a partner instead of an adversary and work from the mutual understanding that both sides can achieve positive outcomes and benefits. By doing so, managers and their organizations can take advantage of what nurses actually seek through unionization activities—namely, improving the work environment, nurse staffing levels, and the quality of care received by patients.

Nurse-Physician Relationship

The nurse-physician relationship is a key ingredient in sustaining a healthy work environment but is one of the greatest impediments to an improved workplace. When nurse-physician relationships are collegial, collaborative, and founded on open communications, nurses tend to be more satisfied with their work environment and are more likely to remain in their positions (Jansky 2004; O'Brien-Pallas et al. 2005). When nurse-physician relationships are caustic, over time, nurses become dissatisfied, demoralized, undervalued, and burned out—feelings that may cause them to leave their jobs. In the long run, patient care may suffer.

Because both nurses and physicians work for the good of the patients and to promote quality care, one would expect their relationships would be positive. However, nurse-physician relationships, in general, have been characterized as dysfunctional and in some cases pathologic (Stein 1967). A recent meta-analysis reported a strong and inverse relationship between nurse-physician collaboration and nurse job stress (right behind nurse job satisfaction) (Zangaro and Soeken 2007). Schmalenberg and colleagues (2005) argue that, although both nurses and physicians rate their relationship as important, literature on the topic has appeared primarily in nursing journals. Another study of nurses and physicians reported that both groups acknowledged the presence of disruptive physician behavior in their organization (Rosenstein 2002). However, in a follow-up study conducted in 50 hospitals, nurses were reported to misbehave almost as often as physicians, and respondents believed

that poor nurse–physician relationships caused stress, frustration, and burnout and had a negative impact on concentration, communication, collaboration, information transfer, and workplace relationships (Rosenstein and O’Daniel 2005). Nurse–physician relationships also are purported to influence nurses’ perceptions of staffing adequacy (O’Brien-Pallas et al. 2005; Laschinger and Leiter 2006), which may be attributed to nurse perception of a work overload when they are frequently involved in negative and emotionally draining interactions with physicians. Poor nurse–physician relationships place an added burden on nurses and physicians, often requiring additional communications, unnecessary follow-up, and perhaps even disciplinary actions for those who may already feel fragmented and stretched thin because of increased patient demands or short staffing. Poor nurse–physician relationships may also be linked to difficulties in recruiting new staff to the unit during times of shortage. For example, if nurse–physician relationships on a particular unit are known to be poor, other units likely know about it; as this information spreads, potential new hires may be deterred from working on the unit.

Despite the hardships that a poor relationship creates for the individuals involved, the bigger concern is that it affects the quality of patient care. Rosenstein and O’Daniel (2005) report that nurses and physicians perceived that negative relationships potentially affect patient care and outcomes, resulting in adverse events, medical errors, compromised patient safety, increased patient mortality, and lowered patient satisfaction. Other studies have found a link between good relationships and high patient satisfaction, minimized patient mortalities, fewer ICU readmissions, decreased length of stay, lowered costs, and perception of higher quality of care (O’Brien-Pallas et al. 2005; Schmalenberg et al. 2005).

Following are important recommendations for managers to improve nurse–physician relationships on their unit or in their organization:

- Conduct training workshops on interdisciplinary collaboration, communication, and coordination (O’Brien-Pallas et al. 2005).
- Hold joint, interdisciplinary staff meetings, rounds, and/or case reviews (O’Brien-Pallas et al. 2005; Schmalenberg et al. 2005).
- Articulate expectations clearly regarding nurse–physician relationships (Matthews and Lankshear 2003; Schmalenberg et al. 2005).
- Facilitate the development of joint critical pathways and protocols (Schmalenberg et al. 2005).
- Keep patient care as the shared, superseding goal (Schmalenberg et al. 2005).
- Develop and articulate clear processes for conflict resolution (Schmalenberg et al. 2005).
- Manage conflicts constructively when they occur (Schmalenberg et al. 2005).

- Role-model positive interactions with physicians and the medical director (Schmalenberg et al. 2005).
- Foster nurse competence through educational offerings (Schmalenberg et al. 2005).
- Create a positive culture that puts patients first, empowers nurses and builds their confidence, values teamwork and collegiality, builds trust, and respects each individual (Schmalenberg et al. 2005).

Walking rounds by the manager will also provide opportunities to observe nurse-physician interactions and to address concerns that may affect the work environment. Above all, managers play a fundamental role in fostering positive nurse-physician relationships, which in turn affects patients and potentially future unit staffing.

Workforce Diversity

One of many recommendations for addressing the nursing shortage has been to increase diversity in the nursing workforce (AACN 2001; Joint Commission 2002). In fact, the "Nursing's Agenda for the Future"—a document compiled by 19 U.S. nursing organizations, with input from more than 60 public and private organizations—lists diversity as one of its ten strategic goals for 2010 (Nursing's Agenda for the Future Steering Committee 2002). The Joint Commission (2002, 24) also recommends diversifying the nursing workforce as a recommendation for addressing the nursing shortage "to broaden the base of potential workers and to improve patient safety and health care quality for patients of all origins and backgrounds."

Nursing always has been and still is predominantly composed of white females. Currently only about 5.8 percent of the nursing workforce is made up of males (Bureau of Health Professions 2006). While this number represents a 14.5 percent increase in male nurses since 2000 (and a 273 percent increase since the baseline National Sample Survey of Registered Nurses conducted in 1980), males still represent a very small percentage of the nursing workforce overall. Additionally, approximately 11 percent of the nursing workforce is made up of nonwhite Latino, which is a decline from the 12.4 percent reported in 2000 (Bureau of Health Professions 2006).⁷ Like the percentage of males in nursing, however, nurses of diverse racial and ethnic backgrounds still represent a very small proportion of the overall nursing workforce. This does not mirror the composition of the U.S. population at large.

Literature on the effects of workforce diversity on nurse staffing is largely absent. However, growing evidence suggests that individuals prefer to receive care from healthcare professionals who share their racial background and that healthcare professionals are more sensitive to the values and beliefs of patients from their own racial background (Coffman, Rosenoff, and Grumbach 2001;

Institute of Medicine 2004). Although the composition of the nursing workforce is changing, progress in achieving diversity in the last 20 years has been slow when compared to changes in the U.S. population. These changes may be partly the result of problems in the nursing work environment, slowly rising nursing wages, and other issues associated with the nursing shortage. However, they may also reflect the opportunities available to individuals from diverse backgrounds, their cultural beliefs, and even the slow progress in achieving cultural competence in the healthcare workplace. However, much is unknown, and this is an area ripe for research.

Several documents offer recommendations for healthcare leaders and managers toward building a more diverse workplace (Institute of Medicine 2004; Nursing's Agenda for the Future Steering Committee 2002):

- Create diversity and cultural competence through educational programs and standards.
- Provide opportunities for individuals of diverse racial and ethnic backgrounds to receive mentoring and guidance from leaders of similar and different backgrounds.
- Recognize the value of diversity on the patient care team, and promote diversity through hiring practices.
- Engage staff in developing a unit-based diversity plan.
- Seek information from nurses of diverse backgrounds to target recruitment and retention programs to diverse populations.
- Involve staff in recruitment and hiring decisions.
- Create leadership career paths for nurses from diverse backgrounds.

Balancing Quality and Costs of Care

Healthcare organizations are feeling increasing pressure to improve the quality of care while at the same time operating under a constrained financial environment. Also, during times when organizational revenues fall short of expenditures and/or healthcare costs rise, labor often becomes the target of budget cuts. This cost-cutting measure puts pressure on nurses because they are typically the largest group of professionals in the organization. Nurse staffing often comes under scrutiny in cases when the organization is considering whether the number of nurses can be reduced or whether the nurse workload and work hours can be increased.

Nurse staffing has received a great deal of attention in the last decade because of society's increasing concerns about patient safety and the high-profile reports that document the relationship between low nurse-staffing levels and adverse patient events (Aiken et al. 2002, 2003b; Kovner and Gergen 1998; Kovner et al. 2002; Mark, Harless, and Berman 2007; Mark et al. 2004; McGillis Hall et al. 2003; McGillis Hall, Doran, and Pink 2004; Needleman et al. 2002, 2006). For example, Aiken and colleagues (2003b) document

that higher patient-to-nurse ratios are associated with a higher risk of mortality and failure to rescue among surgical patients. Specifically, the risk of death is 14 percent higher in hospitals where workloads or ratios are six or more patients per one nurse, and this risk is 31 percent higher in hospitals with workloads of eight or more patients per one nurse, relative to hospitals where nurse workloads are four or fewer patients per one nurse. This study also documents a relationship between nurses' educational level and patient mortality, citing that hospitals that employ higher numbers of nurses with a baccalaureate (or higher) degree have lower patient mortality rates than hospitals that employ fewer nurses with a baccalaureate (or higher) degree.

Pay-for-performance (P4P) programs, which strive to compensate healthcare providers based on achieving certain patient outcomes, are becoming commonplace in the U.S healthcare system. For example, the Centers for Medicare & Medicaid Services (CMS) oversees Medicare's P4P program. The Hospital Quality Alliance program rewards hospitals on achieving a certain threshold on a set of ten quality indicators (e.g., care for myocardial infarction) (CMS 2005). Hospitals that submit data on these ten indicators receive full, DRG-based (diagnosis-related groups) payment. Premier Hospital Quality Demonstration reimburses hospitals based on 34 quality measures in five broad categories (acute myocardial infarction, congestive heart failure, coronary artery bypass graft, pneumonia, and hip and knee replacement); hospitals that score in the top 10 percent receive an added bonus of 2 percent, and hospitals that score in the second 10 percent receive a 1 percent bonus. Conflicting evidence exists regarding the effectiveness of P4P, but given that private groups, such as the Leapfrog Group, are also reimbursing providers based on a P4P system, this payment scheme will likely become the standard for reimbursing hospitals in the future.

Evidence that suggests that the lowest cost mix of nursing staff may not be the best option to improve quality of care and patient outcomes is growing. In fact, Needleman and colleagues (2006) provide what they call an "unequivocal" business case for nurse staffing. Using existing data, they conducted three different nurse staffing simulations to determine associated costs: (1) increasing the proportion of RN nursing care hours per day to the 75th percentile for hospitals below that level; (2) increasing the number of nursing care hours per day to the 75th percentile for both RNs and LPNs, again for hospitals below that percentile; and (3) using a combination of the first two options. The results of these simulations indicate that increasing nurse staffing under the first option provided the greatest return on investment. That is, increasing RN hours only without increasing the total hours of licensed nursing staff was associated with a net reduction in costs.

Given that a richer RN staff has been documented to improve quality and to save money, changing nurse staffing to optimize patient outcomes may well be one of the best solutions for a unit or hospital to consider when examining ways to improve quality scores and in turn increase reimbursements. As Litvak

and colleagues (2005) suggest, if one considers all of the patient safety measures currently being implemented, none of them can substitute for adequate nurse staffing. To ensure adequate staffing, managers can take several steps:

1. Managers should stay up-to-date on current research to be familiar with evidence that can help build their case for justifying changes or modifications in nurse staffing.
2. Managers should work with financial staff to develop and put in place a process for evaluating staffing costs relative to patient outcomes and quality. This kind of evaluation can be used to determine returns on investments made in modifying staffing levels and to develop a business case for modifying nurse staffing levels. It will also help managers understand how variations in staffing may affect patient and organizational outcomes.
3. Managers must involve staff in any attempts to address quality of care or cost concerns through modifications in nurse staffing. By involving staff in decisions regarding a change in the numbers and/or types of unit-based staff, the manager will gain insights from front-line caregivers regarding how potential staff changes may affect patient care and staff. The net result likely will be an improved overall staffing strategy for the unit.

Future Directions and Challenges

Measuring nurse workload and staffing and acting on the results are issues that have occupied healthcare administrators and researchers for decades. As Edwardson and Giovannetti (1994) suggest, many thought that patient classification systems would identify the right numbers of staff to provide care for certain patients. However, these systems have proven to be problematic, especially in terms of their reliability and validity, leaving managers faced with the need to establish nurse workloads and calculate nurse staffing needs for their units. Also, many healthcare organizations still lack the ability to free nurses from non-nursing tasks (e.g., retrieving medications from the pharmacy) that further increase nurse workloads but do not require specific nursing knowledge to carry out (Moody 2004).

Moody (2004) advocates a nurse workload approach that is grounded in human capital theory. This approach uses a nursing productivity index that takes into account nurses' knowledge, skills, and abilities (i.e., human capital) and the needs of patients for whom they provide care. This type of workload model is based on Peter Drucker's (1994) *knowledge worker* concept that values nurses based on their thought processes and judgments, and this system, although difficult to quantify, more adequately reflects the complex nature of nursing work. Moody proposes that this model captures data on patient intensity, nurse staffing, infection and error rates, organizational resources,

(financial and human), patient outcomes, patient ability to provide self-care, and provider outcomes. In addition, Moody advocates for the costs of nursing turnover to be included in the workload model (because nurse turnover reflects a human capital loss that should be considered in valuing nurses and their work) and for determining replacement costs for nurses who leave (Jones 2005). Details of this valuation are not provided, but the concept of valuing nursing work based on knowledge, skills, and abilities is intuitively appealing.

Various nurse staffing studies have documented the important relationship between nurse staffing and patient care outcomes, yet further research is needed to explain this relationship. For example, conceptually cogent and consistent measures of nurse staffing can facilitate the comparison of findings across studies and the identification of specific patient outcomes that are sensitive to changes in nurse staffing for different patient populations. Furthermore, much of the nurse staffing research is generally atheoretical. Thus, theory-driven research in this area is direly needed to help explain the how and why behind the relationship between nurse staffing and patient outcomes (Mark, Hughes, and Jones 2004).

Nurse workload systems are needed that take into account short-term staffing contingencies and variability in patient demand, improve the deployment of nursing personnel, and facilitate the development of long-term staffing plans. Moreover, information systems that link nursing workloads and patient outcomes are needed to improve the quality of patient care. Litvak and colleagues (2005) address the challenges that managers face in managing uncertainty and unnecessary variability in patient demands, which stresses staffing plans, adds strain to nurse workloads, and may compromise patient safety. Litvak and colleagues suggest that variability in hospital workload can be attributed to natural or uncontrollable variability that is largely patient and disease driven (such as patient admissions through the emergency department) and to controllable variability that is largely imposed by providers (such as scheduling elective surgeries and hospital discharges). These types of variability translate into necessary and unnecessary resources and dollars spent on health-care. The latter type of variability, according to Litvak and colleagues, can be minimized to even out demand peaks and valleys, for it is during the valleys that most organizational resources are wasted. For example, in the past, hospitals have staffed nurses based on the number of beds, regardless of whether the beds were occupied. This system worked well when patient demand was high and nurses were in sufficient supply, but it wasted nursing resources when demand was low. During the 1990s, hospitals cut the numbers of nurses and staffed based on low and average demand, but this often resulted in understaffing that in turn caused stress for nurses and quality concerns for patients.

Litvak and colleagues and Pickard and Warner (2007) call for demand-based staffing. Litvak and colleagues suggest that organizations must understand and manage their sources of controllable variability and must recognize that predicting when patients will come to the emergency department is as

possible as predicting elective procedures. Queuing theory and other operations management techniques can be used to understand and manage variability, smooth the extremes of demand, and reduce stress on the system. By eliminating or minimizing the controllable variability (e.g., appropriate use of block scheduling for physicians' operating room time, more coordinated discharge planning), the organization can then better staff for the uncontrollable or patient-driven demand.

Pickard and Warner (2007) present a demand management model to support staffing that is based on patient outcomes, measured in real time, and that is used to project future short-term patient demand (i.e., days). These requirements are embedded in a decision-support system that uses electronically captured data. This approach forecasts demand for controllable and uncontrollable variability by incorporating progress patterns for different types of patients; scheduled and predicted unscheduled admissions (based on staff input and historical data); and staffing information to help identify demand by unit, by day, and by hour and shift, which can be used in turn in making short-term staffing projections. Staffing is continuously updated based on patient outcomes and progress.

Although electronic systems such as the demand management system described earlier will become commonplace in the future, there is no substitute for the critical judgments of managers, who possess unique knowledge of nurse workload measurement, the work of nurses, clinical care processes, and the patients whom nurses serve. Healthcare administrators can contribute unique insights into nurse staffing to proactively plan and ensure that (1) nurses are involved in decisions that affect unit operations and nurse workloads, (2) adequate nursing resources are available to provide patient care, and (3) adequate support services are in place to support nurses and relieve them of performing nonessential tasks (Burke 2003).

Summary

Nurses are key members of the healthcare team. Understanding how best to deploy nurses while balancing quality and costs is an important ongoing function for healthcare administrators that may be especially challenging during periods of nursing shortage, when adequate numbers and types of nurses needed to ensure the delivery of safe, high-quality care may be in short supply. This chapter provides an overview of important tools and techniques that calculate nurse workload, and it presents examples to illustrate these calculations. Use of these tools and techniques aids in the routine planning of patient care delivery, development of unit and organizational budgets, and the equitable distribution of nursing staff. More importantly, however, use of these practices will foster the creation of an environment that increases nurse job satisfaction and well-being and that decreases the stress and burnout often associated with high