



**THE CENTER**  
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## **CALIFORNIA'S NURSING LABOR FORCE: DEMAND, SUPPLY, AND SHORTAGES**

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## 1. Introduction

In recent years, attention has focused on the nursing profession due to a crippling shortage of registered nurses (RNs) that has been reported throughout California, the United States, and in many other countries (Buerhaus 2001; Murray, 2002; Spetz and Given, 2003). California's nursing shortage is among the most severe in the United States (U.S. Bureau of Health Professions, 2002). Many of the state's hospitals are having great difficulty recruiting and retaining licensed nurses (Kucher, 2000). The forecasted shortage of RNs in 2030 is estimated to be between 99,945 and 122,223 full-time equivalent in 2030 (Spetz and Dyer, 2005), and even larger numbers are needed nationally (Buerhaus, Staiger, and Auerbach, 2000). The California Employment Development Department predicts that there will be 109,100 job openings for RNs and 22,900 openings for licensed vocational nurses (LVNs) by 2014 (California Employment Development Department, 1998-2006).

In response to the nursing shortage in California, Governor Gray Davis announced the Nurse Workforce Initiative in his January 2002 State-of-the-State speech. The purpose of the Nurse Workforce Initiative (NWI) was to develop and implement proposals to recruit, train, and retain nurses both to address the current shortage of nurses in California and to support implementation of new hospital nurse-to-patient staffing ratios announced in late January 2002. The Governor made available \$60 million over three years for the NWI, of which approximately \$35 million was awarded before his term ended and the program was discontinued. The NWI included components designed to address the nurse shortage using both short and longer-term strategies, including regional training collaborations, scholarships for nursing students, career ladder projects, workplace reform efforts, and other strategies to increase the number of nurses. The NWI also included an evaluation of the initiative, to determine which strategies to increase the supply of nurses are most effective and improve our understanding of the labor market dynamics for nurses.

This report provides information on the labor market of nurses in California. We begin with a descriptive overview of the nursing labor market in Chapter II, focusing on the institutions and regulations that affect the labor market. Chapter III then provides in-

depth information about the demand for nurses. The types of health care providers that employ nurses and the regulations they face are explored. The supply side of the labor market is described in Chapter IV, with descriptions of the characteristics of the current supply of nurses, and the flows of nurses into and out of the workforce. Chapter V explicates how the demand and supply for nurses lead to the labor market outcomes of employment levels, wages, and fringe benefits. This chapter concludes by presenting information about inter-firm mobility of nurses and working conditions. Chapter VI describes nursing shortages in depth, with an explanation of the economics underlying them and a review of potential solutions. We conclude with Chapter VII, by offering directions for future analysis. An Appendix to the report provides information about regional nursing labor markets in California.

## **2. Nursing in California: An Overview**

### A. Nursing in California

Licensed nurses constitute the single largest occupation in the health care industry (Coffman, Spetz, Seago, et al., 2001). The majority of licensed nurses work in hospitals, and nurses also practice in a variety of other settings, including homes, schools, clinics, physicians' offices, long-term care facilities, and public health agencies. Nurses play a critical role in the provision of health care because their scope of practice places them in direct contact with patients in most health care environments. Patients rely on licensed nurses to assess, treat, and monitor their diseases and conditions, and to educate them about maintaining health and managing chronic illness.

Licensed nurses include both licensed vocational nurses (LVNs) and registered nurses (RNs). LVNs obtain their licensure after completing a one or two year program at a community college, an adult educational program, or private vocational school, and passing an examination approved by the Board of Licensed Vocational Nursing and Psychiatric Technicians. In all other states except Texas, LVNs are called "licensed practical nurses" (LPNs). The duties and responsibilities allowed by an LVN/LPN license vary across states. In most states, an LVN's scope of practice includes provision of basic hygienic and nursing care, measurement of vital signs, performance of prescribed medical treatments, administration of prescribed medications, and performance of non-medicated intravenous therapy and blood withdrawal (US Department of Labor, 2002).

Registered nurses (RNs) obtain their license after completing an associate degree, baccalaureate, or diploma nursing program and passing an examination approved by the Board of Registered Nursing. RN education requires two to four years of coursework, but more time often is needed to complete RN programs due to prerequisite requirements and overcrowded campuses (Seago and Spetz, 2002). The scope of practice of RNs is broader than that of LVNs, allowing the assessment of patients, development of care plans, providing intravenous medications, administering blood products, and provision of other complex therapies and treatments. As a result of this broad scope of practice, RNs

are employed more frequently in environments in which patients are severely ill, such as hospitals (US Department of Labor, 2002).

California's nursing workforce in 2005 consisted of 298,500 actively-licensed RNs and approximately 90,000 LVNs. Some nurses with California licenses live in other states; 255,000 RNs with an active California license live in California. Approximately 84 percent of the State's RNs are working in nursing (California Board of Registered Nursing, 2005).<sup>1</sup> Hospitals employ the greatest share of RNs, with 61 percent of RNs working in hospitals. LVNs predominantly work in hospitals and nursing homes, with 28 percent in hospitals and 26 percent in nursing homes (California Employment Development Department, 2001). In 2006, California's RNs earned an average of \$34.58 per hour, and LVNs earned an average of \$21.15 per hour (California Employment Development Department, Occupational Employment Statistics, 2006). In the 2001-2002 fiscal year, average hourly hospital wages were \$30.29 for RNs and \$18.73 for LVNs (California Office of Statewide Health Planning and Development, 2003).

#### B. Features of Nursing Labor Markets

The nursing labor market exhibits a number of features that distinguish it from other professional labor markets. The most important characteristic of nursing is that it is a licensed profession. The Boards of Vocational Nursing and Psychiatric Technicians (BVNPT) and Registered Nursing (BRN) license nurses in California, after potential nurses have completed an approved nursing education program and passed the exam appropriate to their license. Without a license, an individual cannot perform a variety of tasks that are essential to the provision of health care. The goal of the Boards is to protect consumers, who are vulnerable to poor care when they interact with the health care system. As a result of licensure, entry into the profession of nursing is restricted.

The demand for licensed nurses also is controlled by consumer protection-oriented regulations. The California Department of Health Services (DHS), Licensing and Certification Division, requires that hospitals and nursing homes meet certain nurse staffing requirements. The goal of DHS is to ensure that hospitals can provide adequate

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<sup>1</sup> The share of licensed vocational nurses who are working in nursing jobs is not available from any data source of which we are aware.

patient care, and because only licensed nurses provide many health care services, DHS focuses on licensed nurse staffing. Federally certified nursing homes are required to have an RN director of nursing and an RN on duty 8 hours a day, seven days a week. If the facility has fewer than 60 beds, the director of nursing can serve as the RN on duty (Harrington, 2001). They also must have a licensed nurse (RN or LVN) on duty during all other shifts. Under California regulations, a nursing home must have an RN on duty 24 hours a day if the facility has 100 or more beds. Hospitals are required to have a system in place to measure the acuity of illness of patients and determine appropriate staffing. Since January 2004, hospitals also have had minimum nurse-to-patient ratio requirements that exist in tandem with the patient acuity measurement systems. As a result of these regulations, the demand for licensed nurses is not as flexible as in other labor markets.

The regulations of the BVNPT, BRN, and DHS contribute to the slow responses to market changes inherent in the nursing labor market. This “stickiness” of the labor market is exacerbated by the dominance of relatively few institutions in the labor market. The supply of new licensed nurses is primarily dependent on nursing programs in colleges and universities. Although there are 87 programs that offer entry-level LVN education and 101 programs that offer entry-level RN education, there are substantially more qualified applicants for these programs than space in these programs (Seago and Spetz, 2003). Educational capacity has risen over the past four years, as discussed below, and at least two new RN programs will be admitting students within one or two years.

The demand for licensed nurses is concentrated in the hospital and nursing home industries, and these employers increasingly are consolidated into multi-site corporations (Spetz, Mitchell, and Seago, 2000). The employers of registered nurses include not-for-profit, for-profit, and government organizations, with not-for-profit companies dominating the hospital market and for-profit companies holding the majority of the nursing home market (CA Office of Statewide Health Planning and Development, 2003). Other types of health care providers are demanding progressively greater numbers of licensed nurses, particularly ambulatory care and home health providers (CA Employment Development Department, 2001). Even during time periods when nursing

surpluses are reported, unemployment rates for licensed nurses have been very low, never topping 1.5 percent (Levine, 2001).

Labor markets for licensed nurses generally are not national in scope. In some geographic regions there are few employers and these employers may have a high degree of control over the local labor market. Other nursing labor markets are very competitive, with a plethora of employers. Because job opportunities for licensed nurses are plentiful at nearly all times, nurses usually do not need to relocate to find interesting and rewarding work. In addition, over 70 percent of RNs are married and thus may not be geographically mobile because they must coordinate their employment with their spouses' (U.S. Bureau of Health Professions, 2006). In a single year, only five percent of California's RNs move to a new county; thus, it is important to ensure that supplies of new nurses are distributed across regions (U.S. Bureau of Health Professions, 2002).

### C. Nursing Shortages

At present, there is a significant shortage of licensed nurses in the United States (Gurnon, 1997; Buerhaus, 1998; Kelley, 1998; Buerhaus 1999; Kilborn, 1999; Buerhaus and Staiger, 1999; U.S. Bureau of Health Professions, 2002; Spetz and Given, 2003). Reports of nursing shortages in the United States have arisen regularly over the past 60 years (Yett, 1975; Friss, 1994). Prior to the current shortage, the most recent shortage was reported in the late 1980s and early 1990s (Aiken and Mullinix, 1987). By the mid-1990s, these complaints of shortage were replaced with concerns that there was an oversupply of nurses, largely due to the growth of managed care in the United States (Aiken, Sochalski, and Anderson, 1996; Buerhaus and Staiger, 1996). However, by 1998, stories of shortage resurfaced, particularly in nursing specialties such as critical care and on the western and eastern coasts of the United States (Gurnon, 1997; Kilborn, 1999).

In classical economic theory, a shortage of labor is defined as occurring when the supply of labor is not as large as the demand for that labor, at the current wage. When there are shortages of labor, employers respond by increasing the wages they offer. These wage increases should result in an increase in the supply of labor since the financial returns to employment are larger. There also should be a decline in the demand

for labor, because employers will look for ways to reduce their use of labor as its price rises. The combined effect of the increase in supply and decrease in demand is an abatement of the shortage.

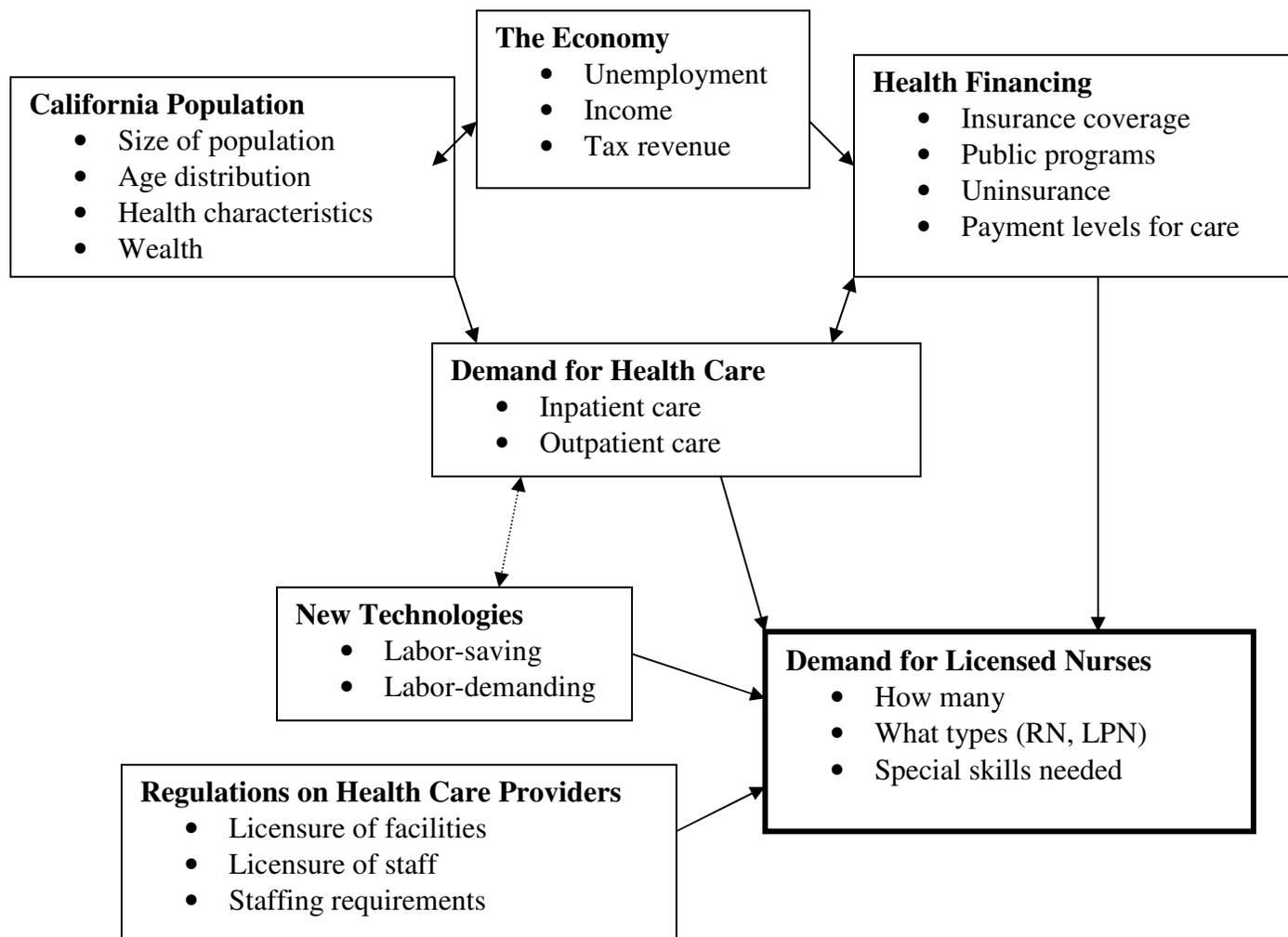
The classical theory of labor markets does not allow for the possibility that labor shortages continue in the long-term. However, a shortage can become persistent for several reasons: wages might not adjust, supply might not increase, or demand might not decline. For example, changes in supply or demand might not occur immediately because of a pre-established delay, such as the time it takes to train a worker. Nursing labor markets might have all three of these difficulties in rectifying shortages. Many employers of nurses face limited revenues because their services are reimbursed by government programs and their private revenues are determined by pre-existing contracts. Thus, employers cannot easily absorb increased labor costs. Furthermore, the supply of licensed nurses is restricted by the size of the educational system and licensure regulations. Also, the demand for licensed nurses is controlled by various regulations that prevent health care providers from reducing their nurse staffing.

In a labor market such as nursing, government intervention may be required to alleviate shortages. However, for such intervention to be effective, policymakers must have a deep understanding of the supply and demand forces pervading the market. The next three chapters of this report are a preliminary effort to offer California's policymakers the information they need to prevent and address future shortages of licensed nurses.

### 3. The Demand for Nurses

The demand for licensed nurses is derived from the demand for health care, and is affected by a variety of factors, including the general population's demographics and health, new medical treatments, health care payment systems, and health care regulations. Figure 3.1 depicts how these factors contribute to the demand for nurses in California. In this chapter, we examine each of these factors.

**Figure 3.1. Factors Affecting Demand for Licensed Nurses**



## A. Demographics and the Demand for Health Care

### *Population characteristics and growth*

The dominant determinant of the demand for health care is the size of California's population. As the population increases, the demand for health care services rises. This is true whether the population growth arises from new births, interstate migration, international immigration, or lower death rates. Each of these components of population change is associated with increased demand for particular types of care. High birth rates increase the demand for prenatal care, obstetric services, and pediatric care. International immigration may increase demand for preventive services for chronic and acute diseases that are more prevalent among immigrants, such as tuberculosis. Lower death rates result in a growing elderly population, which demands geriatric health care services.

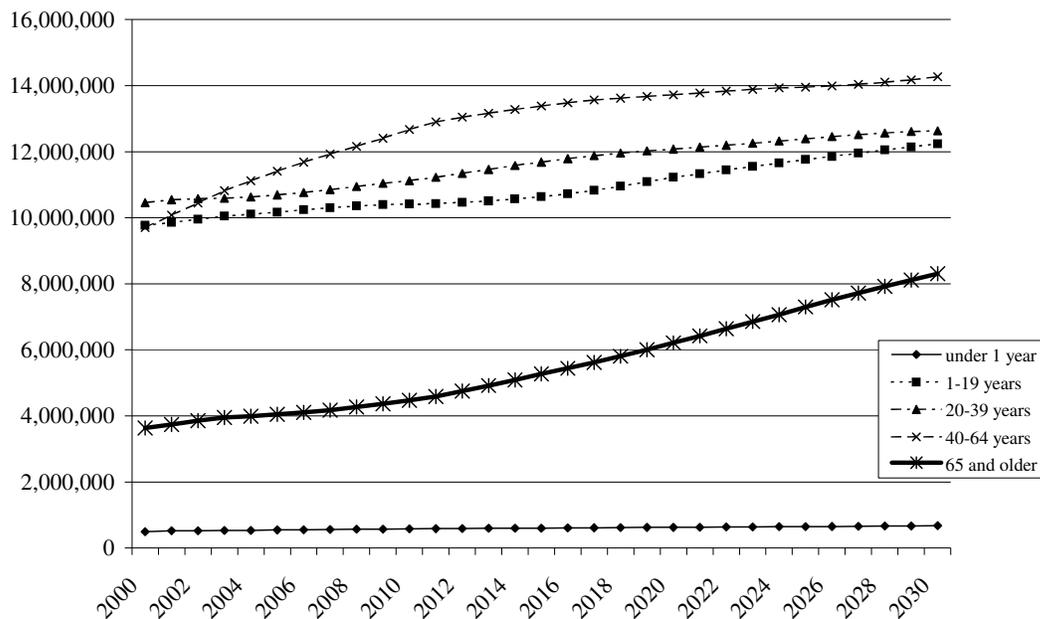
California's population is expected to grow 33 percent between 2000 and 2020 (California Department of Finance, 2001), and the demand for health care also should grow substantially over this time.

As suggested above, the age distribution of the population has an important affect on the demand for health care. Children require relatively little treatment for serious, acute ailments, but typically demand many preventative services such as vaccines. As more children experience chronic illnesses, demand for ambulatory care has risen. Young adults tend not to demand many health care services. Young women require routine gynecological care, and young men and women episodically seek care in response to illness or accidents. Child-bearing women demand greater health care services during their pregnancies and postpartum period. As people age, they require more preventative services, such as screening for high blood cholesterol, breast cancer, prostate cancer, and colorectal cancer. These also are the ages at which increases in rates of cancer and heart disease are observed. As individuals continue to age, their health needs grow. In general, populations that have a high share of elderly individuals demand more health care services. The future aging of the California population is expected to increase the demand for health care services dramatically (Coffman, Spetz, Seago, et al., 2001). As seen in Figure 3.2, over 8 million of the 48 million Californians anticipated in 2030 will

be age 65 or older. This age group will experience greater age growth than any other age group, with a forecasted rate of over 128%.

Ethnic diversity affects the health needs of California's population. Ethnic minorities have poorer access to health services than whites, on average, and they use fewer health services (Holtby, et al., 2006). Lack of English proficiency among immigrants is an important barrier to use of health services (Ponce et al., 2006). Some health conditions are associated more strongly with certain ethnic groups; for example, African-American babies are more likely to be born prematurely and at low birth weight, while Latino mothers and babies generally have good birth outcomes (Guendelman, et al., 2006b; Page, 2004). This is particularly true for first-generation immigrants (Guendelman, Thornton, Gould, and Hosang, 2006). African-American Californians have higher rates of asthma, diabetes, and hypertension, as compared with all other ethnic groups in California (Holtby, et al., 2006; Yancey, et al., 2003). As the ethnic composition of California's population changes, there will be adjustments in the mix of services needed in the State, and this will affect the demand for nursing care.

**Figure 3.2. Forecasted Population Growth, by Age Group, 2003-2050**



Source: California Department of Finance

Specific health characteristics of the population have a substantial effect on the demand for health care, beyond the age distribution of the population. Local cultural patterns such as food preferences and popularity of exercise can affect population health. Obesity is more prevalent in some communities than others. If a population exhibits a high rate of chronic illness, such as diabetes, asthma, or heart disease, there will be higher demand for outpatient services to manage these ailments. If such outpatient services are not available, there will be greater demand for inpatient hospital care since people with chronic illnesses are more likely to have events demanding acute care if they do not obtain appropriate outpatient care. Thus, the specific health needs of local populations have a substantial effect on the level and composition of health services demanded.

The wealth of a population also affects its demand for health services. In general, individuals with higher family income face fewer chronic diseases and are better able to engage in preventative behaviors. These characteristics reduce the overall demand for health care, particularly for acute care services. On the other hand, wealthier individuals also are more likely to seek health care services that improve quality of life, such as prescription antihistamines and cosmetic surgery. Some research suggests that higher levels of wealth are associated with unhealthy behaviors, such as alcohol consumption and lack of exercise (Feinstein, 1993), so populations with high per capita income may have special health needs. Communities with low per-capita incomes face different problems, ranging from diseases that are easily communicated in overcrowded housing conditions, to poor nutrition, to poor dental care, and to violence. The ambulatory and inpatient health care needs in these communities typically are greater than in wealthier communities; also, different types of services are demanded.

### *Financing of health care services*

The method by which health care is financed has a significant effect on the demand for health care. It is well known that individuals who have health insurance use more health care services, and demand for health care is inversely related to the size of copayments made by patients (Manning, Newhouse, Duan, et al., 1987). Public insurance programs increase the use of health care services among those who would otherwise be uninsured. However, publicly funded insurance, such as Medi-Cal, also

changes the composition of services demanded. Individuals with health insurance tend to demand more primary care and outpatient services, while uninsured individuals more often obtain their health care through hospitals and emergency clinics (Smith-Campbell, 2000; Elixhauser, Machlin, Zodet, et al., 2002; Dohan, 2002). In 2005, 6.5 million Californians – one-fifth of the population – did not have health insurance at some time during the year (Yoon, et al., 2006). Over ten percent of children and 24 percent of adults were uninsured all or part of the year. Rising rates of uninsured Californians have been associated with instability in employment-based health insurance. Proposals to extend health insurance to all Californians could change the demand for health care in the State.

The structure and reimbursement mechanisms used by health insurance plans can affect the demand for health care. In the early 1980s, the federal Medicare system, which provides health insurance for the elderly, changed to the Prospective Payment System (PPS). In this system, all inpatient diagnoses were grouped into categories, and payments to hospitals were based on these Diagnosis-Related Groups. If the cost of caring for a patient cost less than the payment received, the hospital could earn a profit; however, the hospital also faced a risk of financial loss. In response to PPS, hospitals actively worked to reduce the length of inpatient hospital stays, and they moved many health care services to the outpatient setting. The net effect was a reduction in demand for inpatient health care but increases in outpatient surgery and certain types of ambulatory care.

At the same time PPS came into effect, California implemented legislation that allowed for the growth of Health Maintenance Organizations (HMOs) and Preferred Provider Organizations (PPOs). These managed care insurance plans strive to reduce the use of expensive health care services. As a result, they may increase use of preventive services, such as routine screenings for disease. In the mid-1980s and mid-1990s, as Medicare PPS evolved and managed care expanded in California, the rate of inpatient hospitalization declined and hospitals reported fewer patient discharges (Figure 3.3).

Over the past few years, managed care has retreated from active cost-control strategies (Lesser, Ginsburg, and Devers, 2003). At the same time, hospital utilization has increased, as seen in Figure 3.3. Concordantly, health care costs have been rising at double-digit rates (Strunk & Ginsberg, 2003). If managed care continues to diminish in

its effectiveness, demand for health care might continue to grow at a faster rate than in the past decade (Strunk & Ginsberg, 2003).

### *The economy and demand for health care*

The status of the economy affects demand for health care in several ways. First, the unemployment that accompanies economic recession leads to increases in both the number of people who are uninsured and the number who receive health insurance through Medi-Cal. As discussed above, these changes in insurance coverage affect the demand for health services.

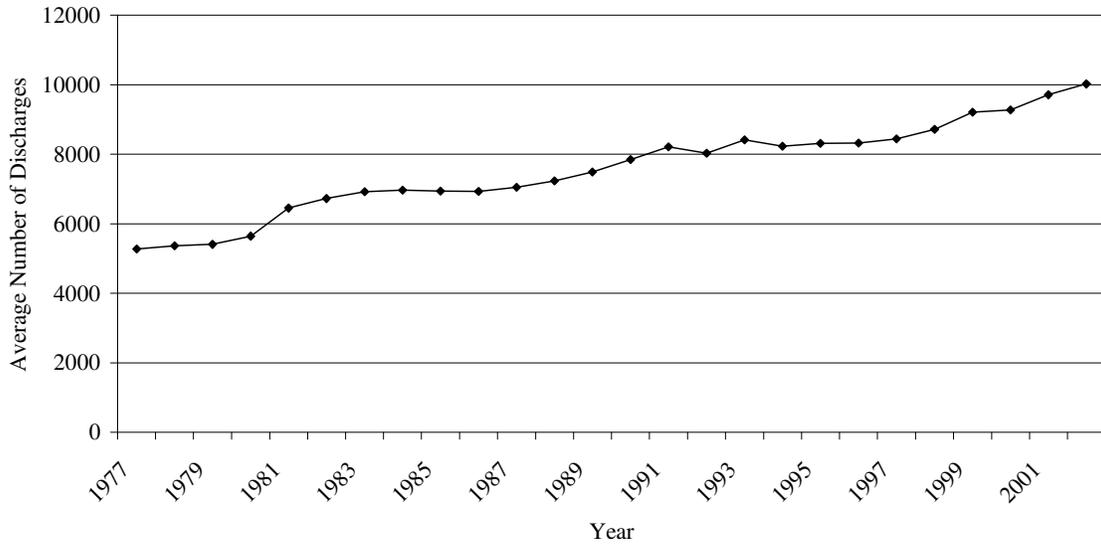
Second, a small body of research suggests that economic recession has a direct negative effect on the health of the population (Gerdtham & Johannesson, 2003). Increased stress due to unemployment, unhealthy behaviors that arise in response to stress (such as consuming alcohol), and difficulty affording healthy food may explain these findings. However, some research has found that economic growth is more closely associated with declines in community health (Ruhm, 2001; Gerdtham and Ruhm, 2002). As California's economy moves through business cycles, the demand for health care rises and falls.

## B. The Demand for Health Care and the Demand for Nurses

### *The employers of licensed nurses*

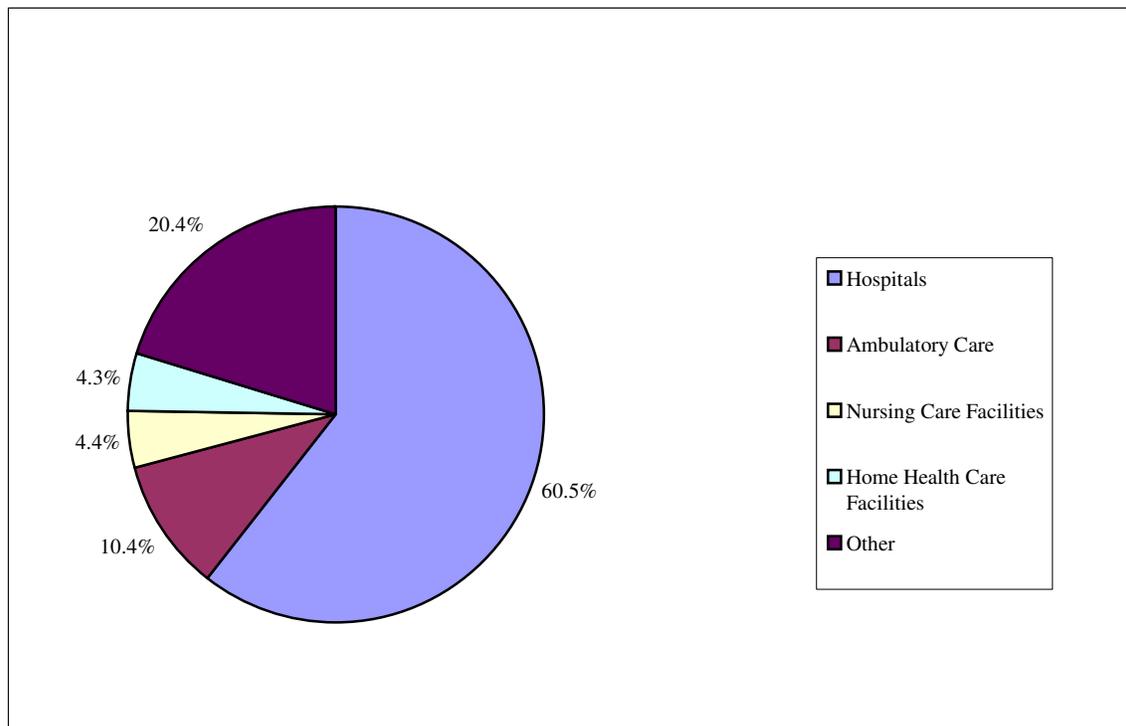
Health care providers rely on licensed nurses to provide the majority of direct patient care. Registered nurses assess patients, develop plans for their care, perform tests, provide medical treatments, plan for patients' discharges, teach patients and their families how to provide ongoing care, and keep detailed records of all these activities. Licensed vocational nurses assist in patient assessments and the development of care plans, provide medications to patients, start intravenous fluids, obtain blood samples, and participate in numerous other components of patient care. Without licensed nurses, many health care providers could not care for patients. Figure 3.4 presents RN employment by setting, and Figure 3.5 presents the settings in which LVNs work.

**Figure 3.3. Average Per-Hospital Discharges, 1977-2003**



Source: California Office of Statewide Health Planning and Development, Annual Hospital Disclosure Reports

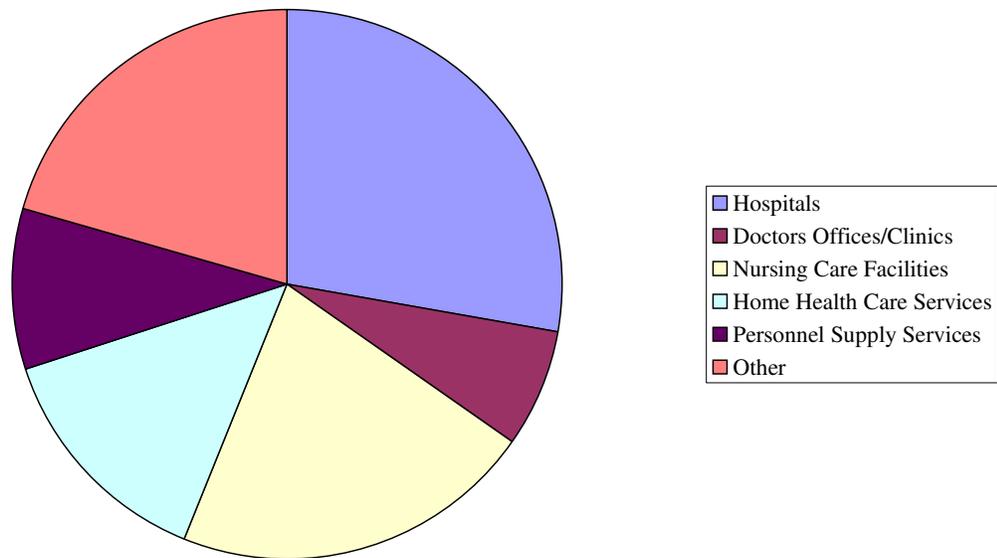
**Figure 3.4. Employment Settings in Which RNs Work, 2004**



Source: California Board of Registered Nursing, 2004 Survey

The dominant employer of licensed nurses is the hospital industry, although RNs are more likely to work in hospitals than are LVNs. As the number of patients and patient days in hospitals rise, demand for RNs and LVNs rises (Spetz, Dyer, Chapman, et al., in press). The increasing acuity of illness of patients in the hospital makes RNs particularly important to hospital care, as does the diffusion of high-technology medical services in hospitals (Spetz, 1999). LVNs are restricted from giving patients medications through intravenous lines (IVs), administering blood products, and providing other types of care that are critical in the hospital setting (Seago et al, 2004). These restrictions reduce the usefulness of LVNs to hospitals, and thus the demand for LVNs has declined in California hospitals since the mid-1980s (Spetz, 1999). Hospitals also demand RNs with special training and certification in surgery, anesthesia administration, critical care, and other types of care primarily provided by hospitals.

**Figure 3.5. Employment Settings in Which LVNs Work, 2004**



Source: California Employment Development Department, Occupational Employment Statistics Survey, 2004.

A high share of LVNs work in nursing homes and long-term care facilities; relatively fewer RNs, however, work in these settings (Seago et al., 2004). Patients in nursing homes generally do not receive complex treatments such as IV medication therapy, and thus much of the patient care in nursing homes can be provided by LVNs and unlicensed nursing personnel. LVNs assist in the ongoing assessment of nursing home patients and the administration of oral medications.

A growing share of licensed nurses works in ambulatory care settings, such as outpatient surgery centers, doctor's offices, and urgent care clinics. In these settings, licensed nurses have a wide range of responsibilities, ranging from assessing patients to providing medical care to maintaining records. Many nurse practitioners (NPs) and certified nurse midwives work in outpatient care environments.

Home health is another industry in which there has been growing demand for licensed nurses. The growth of managed care and subsequent waning of the use of hospital care led to an increased need for home health care. RNs and LVNs are instrumental in providing home health services, as they can deliver medications, monitor patients, and teach self-care strategies.

Health care services are provided in a variety of other environments, such as schools, private companies, and public health departments. Public and private school districts employ school nurses to address the health needs of their students. By law, school nurses must be master's prepared RNs. Private companies use occupational health nurses to develop workplace safety programs and monitor the health of their employees. Public health departments employ nurses in a variety of roles, ranging from patient care in clinics to management of public health programs. Certified public health nurses are particularly valuable to public health departments.

Licensed nurses also hold jobs that do not involve direct patient care. Some of these positions are administrative and managerial jobs within patient care environments such as hospitals and nursing homes. Licensed nurses work in utilization review departments, management offices, research laboratories, and other departments within health care organizations. Licensed nurses also hold positions in health care organizations that do not provide direct patient care, such as insurance companies, disease management software development companies, and pharmaceutical firms.

Because they have a broad understanding of health, the disease process, and patient care, licensed nurses bring clinical expertise to management, development, sales, and marketing teams.

Finally, RNs work in education programs, as teachers of new RNs and LVNs. Most nursing education programs rely upon RNs with graduate degrees in nursing, as explained below.

### *Health care financing and delivery*

The financing of health care affects the demand for licensed nurses in two ways. First, restricted reimbursements to health care providers reduce demand for health care services and thus fewer licensed nurses are needed to provide care. Second, when health care providers face tighter budgets, they are more inclined to substitute unlicensed nursing personnel for licensed nurses. Health care providers have seen reductions in revenues as a result of managed care, Medicare's Prospective Payment System, and declining Medi-Cal payments. Increased demand for charity care services by the uninsured also reduces the funds available to health care providers to hire licensed nurses.

At the same time that managed care insurance gained dominance in health care financing, health care providers consolidated into multi-site corporations (Spetz, Mitchell, and Seago, 2000). Multi-hospital corporations, both for-profit and not-for-profit, grew substantially over the past two decades, so that by 2000, over half of California's hospitals were in multi-hospital systems (Spetz, Mitchell, and Seago, 2000). Multi-site corporations also are dominant in the long-term care industry. Some corporations are vertically integrated, owning hospitals, nursing homes, medical groups, and other health care services. There has been little research on the effects of system integration on the demand for and wages of licensed nurses. Two recent papers find that hospitals demand fewer RNs after joining multi-hospital systems (Currie, 2005; Spetz, Seago, and Mitchell, 2003).

Economic cycles also affect the demand for nurses. During recessions, the number of uninsured Californians rises. More uninsured patients increase the charity care burden of health care providers. Recessions also result in decreased government revenue. Governments respond to revenue shortfalls by reducing expenditures for

government programs. For government-financed health care programs such as Medi-Cal, this usually equates to lower reimbursements to health care providers. Both of these things lead to greater financial pressure for health care providers, and thus demand for licensed nurses may decline during recessions.

#### *Regulatory effects on nurse demand*

State and federal regulations affect the demand for licensed nurses. Health care facilities in California are licensed by the California Department of Health Services (DHS), and maintenance of operating licenses requires meeting staffing requirements established by DHS. Nursing homes face licensed nurse staffing requirements under both federal and state regulations. Federally certified nursing homes are required to have an RN director of nursing and an RN on duty 8 hours a day, seven days a week. If the facility has fewer than 60 beds, the director of nursing can serve as the RN on duty (Harrington, 2001). They also must have a licensed nurse (RN or LVN) on duty during all other shifts. Under California regulations, a nursing home must have an RN on duty 24 hours a day if the facility has 100 or more beds.

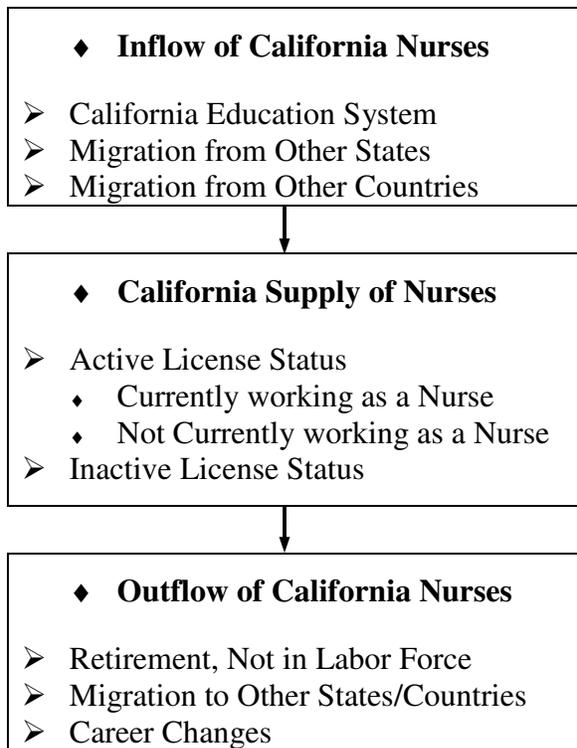
Hospitals are required to have a system in place to measure the acuity of illness of patients and determine appropriate staffing (Title 22, Division 5, Chapter 1, Article 6, Section §70495(e)). Since the mid-1970s, hospital critical and intensive care units have been required to have no less than one licensed nurse for every two patients, and half of these licensed nurses must be RNs (Title 22, Division 5, Chapter 1, Article 6, Section §70495(e)). In January 2004, minimum licensed nurse-to-patient ratio requirements were implemented for all units of acute-care hospitals, as established by Assembly Bill 394 (Chapter 945, Statutes of 1999). Several estimates of the effect of these ratios on demand for licensed nurses have been published. The DHS analysis, conducted by researchers at the University of California, Davis, predicts that 5,820 new nurses will be needed in California hospitals to meet the staffing requirements (Kravitz, Sauve, Hodge, et al., 2002). Alternative analyses conducted by independent researchers have reported that the increased demand for nurses due to the ratios could be as low as 1,600 (Spetz, 2002.). At this time, it is not known if these estimates were correct.

## 4. The Supply of Nurses

### A. Overview of California's Supply of Nurses

The supply of nurses consists of nurses with active licenses. Some of these nurses are not working in nursing, but they are part of the current pool of nurses available to work in California. The supply of nurses increases as nurses flow into the labor market by graduating from California nursing programs, migrating from other states, or emigrating from other countries to California. The supply of nurses declines with retirements, migration out of California, and career changes out of nursing. Figure 4.1 summarizes the labor flows in and out of the California stock of licensed nurses. This chapter examines each of the components of this diagram.

**Figure 4.1: Flows and Stock of California Nurses**



## B. The Stock of California Nurses

### *The number of licensed nurses in California*

California's nursing workforce in 2005 consisted of 298,500 actively-licensed RNs and approximately 90,000 LVNs. The number of registered nurses in California grew steadily from the mid-1990s through 2003 after being stagnant in the early 1990s (see Figure 4.2), and has remained stable since 2003. The increase in the supply of RNs over the past several years is even more pronounced when the RN population is examined according to active license status.

Figure 4.3 shows the percent of registered nurses with an active license and the percent with an inactive license between 1990 and 2003. Maintenance of an active RN license requires submission of evidence of completion of continuing education and payment of renewal fees. Nurses with inactive licenses have paid a renewal fee but have not submitted documentation of continuing education. Some RNs simply do not renew their licenses; little is known about these RNs.

As seen in Figure 4.3, not only did the number of registered nurses increase during the 1990s, but the number of *active* registered nurses also increased during this period. Similarly, the National Sample Survey of Registered Nurses reports that the percent of California registered nurses employed in nursing increased from approximately 77 percent in 1996 to 81 percent in 2000 (see Figure 4.4). Preliminary data from the 2004 National Sample Survey indicates that the share of RNs employed in California has risen to 82.7 percent (U.S. Bureau of Health Professions, 2006). The California Board of Registered Nursing 2004 Survey of RNs, which has a larger sample of California RNs than the National Sample Survey, estimates that 84.2 percent of RNs were employed in nursing in 2004. Comparable data are not available for LVNs.

The changes in the California stock of nurses presented in Figures 4.2 through 4.4 are based on analysis of cross-sectional data, which precludes us from making any conclusions regarding the movements of individual nurses between active and inactive status. The available data do not allow us to specifically identify registered nurses who were not currently working as a nurse (or had an inactive license) at one point in time and then decided to work as a nurse (or made their license active) at a later point in time.

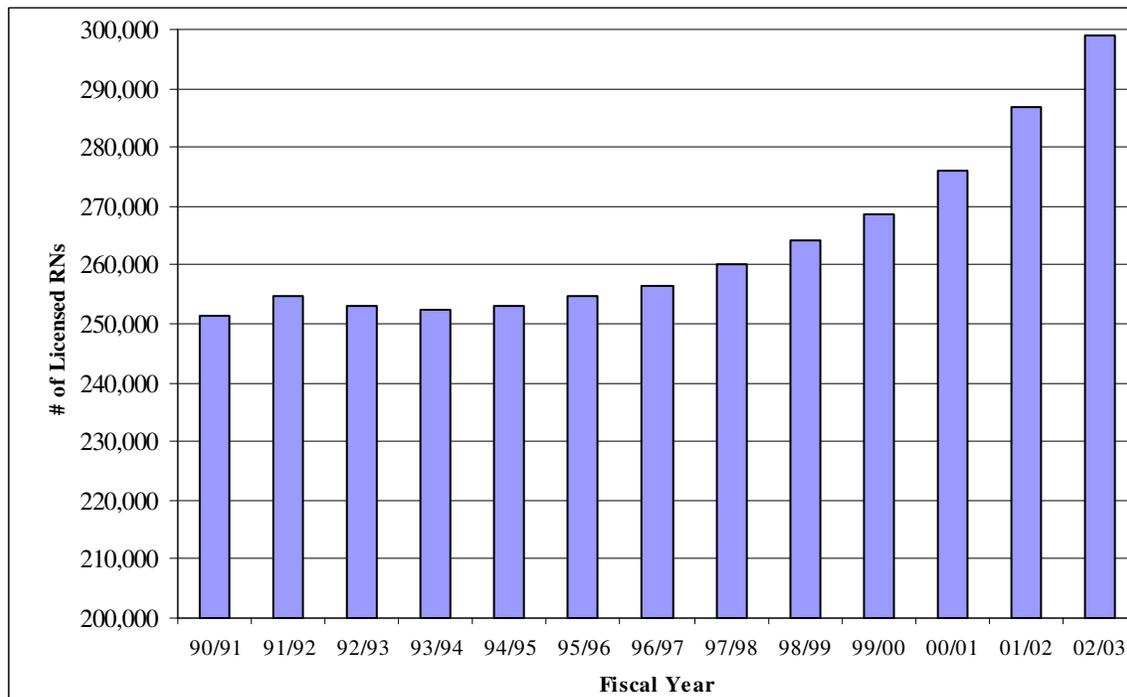
Data from the Board of Registered Nursing suggests that few nurses reactivate licenses – only 303 RNs did so in the 2003-2004 fiscal year (Spetz & Dyer, 2005). Figure 4.1 presents the rate of RNs with active licenses changing to inactive status in the 2003-2004 fiscal year, as reported by the BRN (Spetz & Dyer, 2005).

**Figure 4.1: Estimated Annual Rate of RNs Moving from Active to Inactive Status, by Age Category**

Age Category	Rate of Transition to Inactive Status
<30	0.1%
30-34	0.4%
35-39	0.5%
40-44	0.6%
45-49	0.5%
50-54	0.7%
55-59	0.9%
60-64	1.8%
65+	4.8%

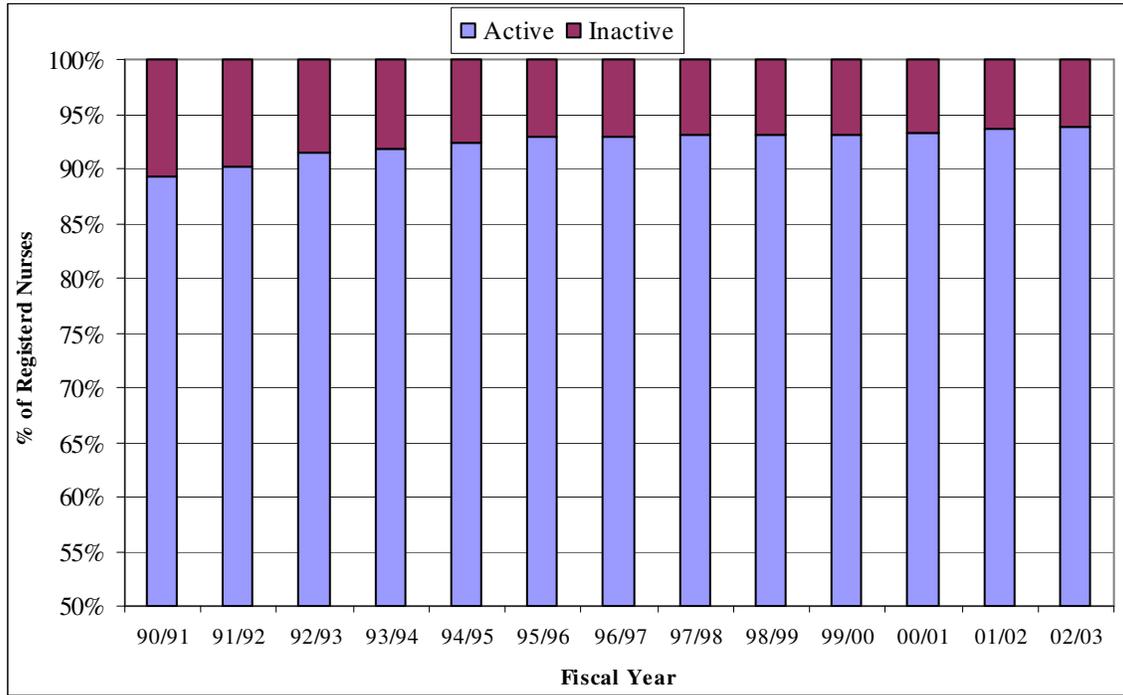
Source: California Board of Registered Nursing

**Figure 4.2: Number of RNs Licensed in California, 1990-91 to 2002-03**



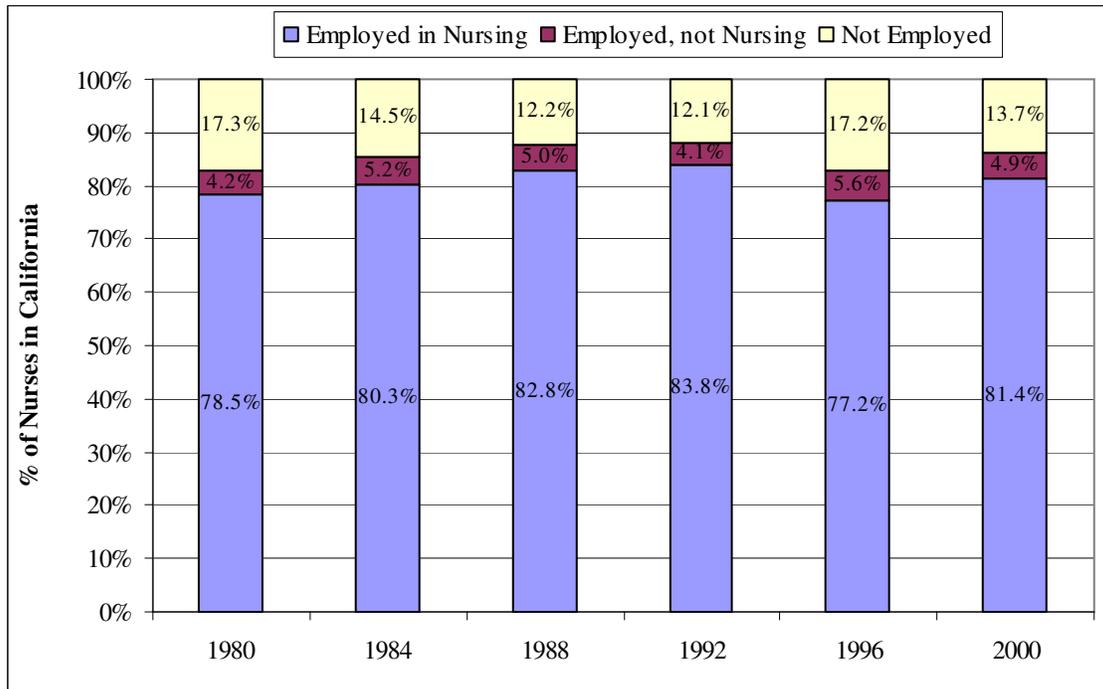
Source: California Board of Registered Nursing.

**Figure 4.3: Active License Status of RNs, 1990-91 to 2002-03**



Source: California Board of Registered Nursing.

**Figure 4.4: Employment Status of RNs in California, 1980 to 2000**

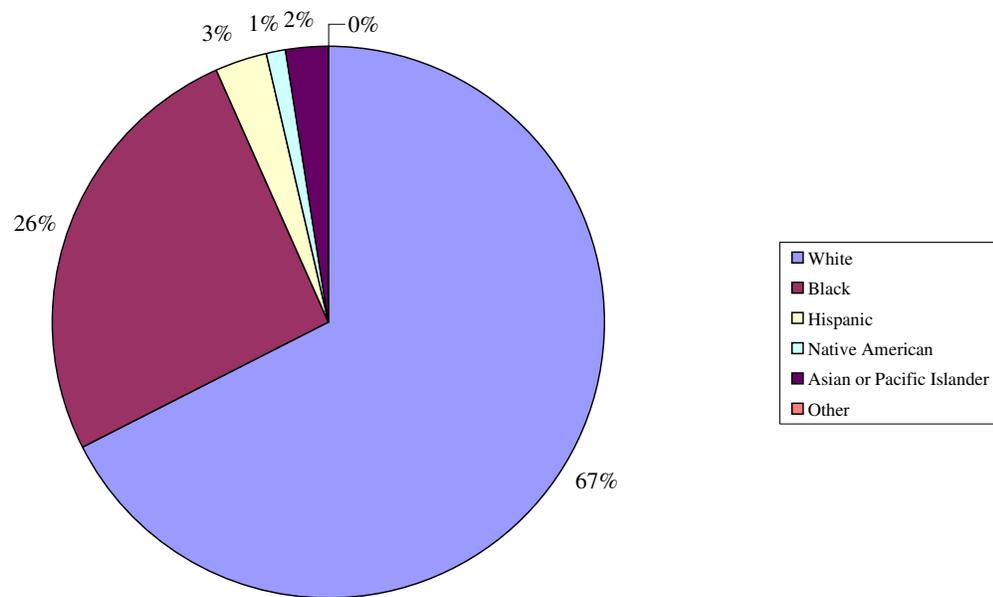


Source: National Sample Survey of Registered Nurses, 1980, 1984, 1988, 1992, 1996 and 2000.

*Demographic characteristics of California's nurses*

Little is known about California's LVN workforce, because there are no national or statewide surveys of LVNs. The Current Population Survey, a monthly survey of households conducted by the Bureau of the Census for the Bureau of Labor Statistics, can be used to examine the LPN workforce nationwide, but the survey does not include enough respondents to describe the LPN workforce at the state level (U.S. Bureau of the Census, 2004). LPNs are self-identified in these data by reporting that their occupation is licensed practical nursing. We report some of the demographic characteristics of the LPN workforce here.

**Figure 4.5: Racial and Ethnic Background of Licensed Practical Nurses in the United States, 2001**



Source: U.S. Bureau of the Census, Current Population Survey, 2001

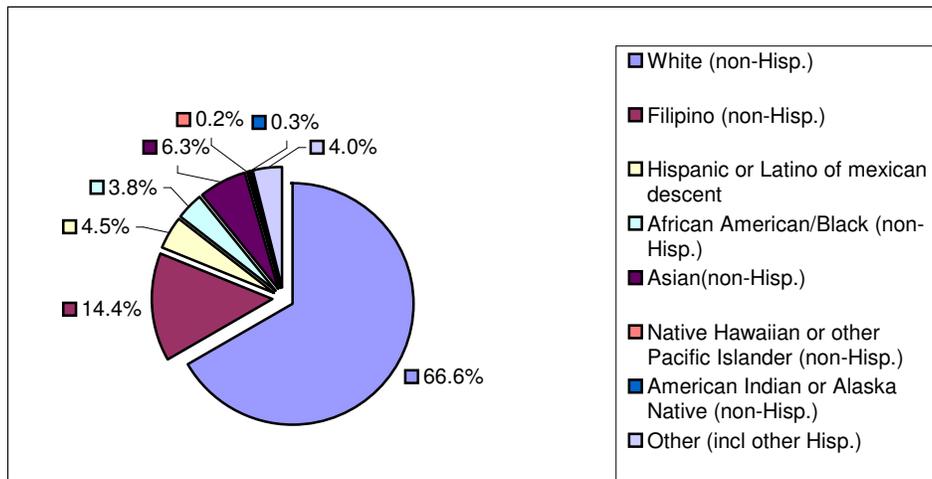
The national LPN workforce is predominantly female, with men comprising only 5 percent of LPNs. As seen in Figure 4.5, 67 percent of LPNs are white, and 26 percent are Black. Although Blacks are overrepresented in the LPN workforce, other ethnic minorities, such as Asians and Hispanics, are underrepresented. Most LPNs are married (60%), but 26 percent report being widowed, divorced, or separated. The average age of LPNs in the United States was 43 in 2001.

Much more is known about California's RN workforce, because there are national and state-level surveys of RNs. As with the national LPN workforce, California's RN workforce predominantly consists of white women. This mirrors the national RN workforce, although newly graduating nurses are more likely to be nonwhite or male. Approximately seven percent of California RNs were male in 2004 (California Board of Registered Nursing, 2005). Nationally, approximately 5.7 percent of all RNs in the US were male in 2004 (US Bureau of Health Professions, 2006).

Figure 4.6 presents the racial and ethnic mix of nurses in California in 2004, according to the Board of Registered Nurses. In 2004, about 67 percent of California's RNs were white (non-Hispanic), while only 44.6 percent of California's total population was white that year (California Department of Finance, 2006). Asians (Filipino, other Asian and Asian Indian) comprise the largest non-white group of RNs in California at 21 percent of the State's RN workforce, and two-thirds of that group is Filipino. Only 11.6 percent of the overall State population is Asian. Hispanic nurses are significantly underrepresented in California's nursing workforce. Only 5.6 percent of the State's RN workforce is Hispanic, which is well below the 34.8 percent of the overall population that is Hispanic (California Department of Finance, 2006). Slightly less than four percent of the RN workforce is African American, which is below the statewide rate of six percent of the California population.

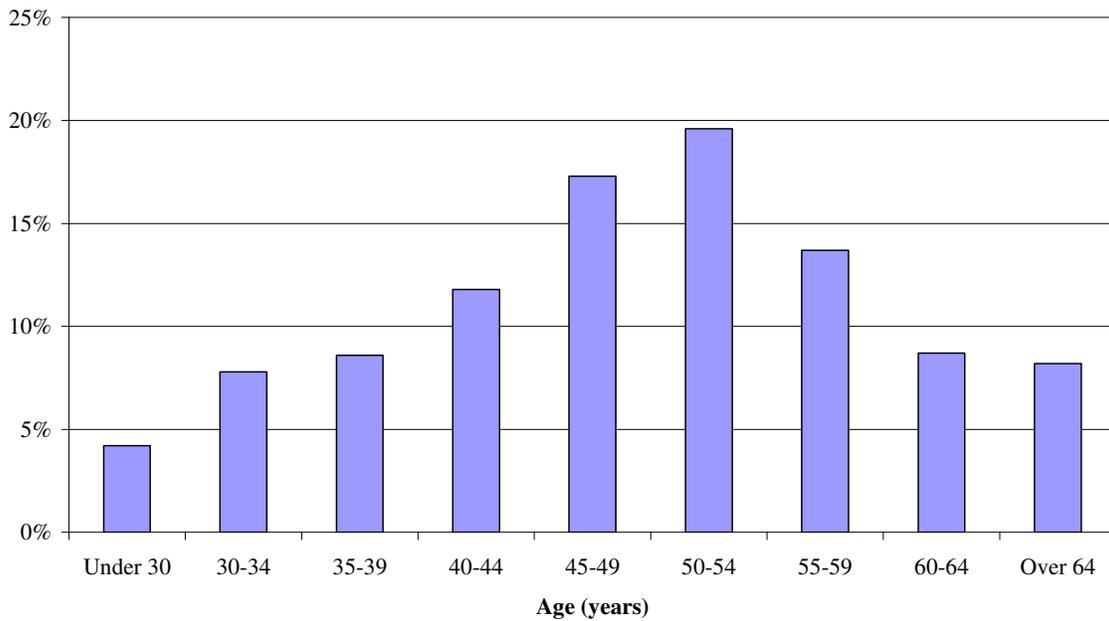
Figure 4.7 presents the age distribution of California's RN workforce. Less than 21 percent of the State's RNs are under 40 years of age, and 17 percent are older than 60 years. Overall, 84 percent of California's RNs are employed in nursing (California Board of Registered Nursing, 2005), but the likelihood of an RN working in nursing declines with age (Figure 4.8). Over 45 percent of nurses over age 60 do not work as nurses, while only 10 percent of nurses under age 30 do not work in nursing.

**Figure 4.6: Racial and Ethnic Background of California’s Registered Nurses, 2004**



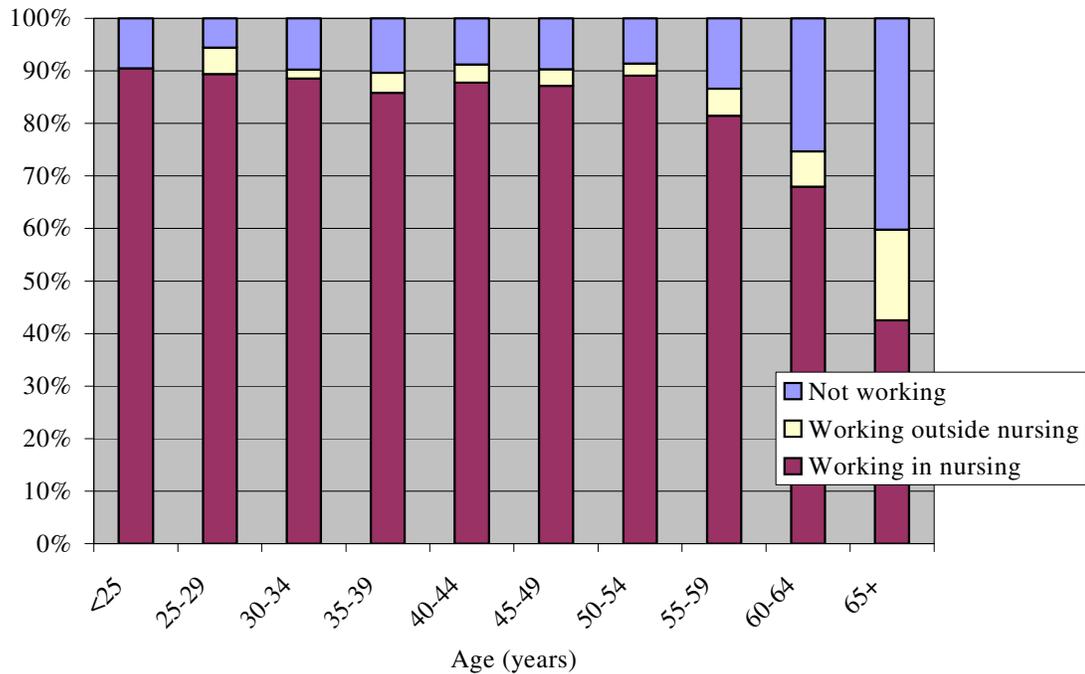
Source: Board of Registered Nursing, Survey 2004

**Figure 4.7: Age Distribution of California RNs, 2004**



Due to rounding, percentages may not add to 100%.  
 Source: Board of Registered Nursing, 2004 Survey

**Figure 4.8: Employment status of California nurses, by age**



Source: California Board of Registered Nursing, 2004 Survey

### C. The Flow of Nurses into California’s Supply

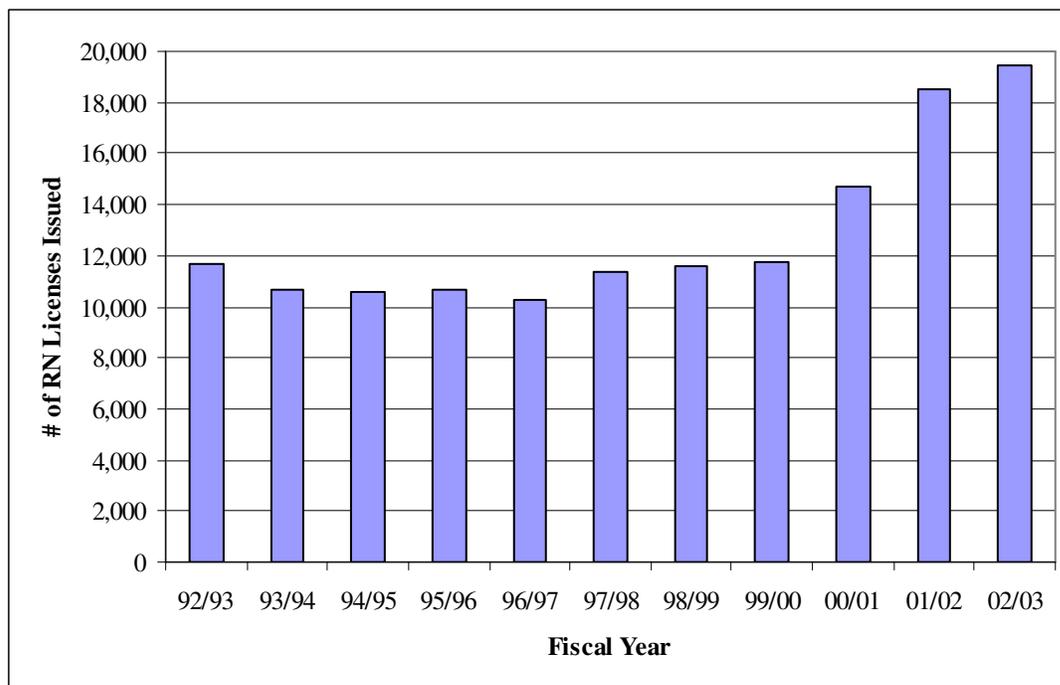
The stock of California nurses increases with three sources of new nurses: (1) California-educated individuals, (2) people migrating from other states into California, and (3) people migrating from other countries into California. California’s dependence on each of these sources changed during the 1990s. Overall, the number of new licenses issued to registered nurses was fairly stable from 1992 to 1999—fluctuating between 10,000 and 12,000 per year. Since 2000, however, the number of new RN licenses increased significantly (see Figure 4.9).

The increase in new registered nurses appears to be driven by an increase in the number of nurses coming from outside California. Figure 4.10 displays the percent of new licenses issued by the source of education. The percent of new licenses issued to those educated in California declined each year from 1996 to 2001, while the percent getting a California license from out-of-state endorsement increased every year (with the exception of 1999) during that period. By 2002 out-of-state endorsements accounted for

roughly 50 percent of the new licenses issued. The greatest change occurred between 1999 and 2000, when the percent of new licenses going to those educated in California dropped from about 42 percent to 32 percent.

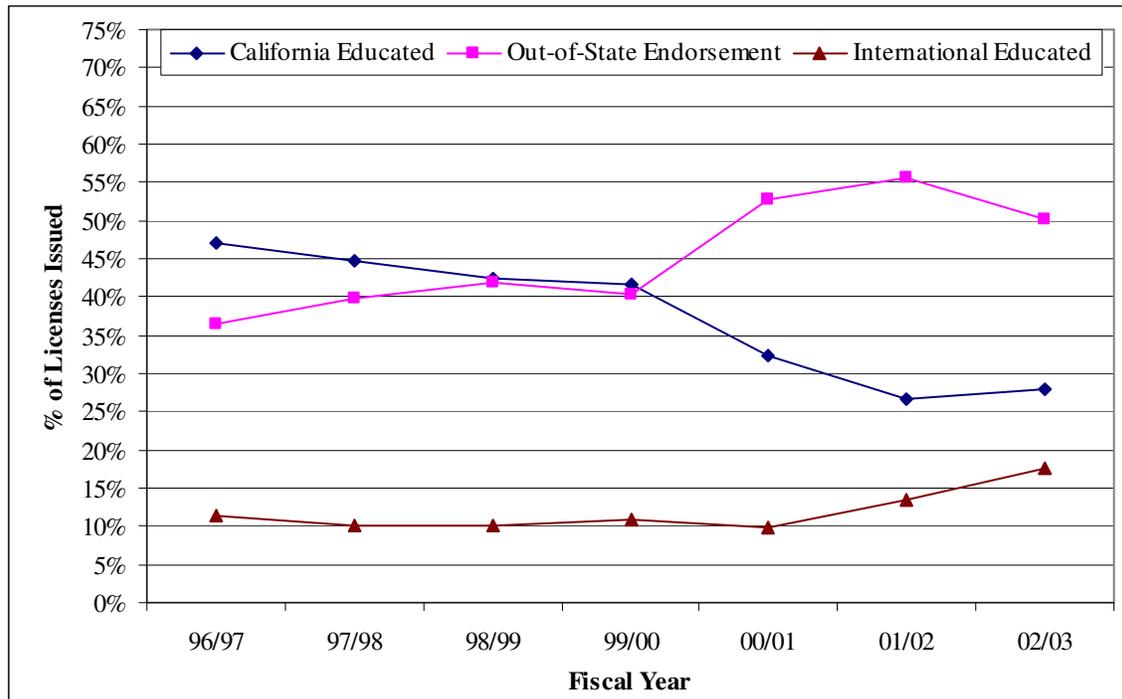
Nurses from other states who obtain California licenses might not live or work in California. Some of these nurses might be thinking about moving to or working in California, but never do so. Others are traveling nurses, who live in another state but work in California periodically. In April 2005, 43,568 RNs had active California licenses but lived in other states or countries. The 2004 BRN Survey of Registered Nurses found that 25 percent of RNs who live outside California reported working in California in the previous year. If this rate is representative of all out-of-state RNs, about 10,848 RNs traveled to California for temporary work in 2004 (Spetz & Dyer, 2005).

**Figure 4.9: Number of RN Licenses Issued in California, 1992-93 to 2002-03**



Source: California Board of Registered Nursing.

**Figure 4.10: California RN Licenses Issued by Source, 1996 to 2003**



Notes: The percentages for a given year do not add to 100 percent because smaller sources are excluded from the figure, such as out-of-state educated individuals taking the RN exam in California.  
 Source: California Board of Registered Nursing

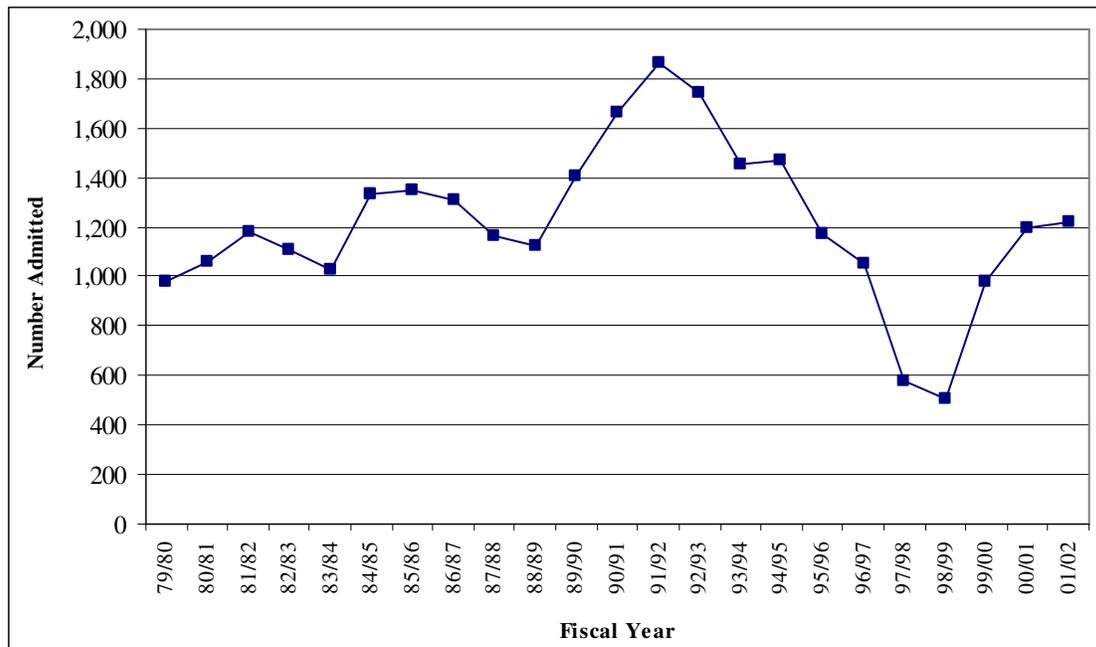
The percent of new licenses going to internationally educated nurses was fairly stable during the 1990s but increased between 2001 and 2003. From 1996 to 2000, about 10 percent of new licenses went to internationally educated nurses. By 2002, the share increased to over 15 percent (see Figure 4.10). Data from the U.S. Immigration and Naturalization Service show a similar pattern: the number of registered nurse immigrants admitted to California declined drastically in the 1990s (see Figure 4.11), after increasing throughout the 1980s. However, the number of registered nurse immigrants increased from 2000 through 2002.

Changes in U.S. immigration policy are partially responsible for the fluctuation in foreign nurses entering California as temporary workers. As the high-tech economic boom of the late-1990s got underway a greater proportion of temporary worker visas (H1-B visas) went to computer science occupations and less went toward health care occupations. At the same time, the H1-A visa category reserved for nurses expired in

1997. In response to the current nursing shortage, Congress passed the Nursing Relief for Disadvantaged Areas Act (NRDAA) in 1999. The NRDAA provides up to 500 H1-C visas per year for registered nurses working in health professional shortage areas. While the H1-C visa category replaces the H1-A visas, it is limited due to the cap and restriction to shortage areas. The H1-C visas expired in 2005, but have since been reinstated.

The shift from California-educated sources of registered nurses to out-of-state sources suggests that in a tight labor market California has looked to import labor in the short run. California’s ability to increase its “domestic” production of registered nurses is constrained in the short run by the capacity levels of California’s education system and the time lag associated with education and training.

**Figure 4.11: Nurse Immigrants Admitted to California, 1979 to 2002**



Notes: Number of registered nurse immigrants reflects the number of immigrants admitted to the U.S. as legal permanent residents that reported registered nurse as their occupation and reported California as their intended state of residence. For FY 82/83, data on occupation were not reliable, so we estimated the number admitted based on the numbers in the previous and subsequent years.

Source: Immigrants Admitted to the United States, Immigration and Naturalization Service, U.S. Department of Justice, annual files (1980-2002).

### *Occupational Choice In the U.S. Economy*

Growth in the domestically-educated nursing workforce begins with interest in the nursing profession. For the first part of the 20<sup>th</sup> century, licensed nursing was one of a few occupations widely open to women. Most women faced limited career choices, and nursing was an attractive option to women who were interested in science. As career opportunities expanded for women in the second half of that century, however, nursing had to compete with numerous other attractive professions for new entrants. It has been suggested that women now are less likely to choose a traditionally female-dominated career such as nursing (Buerhaus, Staiger, and Auerbach, 2000). However, an annual survey of 350,000 first-year college students across the U.S. found that the percent of students planning on a career in nursing remained steady at five percent between 1966 and 1996 (Astin, 1998).

Several factors affect interest in the profession of nursing. Perhaps foremost is the image of nursing relative to that of other professions. In the 1990s, nursing's reputation suffered as nurses complained about low staffing levels, diminished pay, and poor working conditions (Buerhaus and Staiger, 1999). In response to concerns that the declining image of nursing would contribute to long-term nursing shortages, several efforts were launched to attract people to the nursing profession. The most visible of these campaigns has been that of the Johnson & Johnson Corporation, which has produced television commercials and advertising posters and distributed them nationally. Johnson & Johnson also has hosted fundraising events for student scholarships and nurse faculty development. Other, more localized efforts have involved the development of web pages to promote nursing and provide information for prospective students about nursing opportunities (Coffman, Spetz, Seago, et al., 2001). One example of this is the Coalition for Nursing Careers in California (CNCC), an organization formed by health care providers and educators. CNCC has actively promoted nursing in California through its web site ([www.choosenursing.com](http://www.choosenursing.com)), posters, flyers, and "Nurse Ambassador" program, which provides resources for nurses to promote the occupation at local schools and career fairs.

Recent research has found that the image of the nursing profession compares favorably to other professions among college students taking introductory science

courses. UCSF researchers surveyed students taking courses that are prerequisite courses for RN education in the Central Valley region of California. They asked students about their perceptions of the occupations of nursing, physical therapy, medicine, and high school teaching. Students rated nursing above physical therapy and high school teaching for good income potential, job security, prestige and status, interesting work, and flexibility in work schedule (Seago, et al., 2006). Unsurprisingly, students rated medicine higher than nursing in these categories. Nursing fared unfavorably in the areas of risk of injury and ability to work independently. Sixteen percent of survey respondents think the statement “women are better suited to this profession” definitely applies to nursing, compared with six to nine percent for the other professions. Even though students have a positive view of nursing, there are problems with the image of nursing that must be overcome to recruit more people into the profession.

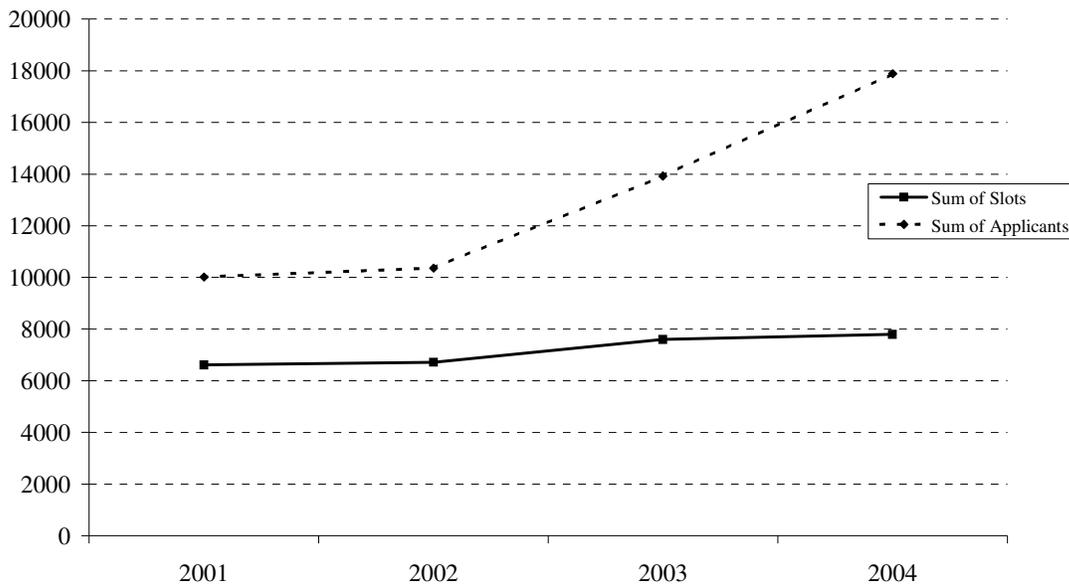
The salaries of nurses relative to other professions also affect the flow of students into nursing (Spetz and Given, 2003). In the mid-1990s, nursing wages in California did not keep pace with inflation (Spetz, 1998; Spetz and Given, 2003), and declined relative to other professions. In general, when the economy is growing and wages are rising more rapidly in other fields than in nursing, nursing schools observe declines in applications (Spetz and Given, 2003). During recessions, when nursing wages are relatively high and unemployment rates for nurses are low, interest in nursing schools grows. Over the past few years, substantial growth in starting RN wages have been reported: inflation-adjusted median RN wages increased 13 percent between 1997 and 2000, and starting RN wages increased 5.7 percent between 2000 and 2002 (Robinson, 2002; U.S. Bureau of Labor Statistics, various years). As shown in Figure 4.12, there has been a concordant rise in applications to nursing schools, which is mirrored by national trends (Maher, 2003). In fact, the number of applications in California has soared above the number of admission slots available in nursing programs.

Many people who pursue nursing education are older than the traditional student who matriculates to colleges immediately after high school. In the 2004-2005 academic year, only 26 percent of California RN graduates were age 25 or younger. Figure 4.13 presents historical data on the age distribution of RN graduates; the 2004-2005 survey reported different age categories and thus the data cannot be compared with previous

years. Over the past several decades, the average age at which RNs complete their basic nursing education has been steadily increasing. National data show that the average age at graduation was 23 years in 1988, and by 1996 it had increased to 34 (Bureau of Health Professions, 2002).

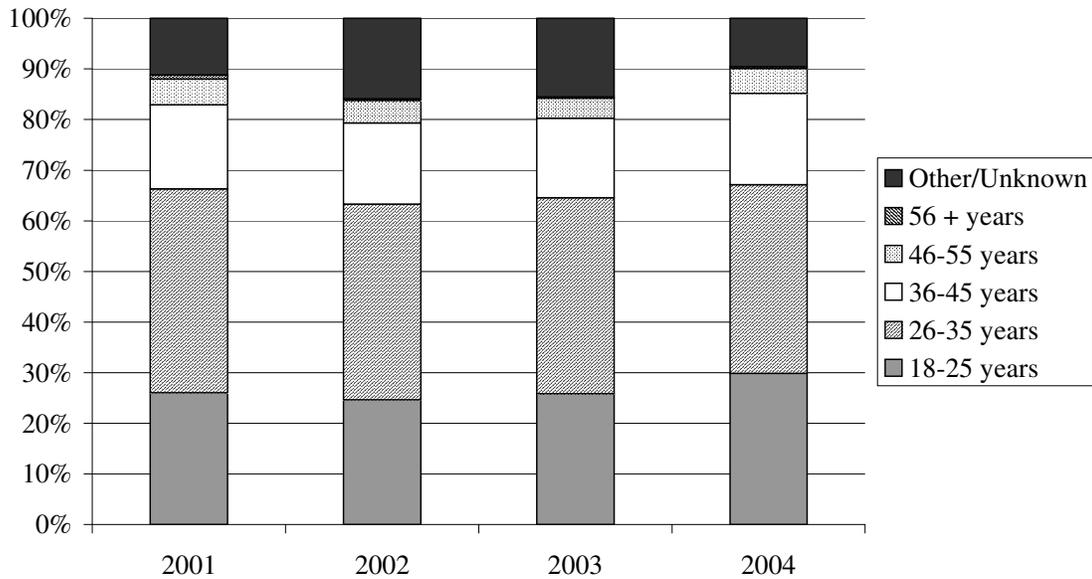
In addition, 13.6 percent of nurses obtained some other non-nursing degree before their nursing education (Bureau of Health Professions, 2002). Most of these nurses had majored in a health-related field (27.3 percent), but 20 percent were liberal arts majors and high shares had science (14.4%) or business (10.5%) degrees. Nursing appears to be particularly attractive as a “second career” and less attractive to students completing high school.

**Figure 4.12: Admission Slots Available in RN Education Programs, and Applications to Programs, 2000-2001 through 2003-2004**



Source: California Board of Registered Nursing

**Figure 4.13: Age Distribution of Graduating Students, All Regions in California, 2001-2004**



Source: California Board of Registered Nursing Annual Schools Reports, 2001-2004

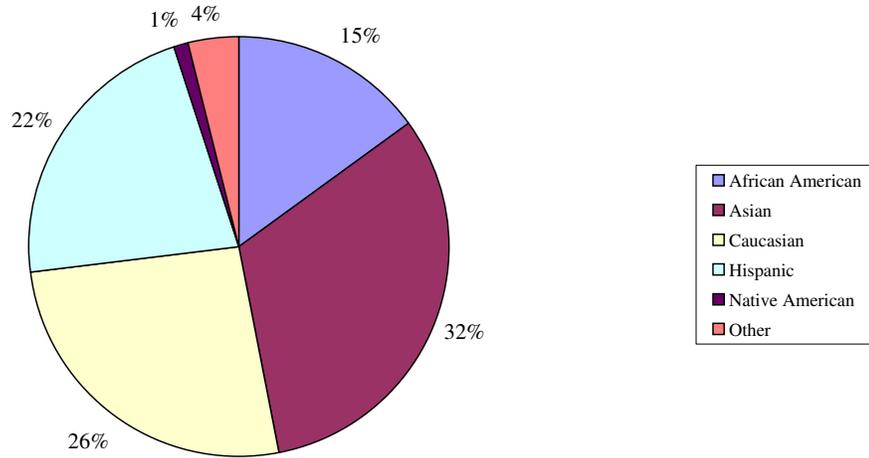
*Nursing Education and Licensure in California*

◆ **Licensed Vocational Nursing Education**

California’s 136 LVN education programs are found in five different settings: community colleges, adult education programs, private schools, regional health occupation centers, and hospitals. There has been rapid growth in the number of LVN education programs in California. Since 2001, more than 50 new programs have opened. An additional 42 programs have been approved recently, and 56 proposed programs are in development. In the 2004-2005 academic year, LVN programs admitted 10,278 students. Figure 4.14 shows the ethnic and racial mix of students admitted to LVN programs, based on data provided by the California Board of Vocational Nursing and Psychiatric Technicians.

LVN education programs require 12 to 14 months of full-time study or 18 to 20 months of part-time study to complete. The programs include both didactic (classroom) education and clinical education, with clinical education occurring in hospitals, nursing homes, and other clinical settings.

**Figure 4.14: Racial/Ethnic Distribution of Newly Enrolled LVN Students, 2004-2005**



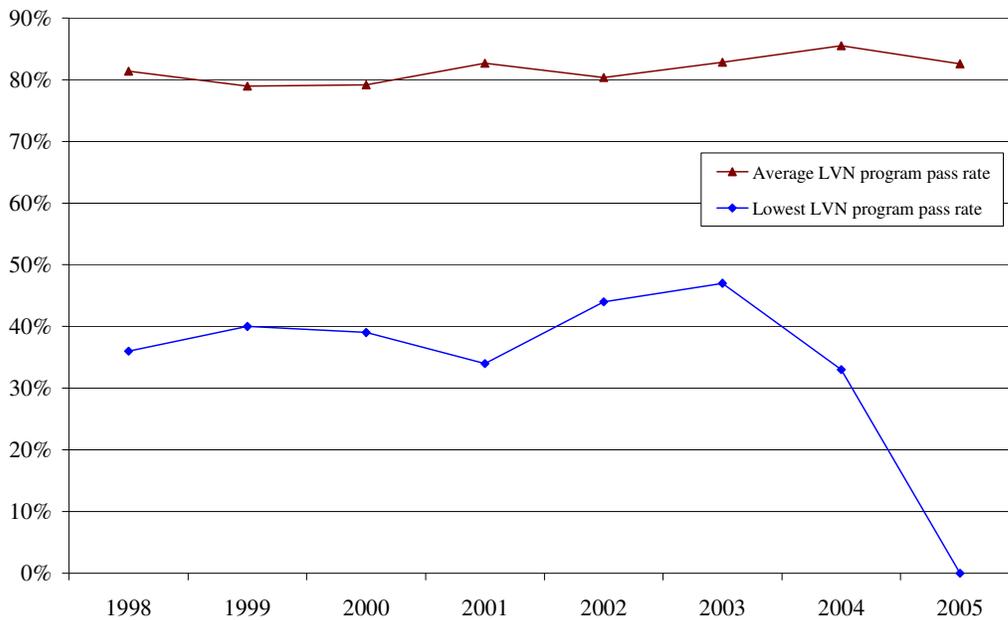
Source: California Board of Vocational Nursing and Psychiatric Technicians

In order to practice as a licensed vocational nurse, a person must first successfully complete the examination approved by the Board of Vocational Nursing and Psychiatric Technicians (BVNPT). The required examination is the National Council of State Boards of Nursing Licensing Examination for Practical Nurses (NCLEX-PN). Without passing the NCLEX, one is not a licensed nurse, even if one has completed a nursing program. New graduates can obtain a six-month interim nursing license to practice until they have attempted the exam the first time. If the new graduate does not pass the exam on the first attempt, the interim permit is revoked and the graduate cannot practice until they pass the examination.

First-time pass rates on the NCLEX-PN vary widely. As seen in Figure 4.15, LVN programs had an average 82.6 percent first-time pass rate in 2005. Pass rates have improved slightly over the past 8 years. The lowest pass rate for approved LVN programs was 0 percent in 2005, but in most years the lowest rate is between 30 and 40 percent. Twenty-four LVN programs had 100 percent pass rates. Over time, average NCLEX first-time pass rates have remained relatively stable.

The most common way of obtaining a license as a vocational nurse is by completing an approved LVN (or out-of-state LPN) education program and passing the NCLEX-PN exam. However, a person can take the Board exam without studying in an LVN or LPN education program. After completing 54 hours of study in pharmacology, obtaining 51 months of paid bedside nursing experience, and demonstrating skill proficiency, the BVNPT allows a person to take the exam to obtain a license. In addition, former military medical corpsmen can take the exam after 12 months of active duty experience providing bedside care, completion of the basic course in nursing in the armed forces, and honorable discharge from the military.

**Figure 4.15: First-Time Pass Rates on the NCLEX-PN Exam**



Source: California Board of Vocational Nursing and Psychiatric Technicians

The basic LVN license in California does not allow LVNs to start intravenous drips or draw blood. AN LVN must demonstrate competency in these tasks to receive special certification to perform them. Classes are offered to fulfill the requirements, and often the material is combined into a single class. Some LVN education programs include this additional coursework in their curriculum, while other programs require the student to pursue additional education after licensure.

Many of California's LVN programs are accredited by the National League for Nursing or another accreditation board. Accreditation by a national organization is not required by the California Board of Licensed Vocational Nursing and Psychiatric Technicians (BLVNPT), which approves all LVN programs in California. The BLVNPT also approves faculty who teach in LVN programs. Faculty must have a minimum of a baccalaureate degree in nursing and an active RN license. The BLVNPT prefers that faculty have master's degrees. The Board of Vocational Nursing and Psychiatric Technicians can consider NCLEX pass rates in their decisions to accredit and reaccredit nursing programs.

LVN programs vary widely in cost, with adult school, regional health occupation center, and community college programs charging nominal tuition, and private schools charging thousands of dollars. Financial aid is available through a variety of federal and state programs, and schools actively assist students in obtaining grants and loans. The most significant cost to a student in a publicly-funded LVN program is the time the student must take away from paid work to pursue education. This short-term "opportunity cost" can be significant, but the relatively high earnings of LVNs outweigh this cost in the longer term.

#### ◆ **Registered Nursing Education**

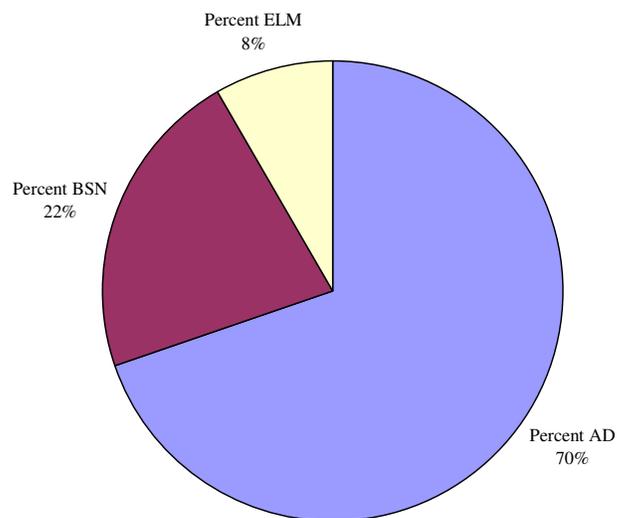
##### *An overview of pre-licensure RN education*

Registered nursing education programs fall into two categories: pre-licensure, taken before licensing as an RN, and post-licensure. In California, 109 programs prepare students at the pre-licensure RN level, 76 of which are associate degree (AD) programs. The baccalaureate of science in nursing (BSN) is offered by 24 programs, and 9 programs offer an entry-level master's (ELM) degree in nursing (Figure 4.16). California has no

diploma programs in nursing; these programs have been on the decline throughout the United States for the past fifty years.

After completing an approved basic RN education program, a graduate must take a board examination offered by the National Council of State Boards of Nursing (NCSBN), called the National Council Licensing Examination – Registered Nursing (NCLEX-RN). New graduates are issued temporary RN licenses that are valid for 6 months, or until examination results are available. As with LVNs, a nursing program graduate does not receive a regular RN license until passing the NCLEX-RN examination. Under certain circumstances, an individual may challenge the NCLEX-RN exam. Such a challenge is most frequently made by former military medical corpsmen with substantial experience. Approval must be obtained from the BRN, however, in order to receive a registered nurse license without completing an approved basic education program.

**Figure 4.16: Types of RN Education Programs in California, 2004-2005**



Source: Board of Registered Nursing, 2004-2005 Annual Schools Report

RN education programs are independent of each other, and they have different prerequisites, graduation requirements, and curricula. RN education is similar to LVN education in that it includes both didactic and clinical components. All RN programs must be approved by the Board of Registered Nursing for graduates of the programs to be eligible for licensure in California. The BRN also approves all faculty who teach in RN education programs. Faculty must have a master's degree in nursing, although a PhD is preferred.

Associate degree pre-licensure programs often are dubbed "two-year nursing programs," but this characterization is false (Seago and Spetz, 2003). AD programs require anywhere from 36 to 63 semester units for completion, after matriculation to the program. In order to be admitted to an AD program, a student must pass 4 to 27 units in prerequisite subjects such as biology, chemistry, anatomy, mathematics, and English. One to two years of study are thus required before entry into nursing education, leading to a total of three or more years to complete the AD in nursing.

A small number of students pursue an option to take the nursing board exam in California after completing 30 units of nursing coursework. Some community colleges offer this option, which does not lead to a degree in nursing, and licenses granted under this option are not transferable to other states. Most people enrolling in this option already have an LVN license. Fewer than 70 students completed this option in the 2004-2005 academic year (California Board of Registered Nursing, 2005).

Baccalaureate pre-licensure programs in nursing are designed to last four years, but some students require more than four years to complete the programs because they have difficulty enrolling in all the required courses at overcrowded campuses. BSN programs include the same curricula as do AD programs, with the addition of upper-division nursing courses such as public health, epidemiology, research methods, community health, and nursing theory. In addition, BSN students must complete all the general education requirements associated with baccalaureate education. A few baccalaureate programs offer accelerated options for students with another bachelor's degree or extremely high grades. For example, San Jose State University offers an accelerated baccalaureate curriculum for 30 students per year, through a 3-year grant

awarded by the Gordon and Betty Moore Foundation. Students must have demonstrated high academic achievement, and area hospitals fund students' course tuition in exchange for a commitment to work for the hospital upon the student's licensure as a Registered Nurse.

The third type of educational program through which one can obtain an RN education in California is the entry-level master's (ELM) program. These programs are for students who have already obtained a bachelor's degree in a non-nursing field. Five programs are in the San Francisco region, one is in San Diego, and three are in the Los Angeles area. ELM students usually complete basic didactic and clinical training in one year of full-time study, at which time students may take the NCLEX exam to obtain an RN license. This portion of their education is essentially the same as the 30-unit option. The subsequent years of their education focuses on master's degree coursework and training. After completion of the master's degree requirements, the student receives a Master's of Science in Nursing. Admission to these programs is very competitive. In the 2004-2005 academic year, there were 876 qualified applicants to entry-level master's programs, but only 400 slots were available.

Public colleges and universities play an important role in RN education. Only 18 entry-level RN education programs are in private colleges; the rest are in community colleges, the California State University system, and the University of California system. In the 2004-2005 academic year, 86 percent of California's RN graduates were educated in public college and university programs. Private colleges and universities charge many thousands of dollars per year tuition, while state-funded nursing programs are substantially more affordable for students.

Nursing students can access a small but growing variety of distance learning and non-traditional programs for entry-level RN education. About 30% of nursing programs offer nursing classes at off-site locations, according to a 2004 survey of nursing deans and directors.<sup>2</sup> Of the programs that offer off-site classes, about half provide their off-site courses through the Internet and/or Interactive Video conferencing. Other programs offer RN education at hospitals or other educational facilities.

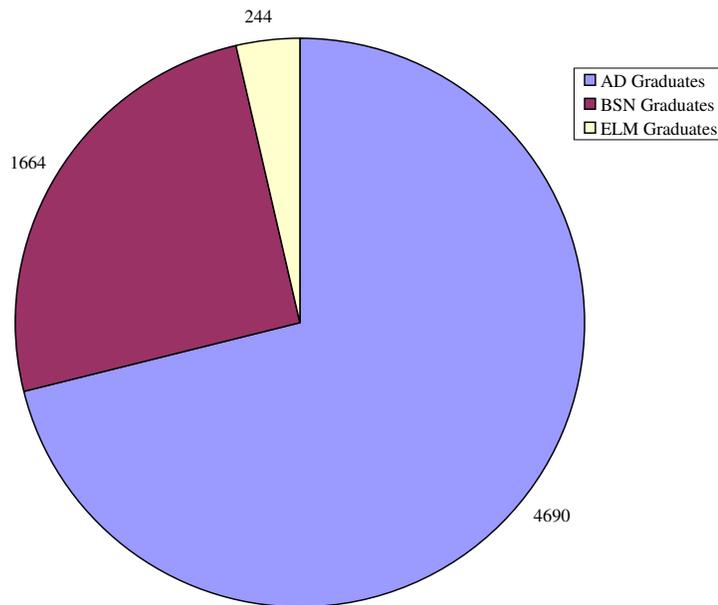
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<sup>2</sup> More information about this survey, which was conducted by the Hospital Association of Southern California, is provided below.

*Admissions and Graduations from California's RN Education Programs*

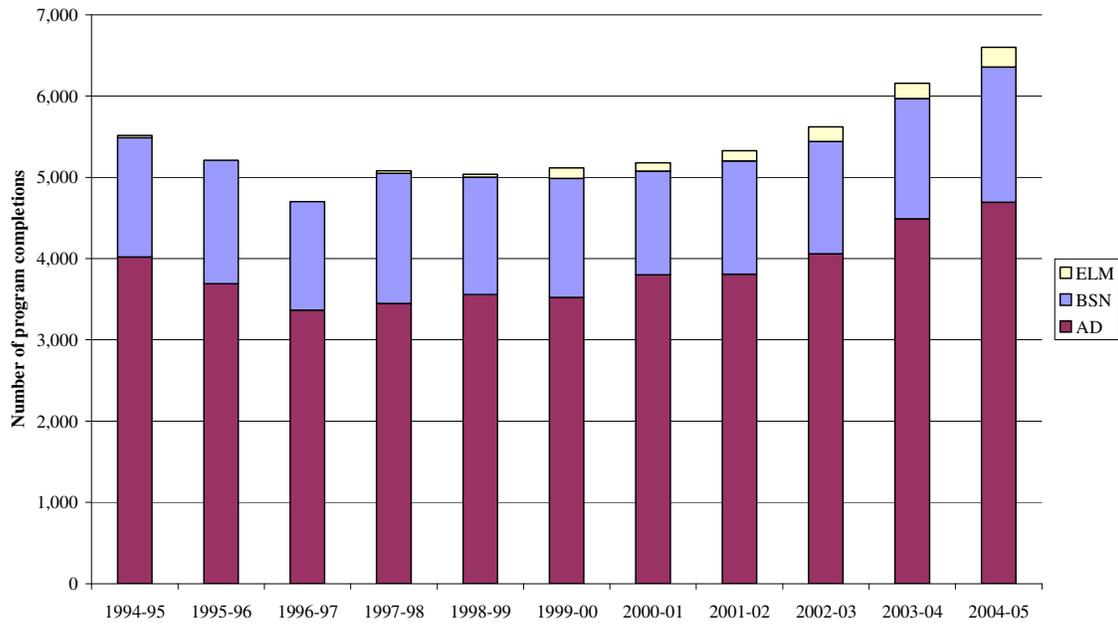
In the 2004-2005 academic year, 6,598 students completed California RN pre-licensure programs (California Board of Registered Nursing, 2005). Figure 4.17 presents the total completions from RN programs in the 2004-2005 academic year by type of program, and Figure 4.18 provides total completions over time; as seen in this figure, there has been a significant increase in the number of graduating nurses over the past five years. Growth in graduations is likely to continue for the next few years, because the number of admission “slots” available in nursing education programs grew from 6,610 in 2000-2001 to 8,890 in 2004-2005 (Figure 4.19). Growth in admissions will lead to increasing graduations two to four years later.

**Figure 4.17: Graduations from RN Education Programs in California, 2004-2005 Academic Year**



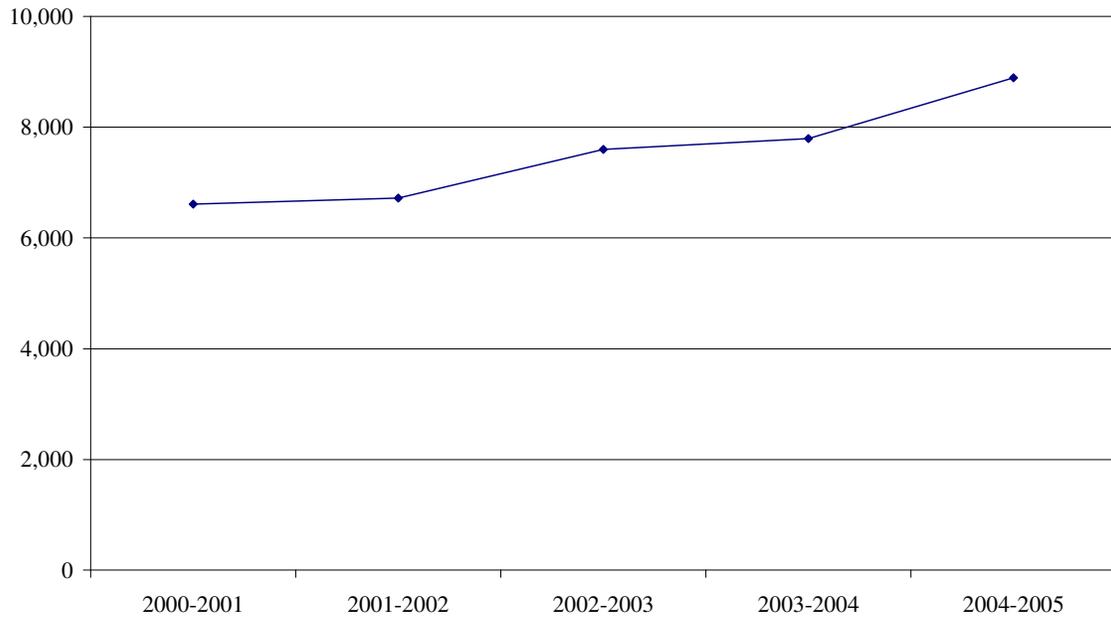
Source: California Board of Registered Nursing, Annual Schools Survey, 2005.

**Figure 4.18: Completions from California Registered Nursing Programs, 1994-1995 through 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.19: Spaces Available for Admissions to California Registered Nursing Programs, 2000-2001 through 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey

Growth in graduations could be even higher, because there are many more applicants to nursing programs than admission slots. Most nursing education programs cannot admit all qualified applicants due to space limitations (Coffman et al., 2001; CA Board of Registered Nursing, 2005). In the 2000-2001 academic year, there were over 10,000 applications for 6,610 slots; in the 2003-2004 academic year, there were 19,771 applications for 8,890 slots. It is not known how many students were unable to find a slot at *any* campus. The count of applicants is not unduplicated; some individuals appear multiple times if they applied to multiple programs. Due to the increasingly competitive nature of nursing programs, applicants may be submitting applications to several schools in order to secure admission into a nursing program. Since the data represent applications rather than individuals, the increase in qualified applications may not represent an equal growth in individuals applying to nursing school.

As seen in Figure 4.20, public RN programs had the lowest admission rates, admitting an average of only 41 percent of qualified applicants. Community college associate degree programs had 13,468 applicants for 5,609 slots, offering an admission rate of only 41.6 percent. California State University nursing programs had an even lower admission rate of 39.7 percent, and public entry-level master’s programs had an admission rate of 35.5 percent. Private associate degree programs had the highest admission rate (96.1%), but these programs offered only 522 slots statewide.

**Figure 4.20: Applications and Admission Slots by Type of RN Program, 2004-2005 Academic Year**

	AD programs		BSN programs		ELM programs	
	Public	Private	Public	Private	Public	Private
Number of Applicants	13,468	543	3,529	1,355	470	406
Number of Slots	5,609	522	1,401	958	167	233
Admission Rate	41.6%	96.1%	39.7%	70.7%	35.5%	57.4%

Source: California Board of Registered Nursing, Annual Schools Survey, 2005

Many RN education programs report multiple reasons for their inability to accept all qualified applicants. In the 2004-2005 BRN Annual Schools Report, 82 programs reported that they could not admit more students because they did not have enough faculty. Whether this lack of faculty is the result of lack of funding to hire faculty, low wages that do not attract faculty, or a shortage of nurses qualified to be faculty is

unknown. Seventy-seven programs reported that they did not have enough placements available for clinical training, 76 specifically cited funding as a problem, and 63 did not have physical space to accommodate more students.

To learn more about these and other issues, we worked with the Hospital Association of Southern California (HASC) to survey RN program deans and directors in 2004. The survey data collected for NWI were combined with data collected earlier that year by HASC and the California Institute for Nursing and Health Care (CINHC). In total, 66 RN program deans/directors responded to one of the surveys. Deans and directors reported that the more important barrier to expansion of enrollment is the number of spaces available in nursing programs. Fifty-two percent of respondents gave this barrier the highest ranking available (5 on a 5-point scale). Another 19 percent ranked it a four out of five. Therefore, over 70 percent of deans and directors find this to be a strong factor in limiting increases in enrollment.

Other important reasons nursing programs have difficulty expanding are funding resources for faculty salaries, availability of qualified faculty for classroom instruction and lack of adequate clinical sites for student rotations. The distribution of scores for the availability of clinical and classroom faculty seemed uniform. Schools were a little more likely to report that faculty availability was a barrier to expansion. For classroom faculty, 32 percent reported it as a high degree of limitation, while 26 percent reported it to be a low degree. For clinical faculty, about 27% reported faculty availability to be a high degree problem, while 19 percent reported it to be a low degree problem.

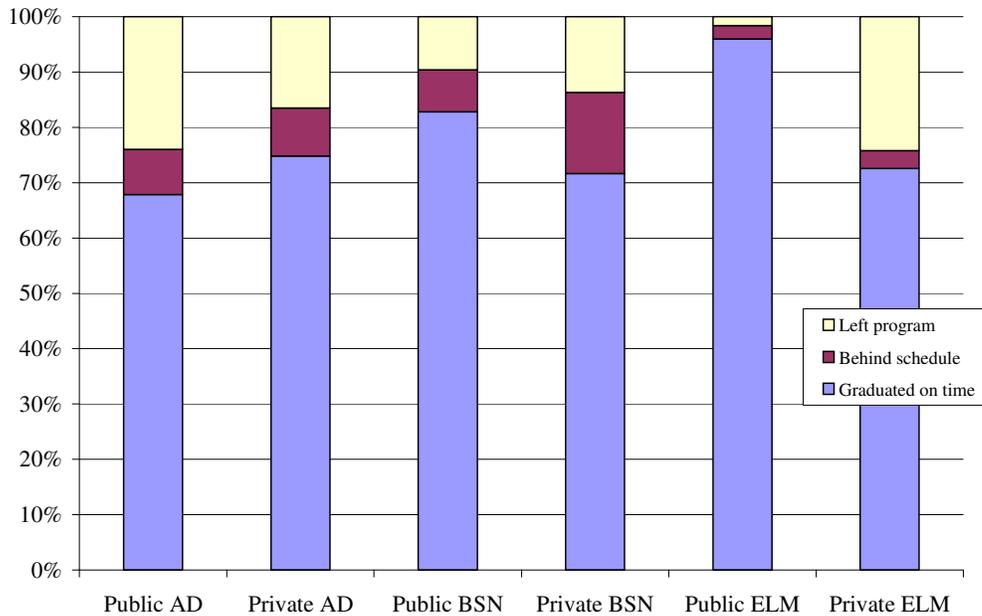
Factors least likely to be named by deans and directors as a barrier to expansion were availability of academically qualified students, college/university standards, support for nursing within the educational institution and student access to non-nursing courses within the college or university.

Admission requirements for entry into nursing programs are particularly important when there are more applicants than admission slots. Each education program establishes its own qualification standards. In most cases, nursing program applicants must pass a set of prerequisite courses with a specified minimum grade point average to be qualified for admission to the program. The HASC/NWI survey of deans and directors found that the majority of RN program applicants meet all admissions criteria.

Thirty-four percent of the deans reported that over 90 percent of their applicants met all admissions criteria in 2003-2004. Once a pool of qualified applicants has been identified, two general strategies can be used to allocate scarce admission slots: choosing the “most qualified” from the qualified applicants (“selective admissions”), or randomly selecting applicants from the qualified applicants. In general, BSN programs and private colleges use selective admission strategies, granting priority to students based on grade point averages, test scores, community service experience, and/or health care experience. In contrast, California’s community college system operates under the philosophy that all qualified students should have access to the educational resources of the college (Seago and Spetz, 2003). Thus, most community colleges have developed methods of admission such as waiting lists, lotteries, and enrollments for those who arrive first on registration day. These strategies favor students who are most perseverant and are willing to wait for a slot to become available for them.

The admission policies of community college RN programs have come under scrutiny in the past decade. The Los Angeles Times reported that some nursing programs have attrition rates as high as 50 percent (Leovy, 1999). The Board of Registered Nursing asks nursing programs to report the on-time completion, delayed progress, and attrition rates for the cohort of students that should have graduated that year (see Figure 4.21). Overall, programs reported that an average of 71 percent of their students completed their programs on time, with an average attrition rate of 20 percent. However, only 68 percent of students in community college programs graduated on schedule, and 24 percent left without completing. California State University RN programs report an 83 percent on-time graduation rate, and a 10 percent attrition rate. Private baccalaureate programs fare less well, with 72 percent graduating on time and 14 percent leaving without graduating. Entry-level master’s programs based in public universities boast an on-time completion rate of 96 percent.

**Figure 4.21: On-Time Completion, Delay, and Attrition Rates by Type of RN Education Program, 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey, 2005

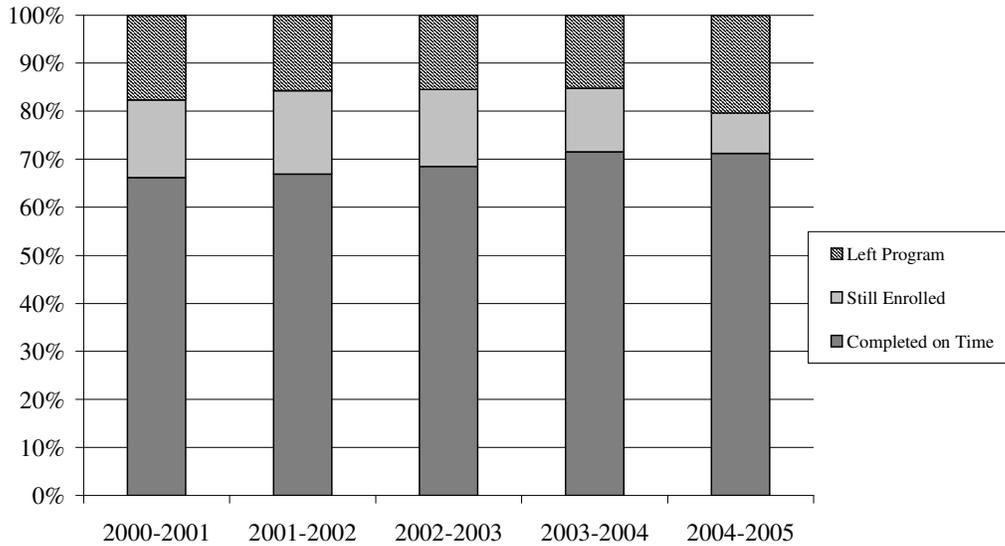
In the early 2000s, the California Community Colleges Chancellor’s Office (CCCCO) commissioned a study of whether student performance in prerequisite courses could predict ultimate success in RN education programs (Phillips, Spurling, & Armstrong, 2002). This study found that students with a higher overall grade point average, higher grades in English and core biology courses (anatomy, physiology, and microbiology), and the fewer repeated attempts to pass core biology courses had significantly higher RN program graduation rates than other students. In response to these findings, CCCCCO has established a process through which RN programs can analyze their own student success data and propose a more rigorous set of requirements for qualification for admission. Some community college nursing programs have completed this process. There was some improvement in on-time graduation rates from RN programs between 2000-2001 and 2003-2004, as seen in Figure 4.22. The on-time graduation rate did not change appreciably between 2003-2004 and 2004-2005, but the attrition rate appears to have risen. There was a revision to the BRN Annual Schools

Survey in 2004-2005, and the change in reported attrition might be the result of new wording for the questions about student success rates. Thus, one should not interpret these data as demonstrating an increase in attrition in the past year.

Nursing program deans have been asked about the primary reasons for student attrition. In the HASC/NWI survey of RN deans, the most highly-ranked reason for attrition is the inability of students to meet the academic challenges of the nursing program. The second most highly ranked reason is demands from families and jobs. The third most highly ranked reason is financial need. The 2004-2005 Board of Registered Nursing Annual Schools Report finds the same ranking of causes of attrition as the NWI survey.

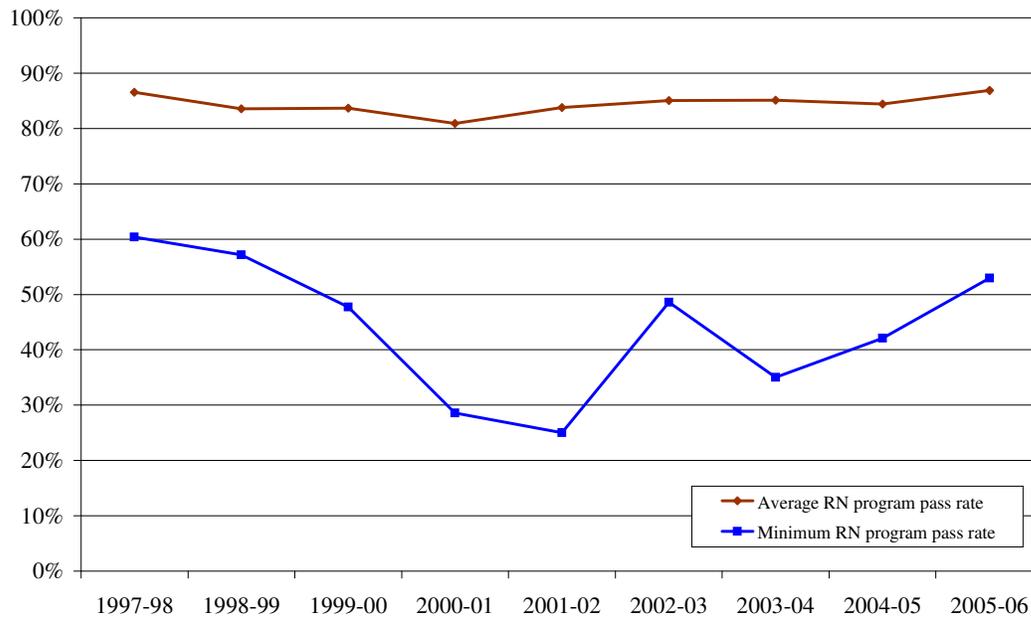
As with LVN programs, a graduate of an RN education program is not a registered nurse until the NCLEX examination has been passed. A new graduate of an RN program can obtain an interim nursing license that is valid for six months or until NCLEX scores are available; if the graduate does not pass on the first attempt, the student's interim permit is revoked. Figure 4.23 presents the average and minimum first-time pass rates for nursing education programs from the 1997-98 academic year through the 2004-05 academic year. First-time pass rates for the NCLEX-RN are usually a bit higher on average than those for the LVN exam, but this is not true for every year. In the 2000-01 and 2001-02 academic years, one school had pass rates below 30 percent. That school's rates, and statewide rates, have risen since those years. In the 2005-06 academic year, only four RN programs had first-time pass rates below 70 percent.

**Figure 4.22: On-Time Completion, Delay, and Attrition Rates for All RN Education Programs, 2000-2001 through 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey, 2001-2005

**Figure 4.23: First-Time Pass Rates on the NCLEX-RN Exam**

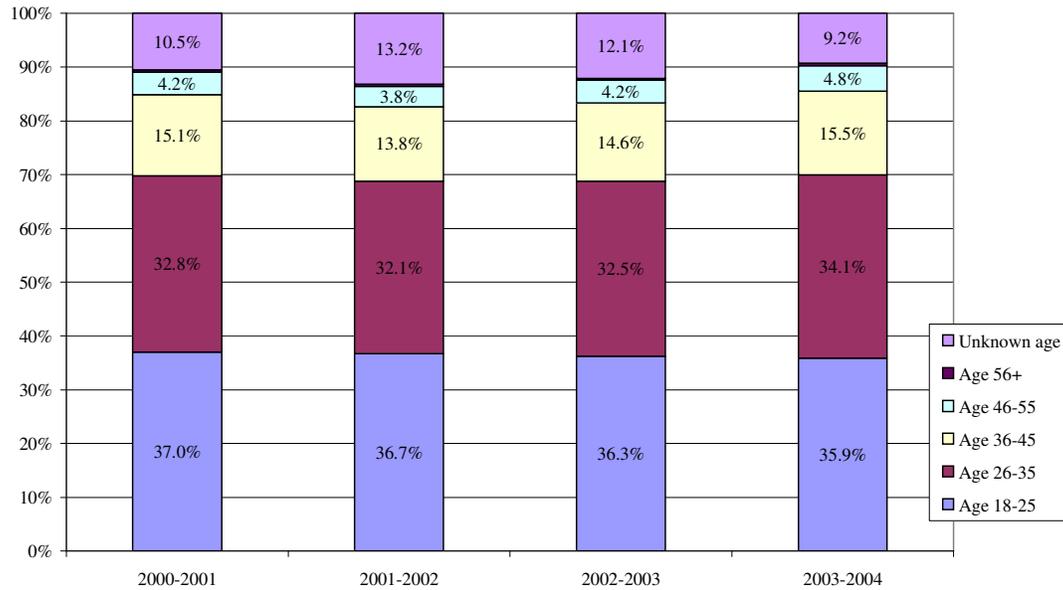


Source: California Board of Registered Nursing

### Demographics of RN Students and Graduates

The nursing population of California is diverse, and is becoming more so as new entrants to nursing programs represent a wider array of the population. Figure 4.24 shows the age distribution of newly enrolled RN students in California over a four-year period.<sup>3</sup> As can be seen in this figure, only 36 percent of new RN students were under 26 years old for the past few years. Approximately 34 percent were between 26 and 35 years, and the remainder were older or of unknown age. These data are consistent with the idea that many people choose to pursue RN education as a “second career”. Relatively few RN students are in the traditional model of seeking postsecondary education immediately after high school graduation.

**Figure 4.24: Age Distribution of Newly Enrolled RN Students, 2000-2001 to 2003-2004**



Source: California Board of Registered Nursing, Annual Schools Survey, 2004

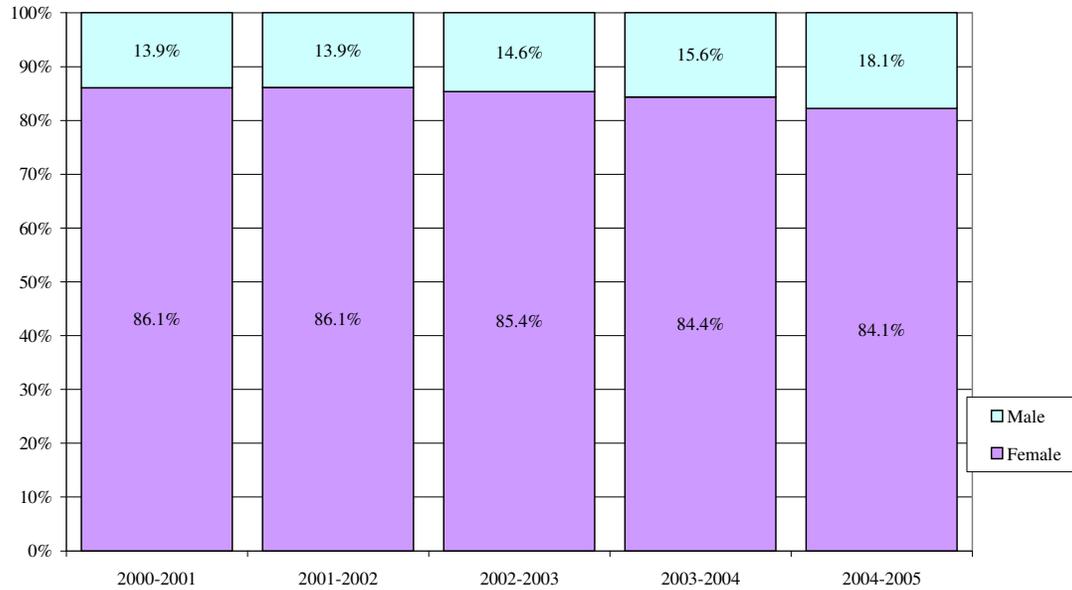
<sup>3</sup> The Board of Registered Nursing Annual Schools Report changed age categories for the 2004-2005 survey, producing data that could not be compared with previous years.

A growing share of California's RN students are men, as seen in Figure 4.25. As noted above, about seven percent of the state's RNs were male in 2004. However, in the 2004-2005 academic year, 18 percent of newly enrolled RN students were male. As these students graduate and enter the workforce, the share of men in the overall RN workforce will rise.

A majority of California's RN enrollees identify themselves as minorities, as seen in Figure 4.26. Only 43 percent were white in the 2004-2005 academic year. Hispanics were the next-largest group, representing 20 percent of new RN students in the 2004-2005 academic year. Although this share is much lower than that of the overall population of California, it foretells future growth in the share of RNs that is Hispanic. In 2004-2005, 13 percent of new RN students were Filipino, and 11 percent were non-Filipino Asian. About six percent of new RN students were African-American, and only one percent were Native American. The remaining seven percent were of unknown or "other" racial/ethnic origin.

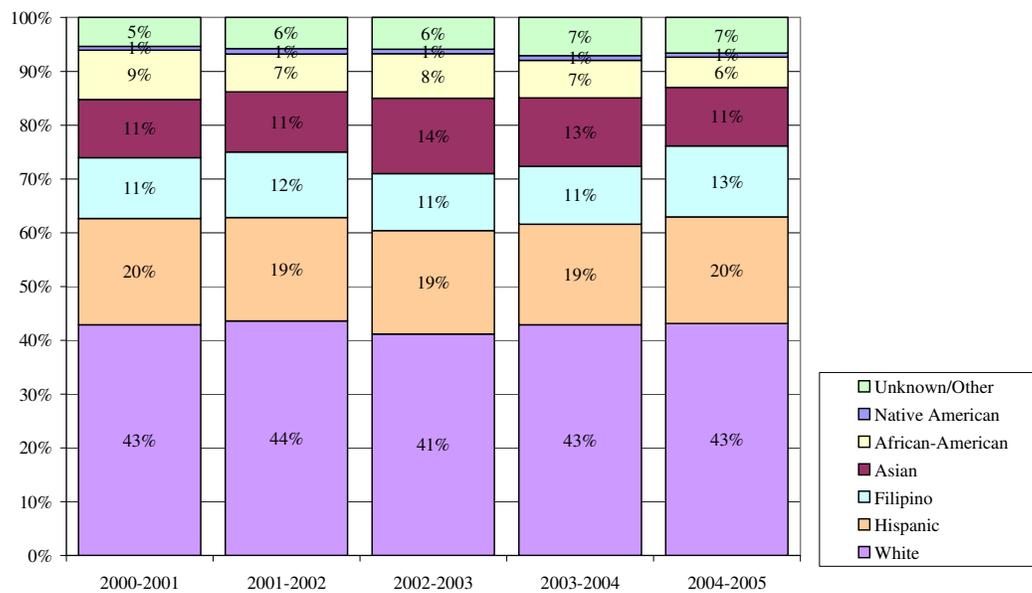
Figures 4.27 through 4.29 present age, gender, and racial/ethnic distributions of new RN program graduates from 2000-01 through 2004-05. These figures generally show the same trends as the enrollment data. The majority of RN graduates are over age 25, with 37 to 38 percent aged 26 to 35 (Figure 4.27). The share of male RN graduates rose between 2000-01 and 2003-04 from 12 to 14 percent, and retracted to 12 percent in 2004-05 (Figure 4.28). Finally, as seen in Figure 4.29, the racial and ethnic diversity of RN graduates closely resembles that of new enrollees.

**Figure 4.25: Gender Distribution of Newly Enrolled RN Students, 2000-2001 to 2004-2005**



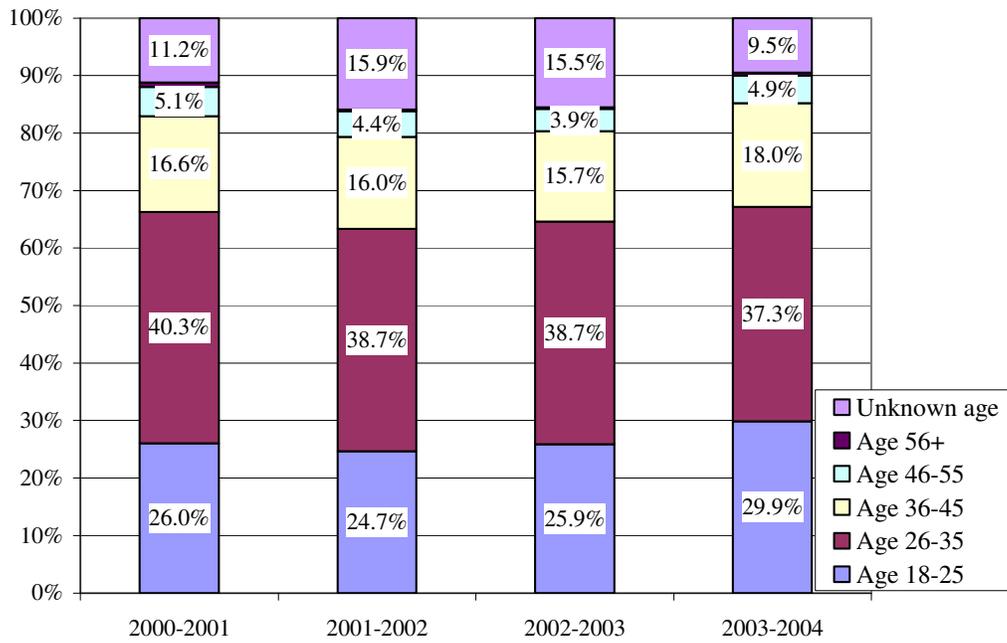
Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.26: Racial/Ethnic Distribution of Newly Enrolled RN Students, 2000-2001 to 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.27: Age Distribution of RN Program Graduates, 2000-2001 to 2003-2004**



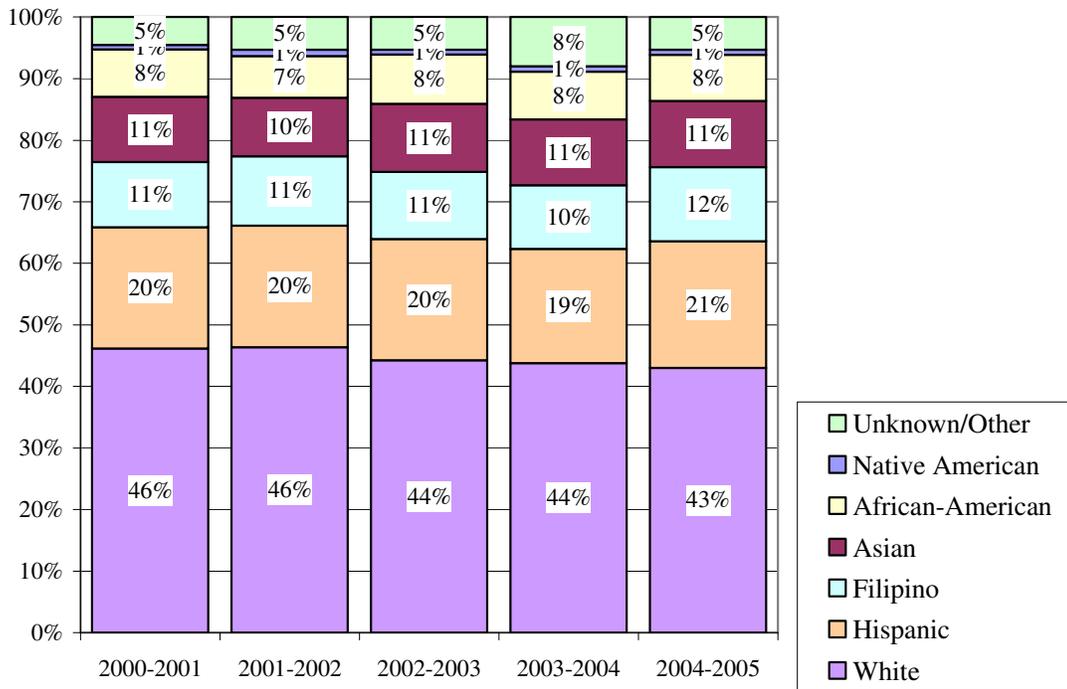
Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.28: Gender Distribution of RN Program Graduates, 2000-2001 to 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.29: Racial/Ethnic Distribution of RN Program Graduates, 2000-2001 to 2003-2004**



Source: California Board of Registered Nursing, Annual Schools Survey

◆ **Maintaining a nursing license**

LVN and RN licenses are renewed every two years in California. In order to renew a license, a nurse must complete 30 continuing education units (CEUs) and pay a renewal fee. Continuing education units are offered by a wide variety of organizations and educational institutions, in subjects ranging from clinical topics to alternative medicine to information about minimum nurse-to-patient ratios. Courses can be taken in a classroom setting, online, or at home. Attendance at some professional meetings and conferences can confer CEUs.

Registered nurses who do not complete continuing education can elect to renew their license in “inactive” status. These nurses pay the renewal fee but do not submit CEUs. This option usually applies to RNs who have retired from the profession. A nurse can reactivate his or her license upon presentation of proof of completion of CEUs.

The Boards of Vocational Nursing and Registered Nursing have the responsibility of ensuring that licensed nurses are practicing according to the laws of the State of California and the standards of the profession. Thus, these Boards receive, investigate, and resolve complaints lodged against individual nurses. Causes for loss of a nursing license include misuse of alcohol, use of illegal drugs, conviction of a crime related to the practice of nursing (such as embezzlement or child abuse), and inappropriate patient care. Nurses undergoing disciplinary action are listed in the Boards' newsletters and this information is made available to their employers and the public.

◆ **Post-licensure education**

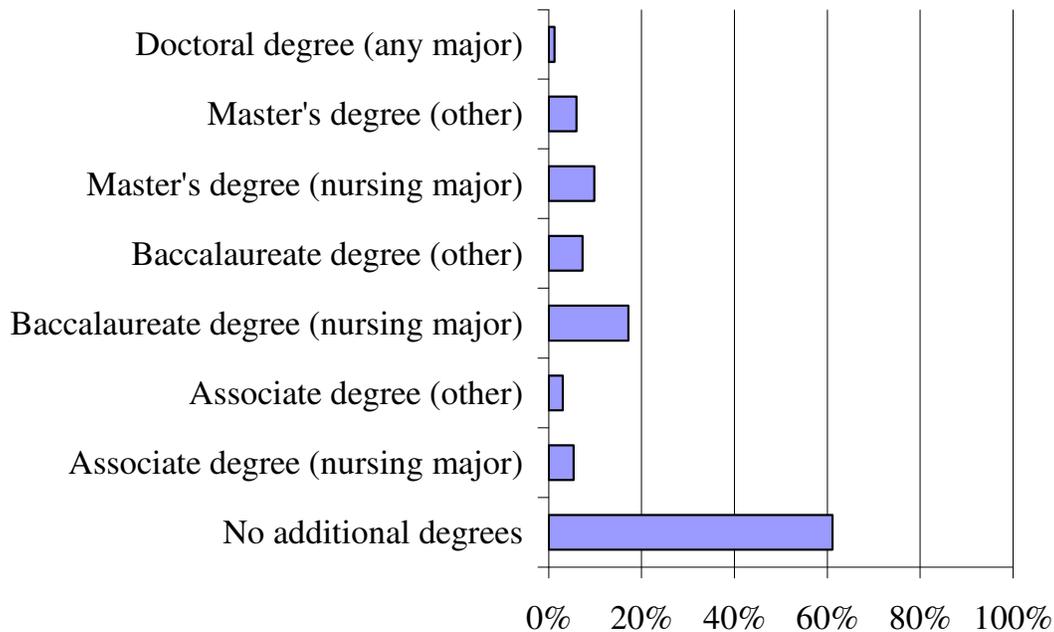
Some schools offer educational programs for students already licensed as vocational nurses who want to obtain RN licensure. LVN-to-RN programs are usually found in community colleges, although some are offered by private and baccalaureate colleges. Some LVN and RN programs are designed to work together, so students can obtain their RN license after an additional year of study. However, such seamless articulation is not universal; some LVNs must complete nearly the entire basic RN curriculum in order to become an RN. In general, vocational LVN programs do not result in a student having many credits to bring to an RN education program, whereas community college LVN programs are usually designed to articulate to the same college's RN program. According to the 2000 National Sample Survey of Registered Nursing, about 11 percent of California's RNs were previously licensed as LVNs or LPNs.

Approximately 39 percent of RNs in California received additional educational degrees after completing their primary nursing education, according to the 2004 Board of Registered Nursing Survey of RNs. As shown in Figure 4.30, the most commonly obtained degree after initial RN licensure is the Baccalaureate of Science in Nursing (BSN). Many schools offer specific programs for RNs with associate degrees to pursue a BSN. These programs are offered at California State University campuses and private colleges, and University of California, Los Angeles. Some AD programs have agreements with BSN programs to allow a large share of course credits received during AD education to be transferred into the BSN program. However, as with LVN-to-RN education, such articulation is not universal. Articulation agreements usually exist within

regions of the state, but students who move from one part of California to another might have difficulty transferring their course credits. According to the 2004-2005 Board of Registered Nursing Annual Schools Survey, 26 schools offer RN-to-BSN programs, 17 of which are public universities.

Graduate education in nursing consists of the master’s degree in nursing (MSN) and the PhD in nursing. About ten percent of California RNs have a MSN, and six percent have some other type of master’s degree. MSN programs offer nurses specialized education in clinical, educational, and management fields. Master’s degrees programs include fields such as nurse practitioner, certified nurse midwife, education, nursing administration, and informatics. After completion of some of these programs, a student may take an exam to obtain certification in a specialized field. The Board of Registered Nursing approves certification programs for nurse anesthetists, nurse-midwives, nurse practitioners, public health nurses, and various clinical nurse specialties.

**Figure 4.30: Additional Education Completed After Basic RN Education, for RNs Residing in California, 2004**



Source: California Board of Registered Nursing, Survey of RNs, 2004

Nurses can pursue doctoral education in a variety of fields. Nursing programs offer Doctorates of Nursing Science (DNSc) and PhDs. These programs are available in many of the same fields as are master's programs, but they emphasize research and require completion of a doctoral dissertation. Nurses who pursue doctoral education typically work as faculty or in top nursing administrative roles. Only 1.2 percent of California nurses have a doctoral degree.

According to the 2004-2005 Board of Registered Nursing Annual Schools Survey, there are at least 28 MSN programs offered in California.<sup>4</sup> Twelve California State University campuses offer the MSN, and California State University at Fullerton offers a Nurse Anesthesia program jointly with Kaiser Permanente. Ten private universities and colleges have MSN program. Three University of California campuses have master's programs: San Francisco, Los Angeles, and Davis. The UC, Davis, nurse practitioner program is operated by the School of Medicine. Only five schools reported that they offer a doctoral program in nursing.

Because post-licensure education does not involve receipt of a new nursing license, there is no centralized source of information about what share of nurses pursue post-licensure education in California. The BRN 2004 Survey of Registered Nurses can be used to estimate rates of obtaining additional education. According to these data, 13.6 percent of nurses whose basic education was the AD report a highest education level of BSN. Another 5.3 percent received a MSN. Among nurses whose primary education was the BSN, 13.6 percent later received a MSN.

#### ◆ **Nursing faculty**

The Boards of Registered Nursing and Vocational Nursing establish requirements for the faculty of RN and LVN education programs. Registered nurses and licensed vocational nurses may serve as faculty in LVN programs if they have a baccalaureate degree, valid teaching credential, basic requirements to teach in a community college or university in California, or one year of full-time teaching experience in an accredited RN, LVN, or psychiatric technician program. All LVN faculty must have at least two years of experience as an RN or LVN within the past five years.

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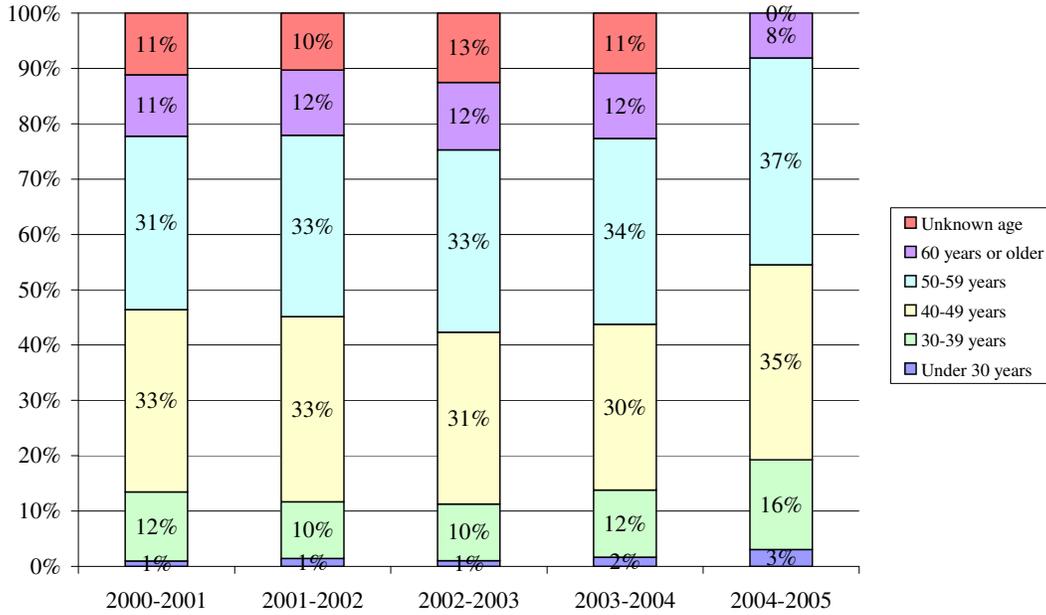
<sup>4</sup> Some programs did not respond to the survey, such as the University of Phoenix.

The requirements for RN faculty are more stringent than for LVN faculty. An RN instructor must have an active RN license, a master's or higher degree from an accredited college or university that includes coursework in nursing, education, or administration, at least one year's experience as an RN providing direct patient care, and completion of at least one year's experience teaching courses related to nursing or a course that includes practice in teaching nursing. Assistant instructors must have a baccalaureate degree that includes courses in nursing or in sciences relevant to nursing practice and at least one year's full-time experience in direct patient care practice as an RN. Clinical teaching assistants simply need to be RNs with at least one year's experience, within the previous five years, in direct patient care.

No data are available describing LVN faculty in California, but the BRN obtains some information about RN faculty in their Annual Schools Survey. Figure 4.31 presents the age distribution of RN faculty in California over the past five years. Nearly half of California's RN faculty is at least 50 years old. Registered nursing program faculty are predominately white women, as seen in Figures 4.32 and 4.33. Over 90 percent of RN faculty is female, and there has been no change in that share over the past five years. Figure 4.33 shows that approximately 75 percent of faculty are white. Seven percent were African-American in the 2004-2005 academic year, a drop from nine percent in 2000-2001. Filipinos, non-Filipino Asians, and Hispanics account for about five percent each of RN faculty.

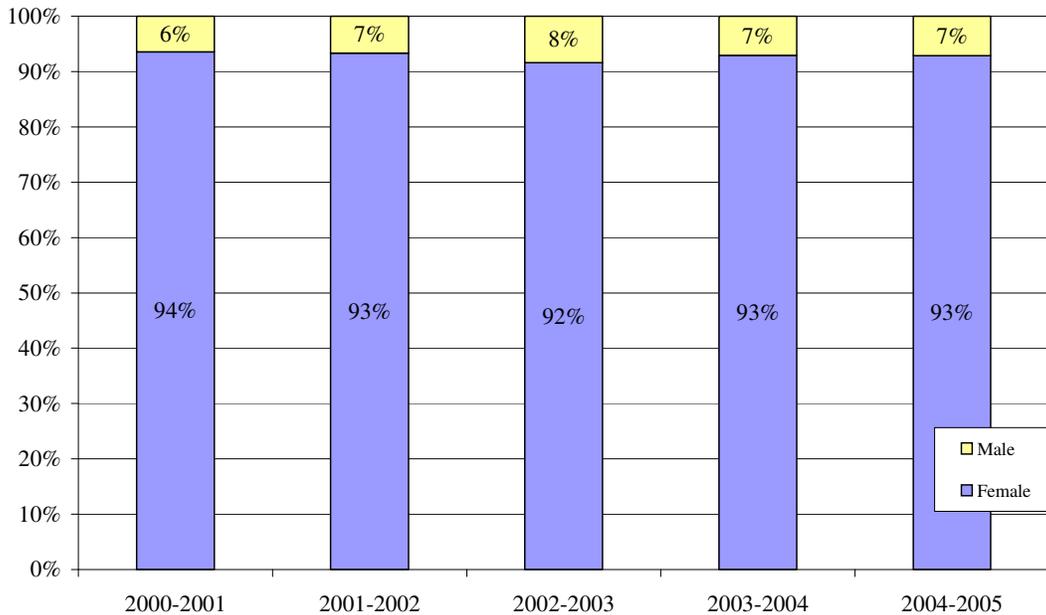
Many analysts believe there is now a shortage of nursing faculty throughout the United States, which will worsen dramatically in the future without action to increase the number of RNs with graduate degrees and to raise faculty salaries (Yordy, 2006; American Academy of Colleges of Nursing, 2003). As seen in Figure 4.31, a large share of RN faculty is approaching retirement age. At this time, the data do not indicate a severe shortage of RN faculty in California, as seen in Figure 4.34. In the 2004-05 academic year, RN programs reported a total of 94 vacancies, resulting in a vacancy rate of 3.9 percent. Future expansion of RN programs to meet burgeoning demand for nurses may drive the vacancy rate higher, and a shortage of faculty may emerge.

**Figure 4.31: Age Distribution of RN Program Faculty, 2000-2001 to 2004-2005**



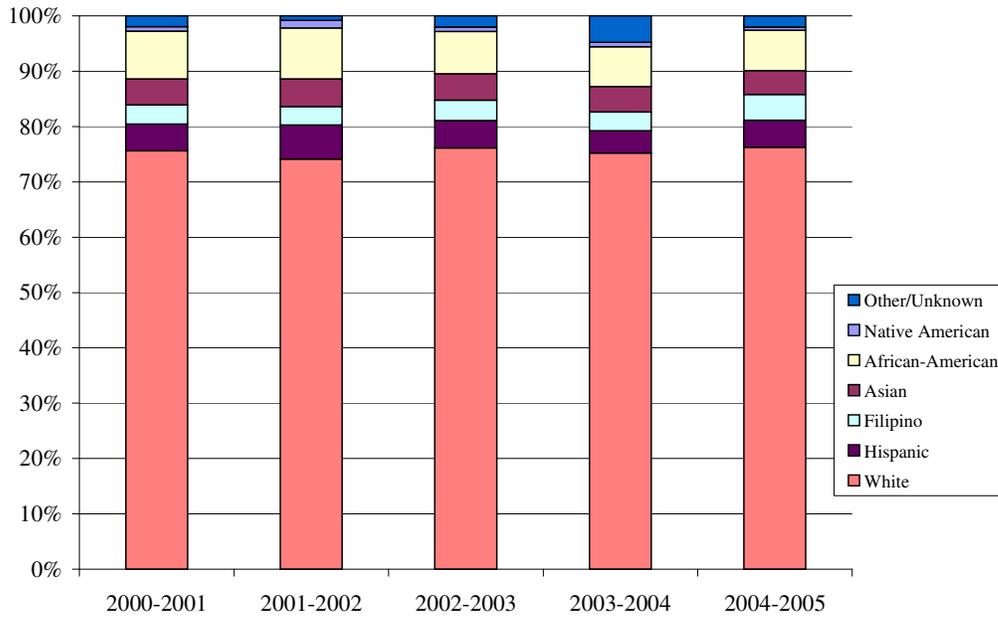
Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.32: Gender Distribution of RN Program Faculty, 2000-2001 to 2004-2005**



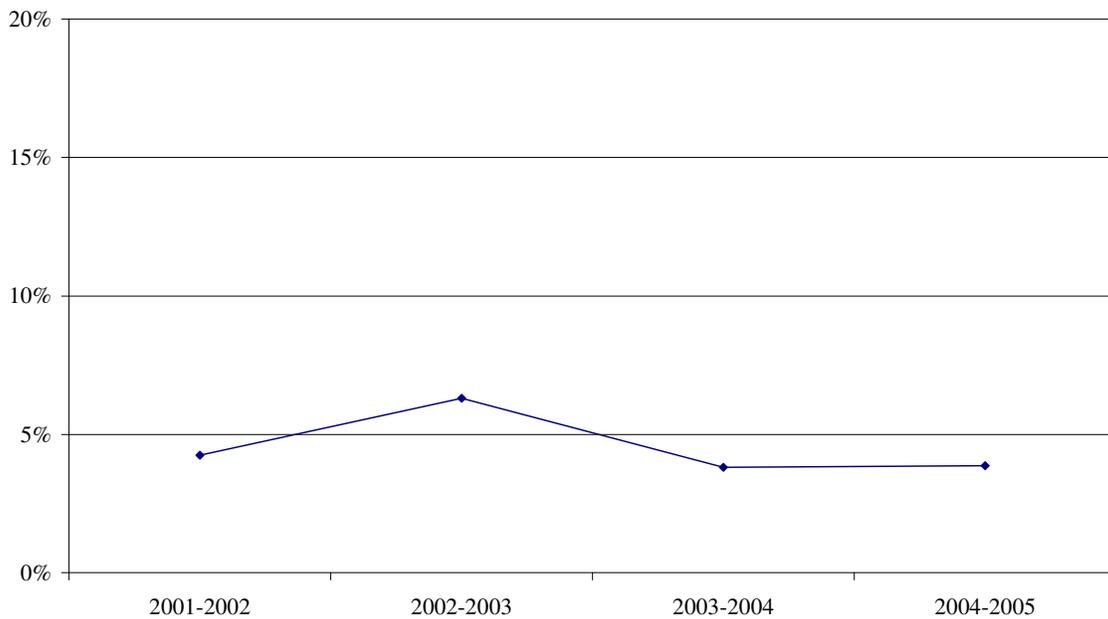
Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.33: Racial/Ethnic Distribution of RN Program Faculty, 2000-2001 to 2004-2005**



Source: California Board of Registered Nursing, Annual Schools Survey

**Figure 4.34: RN Program Faculty Vacancy Rates, 2000-2001 to 2004-2005**

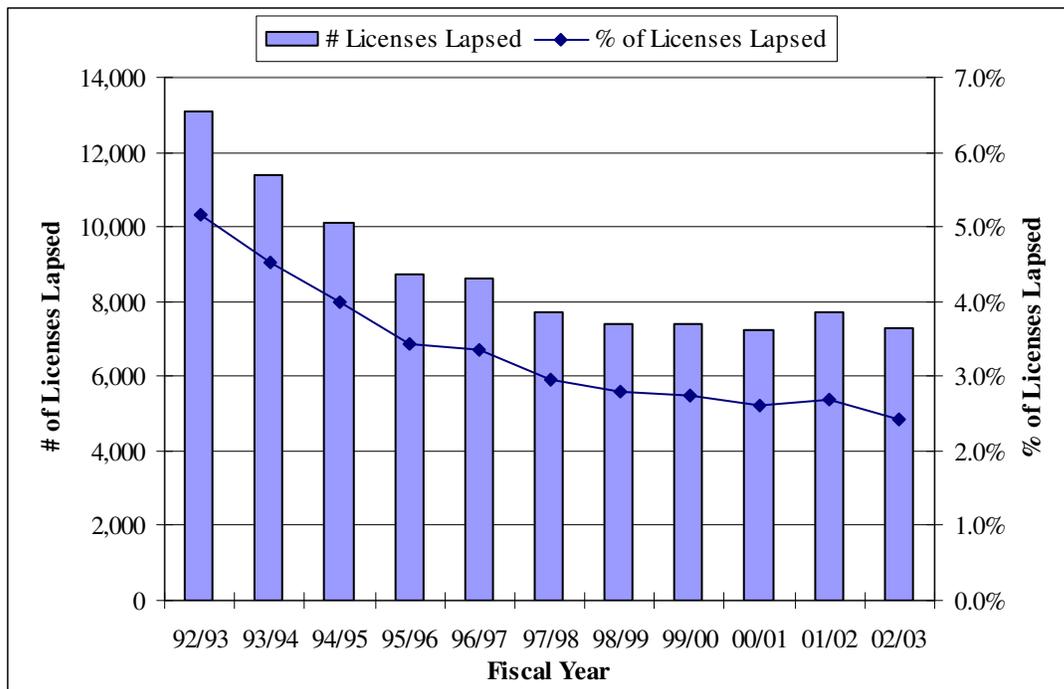


Source: California Board of Registered Nursing, Annual Schools Survey

#### D. The Outflow of California Nurses

California's nursing labor supply declines as nurses allow their licenses to lapse. Nurses may choose to not renew their licenses for a variety of reasons. They may move out of California, and remain in the national nurse labor supply. They may retire, which represents a permanent movement out of nursing. Some nurses choose to work in another occupation. Although many nurses who work in non-nursing jobs maintain their nursing licenses, some expect this to be a permanent change and stop renewing their licenses. Some LVN licenses lapse because the license holder completes an RN education program and is subsequently licensed as an RN.

**Figure 4.35: Number of RN Licenses Lapsed in California, 1992 to 2002**



Notes: The number of licenses lapsed each year is calculated by subtracting the number of new licenses issued each year from the net change in the overall number of licenses each year. The percent of licenses lapsed each year is calculated by dividing the number of licenses lapsed by the total number of licenses in that year.

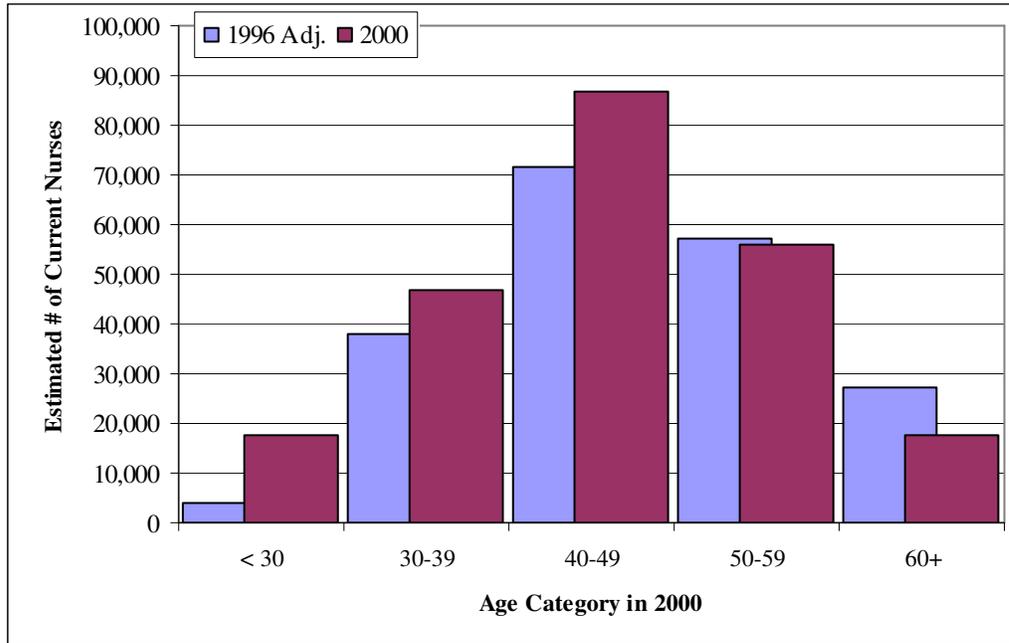
Source: California Board of Registered Nursing

The number of registered nurses who let their license lapse decreased during the 1990s (see Figure 4.35). However, the number of licenses lapsed appears to have leveled off around 7,000 annually by the late-1990s. The trend suggests that certain forces (possibly economic or demographic) decreased the number of people leaving the nursing stock in the mid-1990s, but those forces did not dominate in the late 1990s.

Aging is perhaps the most publicized type of movement out of the nursing labor force. Analysis of the 1996 and 2000 National Sample Survey of Registered Nurses (NSSRN) indicates that California is losing a significant number of nurses to retirement. Figure 4.36 displays the age distribution of registered nurses in California for 2000 and a simulation of what the distribution would be in 2000 if there were no inflow and outflow of nurses since 1996. The difference between the 2000 and 1996 adjusted distribution represents an estimate of the number of nurses lost or gained in each age category. The simulation shows an increase of younger nurses—likely due to higher migration rates among younger people, thus reflecting the increase in out-of-state nurses—and a decrease in older nurses. For the 60 and over category this difference equates to a loss of approximately 10,000 nurses in California between 1996 and 2000, most of which is likely due to retirement.

Just as migration into California accounted for an increasing number of people flowing into California's stock of nurses, migration out of California accounts for an increasing percentage of nurses flowing out of the stock. One indicator of this outflow is the number and percent of people who hold a license to practice as a registered nurse in California but live outside California, as shown in Figure 4.37. This number represents both nurses who have chosen to move outside California and nurses who obtain a license in California to work here temporarily but maintain a permanent residence outside the State. Both the overall number and percent of these nurses increased from 1996 to 2001, with the most dramatic increases occurring after 1999. By 2001 approximately 40,000 (or 14%) of California licensed registered nurses lived out-of-state.

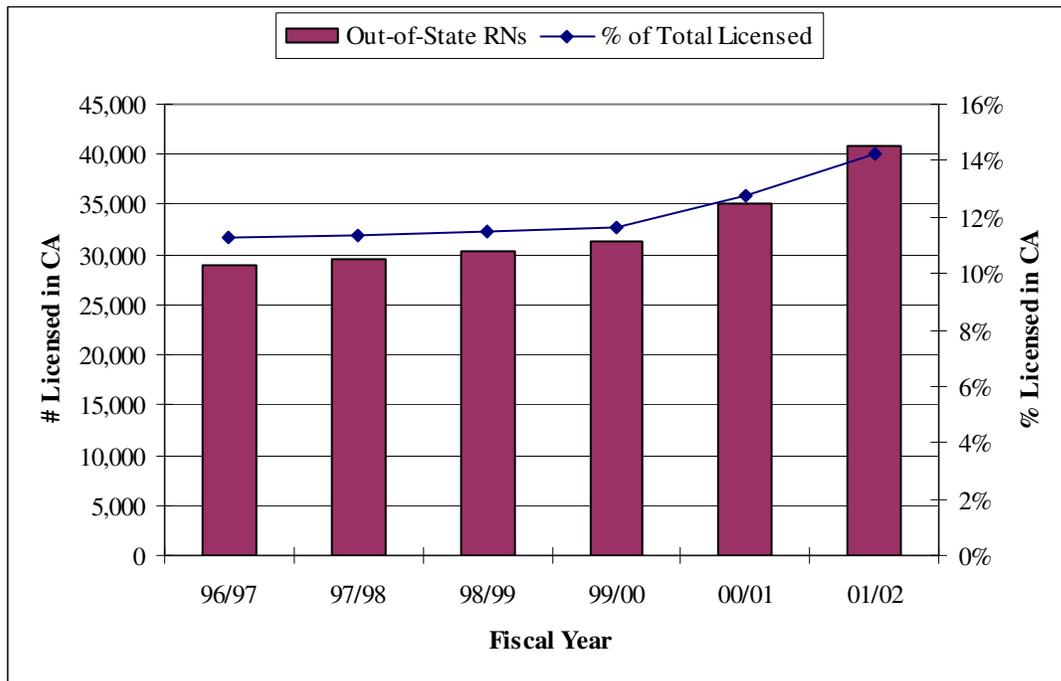
**Figure 4.36: Simulated Change in the Number of RNs through Workforce Aging**



Notes: The 1996 adjusted numbers are based on a simulation of what the age distribution would be in 2000 if there were no inflow and outflow of nurses since 1996.

Source: National Sample Survey of Registered Nursing, 1996 and 2000.

**Figure 4.37: Number of California Licensed RNs Living Out-of-State, 1996 to 2002**



Source: California Board of Registered Nursing

An estimate of the rate at which RNs move out of California can be generated using the 2000 National Sample Survey of Registered Nurses. The survey asks respondents where they lived on March 22, 2000, and March 22, 1999. Figure 4.38 presents estimated rates of migration out of California based on responses to the questions about residence.

**Figure 4.38: Estimated Rates of RN Migration Out of California, by Age Category**

Age Category	National Sample Survey of Registered Nursing estimate
<30	4.06%
30-34	3.07%
35-39	1.54%
40-44	1.65%
45-49	1.71%
50-54	1.49%
55-59	1.69%
60-64	2.22%
65+	1.80%

Source: National Sample Survey of Registered Nursing, 2000

#### E. Supply Responses and Changes

Figure 4.39 summarizes the expected supply responses of different sources of labor based on the above analysis and economic theory. The responses are grouped into short-run, medium-run, and long-run changes. Changes in the employment of currently-licensed but inactive California RNs could change in the short-term, but would likely have a small effect on overall supply of RNs because few RNs are inactive. In the short-term, greater supply increases could be drawn from other states, primarily through recruitment of traveling nurses. In the medium-run, internationally educated RNs provide the most significant flow of RN supply, as California employers recruit and work through immigration regulations. In the long-run, educational capacity within California is likely to have the greatest effect on RN supply; growth in the number of spaces in RN education programs and continued growing interest in the RN profession can have a lasting impact on the state’s pool of RNs.

**Figure 4.39: Summary of Supply Responses and Changes by Source of Labor**

<b>Supply Response</b>	<b>California Education System</b>	<b>Pool of Inactive CA Nurses</b>	<b>Pool from Other States</b>	<b>International Pool</b>
Short-run (< 1 year)	Minimal response: possible change in completion/ graduation rates	Small response: small percentage of nurses are inactive	Modest wage/bonus response; inflow of traveling nurses	Minimal response: fixed by current immigration policy
Medium-run (1 to 4 years)	Modest, but lagged response: constrained by capacity limits	Unknown	Unknown	Modest response: based on CA economic conditions relative to international economies and targeted use of work visas
Long-run	Based on attractiveness of nursing occupation and educational capacity	Tied to overall flow of nurses	Based on relative attractiveness of California as a residential location	Based on changes in immigration policy
Overall Change	Dominated by long-run forces	Dominated by short-run	Dominated by short-run	Dominated by medium-run

## 5. Labor Market Outcomes

### A. Employment Levels for the California Nursing Workforce

Multiple sources of data can be used to estimate employment levels of nurses in California. These data do not provide an unambiguous picture of employment changes over time. Some data sources focus on specific sectors of the economy, others contain cross-sectional data for non-consecutive years, and some have a sampling framework that makes year-to-year comparisons unreliable. Nevertheless, analysis of the available data on nurse employment levels provides a broad understanding of the nursing labor market outcomes.

The Occupational Employment Statistics (OES) Survey provides annual estimates of employment and wages. One advantage of the OES is that it is conducted in every state, thus allowing for comparisons between California and the nation. The survey is conducted annually, but according to the California Employment Development Department (EDD), the United States Bureau of Labor Statistics advises against using the OES as a time series because the data are collected in three-year cycles. In California about 37,000 establishments are surveyed each year, taking three years to fully collect the sample of approximately 113,000 establishments. Furthermore, the 1998 survey (marking the end of a three year cycle) used a different occupational classification system than the 1999 to 2006 surveys, thus complicating comparisons from one three-year cycle (ending 1998) to another three-year cycle (ending 2001).

Despite these limitations, we present the annual employment counts from the OES because it is the only data source available that reports both LVN and RN employment levels on an annual basis at an industry, state, and national level. Figure 5.1 reports the number of registered nurse (RN) and licensed vocational nurse (LVN) jobs identified by the OES from 1998 to 2006. Over 225,000 registered nursing jobs and 52,000 licensed vocational nursing jobs are in California. A majority of the RN jobs are in hospitals, while about a quarter of the LVN jobs are in hospitals and about one-fifth are in nursing care facilities (see Figure 5.2).

**Figure 5.1: Number of Registered Nurse and Licensed Vocational Nurse Jobs, 1998 to 2005**

	1998	1999	2000	2001	2002	2003	2004	2005
<b><i>Number of RN Jobs</i></b>								
National	2,027,830	2,205,430	2,189,670	2,217,990	2,239,530	2,246,430	2,311,970	2,368,070
California	172,210	224,190	203,390	201,070	206,140	206,280	223,170	226,350
Hospitals	112,000	124,600	114,640	120,940	121,010	131,520	142,300	Not Available
Doctors Offices/Clinics	14,970	28,750	25,200	21,130	23,140	23,010	20,600	
Nursing Care Facilities	10,770	11,730	10,750	10,890	10,720	9,460	6,800	
Home Health Care Services	8,020	7,630	6,120	6,060	7,290	7,290	8,800	
Personnel Supply Services	4,690	6,620	6,260	5,540	7,980	6,930	7,900	
Other	21,760	44,860	40,420	36,510	26,700	21,340	36,770	
<b><i>Number of LVN Jobs</i></b>								
National	673,790	688,510	679,470	683,790	692,290	682,590	702,740	710,020
California	49,220	55,430	53,040	52,070	54,990	53,910	52,870	52,480
Hospitals	17,910	15,210	14,270	14,720	15,630	15,950	14,700	Not Available
Doctors Offices/Clinics	6,270	8,860	6,690	5,050	7,680	6,630	3,700	
Nursing Care Facilities	12,580	13,050	13,540	13,710	14,380	14,510	11,300	
Home Health Care Services	3,240	5,230	5,640	6,840	6,910	7,530	7,300	
Personnel Supply Services	2,540	2,210	4,090	3,940	4,580	3,780	5,000	
Other	6,680	10,870	8,810	7,810	4,830	4,460	10,870	

Source: Occupational Employment Statistics Survey, EDD, 1998-2005

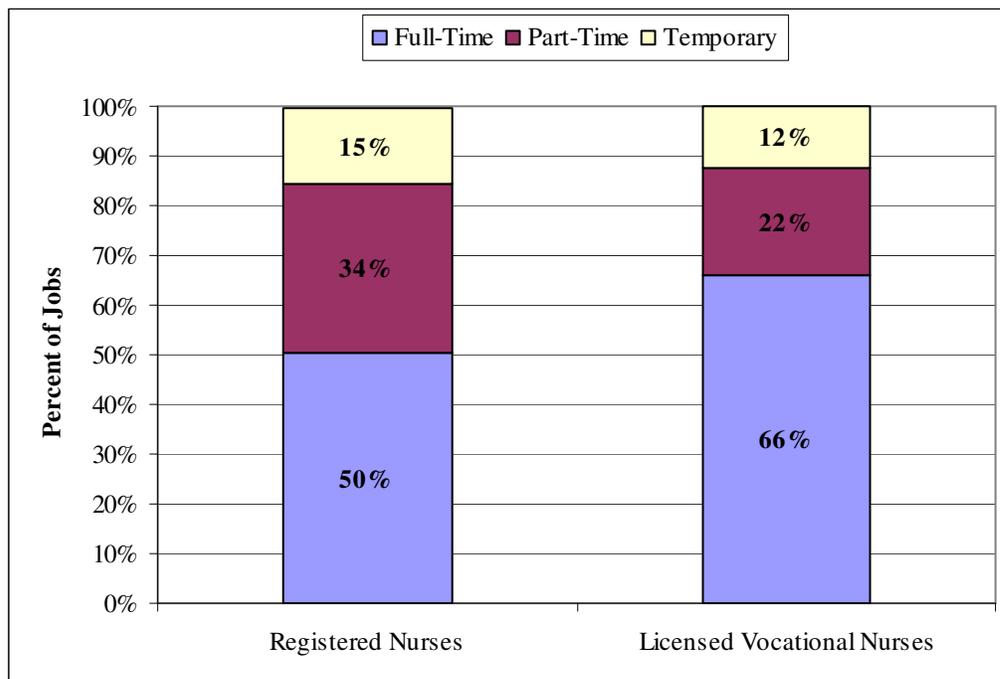
**Figure 5.2: Industrial Distribution of RN and LVN Jobs, 1998 to 2004**

	1998	1999	2000	2001	2002	2003	2004
<i>Distribution of RN Jobs</i>							
Hospitals	65.0%	72.4%	66.6%	70.2%	70.3%	76.4%	63.8%
Doctors Offices/Clinics	8.7%	16.7%	14.6%	12.3%	13.4%	13.4%	9.2%
Nursing Care Facilities	6.3%	6.8%	6.2%	6.3%	6.2%	5.5%	3.0%
Home Health Care Services	4.7%	4.4%	3.6%	3.5%	4.2%	4.2%	3.9%
Personnel Supply Services	2.7%	3.8%	3.6%	3.2%	4.6%	4.0%	3.5%
Other	12.6%	26.0%	23.5%	21.2%	15.5%	12.4%	16.5%
<i>Distribution of LVN Jobs</i>							
Hospitals	36.4%	30.9%	29.0%	29.9%	31.8%	32.4%	27.8%
Doctors Offices/Clinics	12.7%	18.0%	13.6%	10.3%	15.6%	13.5%	7.0%
Nursing Care Facilities	25.6%	26.5%	27.5%	27.9%	29.2%	29.5%	21.4%
Home Health Care Services	6.6%	10.6%	11.5%	13.9%	14.0%	15.3%	13.8%
Personnel Supply Services	5.2%	4.5%	8.3%	8.0%	9.3%	7.7%	9.5%
Other	13.6%	22.1%	17.9%	15.9%	9.8%	9.1%	20.6%

Source: Occupational Employment Statistics Survey, EDD, 1998-2004

While the OES provides information on how many total nursing jobs are in California, other cross-sectional data provide information about the part-time versus full-time distribution of jobs. Figure 5.3 shows the distribution of RN and LVN jobs by employment status (full-time, part-time, or temporary) as reported in the California Cooperative Occupational Information System (CCOIS).<sup>5</sup> The data suggest that only half of RN jobs and two-thirds of LVN jobs are permanent, full-time positions. It is important to note that the CCOIS and OES report on jobs rather than individuals; thus, one RN with two part-time jobs but working full-time would be counted as two part-time jobs.

**Figure 5.3: Employment Status of RN and LVN Jobs in California**



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2003 pooled.  
 Notes: The percent of RN jobs does not sum to 100 percent because 0.3 percent of RN jobs were reported as seasonal. While there are more updated data from the CCOIS program, they are not currently available at the statewide level, only at the county level.

<sup>5</sup> The CCOIS data are collected annually by sampling establishments in selected California counties. Each year the occupations and firms surveyed change. As a result, the data are not necessarily representative of the State as a whole, and comparisons across years should be made with caution. This makes it very difficult to examine temporal trends in wages, benefits, and hours of work using the CCOIS data. We pooled CCOIS data from 1999, 2000, 2001, and 2002 to improve generalizability.

Several data sources can be used to examine employment from the perspective of individual nurses. The U.S. Bureau of the Census 2000 Public Use Micro-Data one percent sample (PUMS) provides information about the employment of people who identify themselves as licensed vocational/practical and registered nurses. The Bureau of the Census Current Population Survey has similar data on an annual basis, but the sample size is much smaller for California and thus the data are not likely to represent an accurate picture of the nursing workforce in California. Because nurses are identified by their stated occupation in the Census data, it is not possible to examine the employment patterns of all licensed nurses. Nurses who are occupied in another field, or not working, are not likely to be identified as nurses in the Census.

Two surveys can be used to obtain detailed information about registered nurses, regardless of their employment status. The U.S. Bureau of the Health Professions has collected the National Sample Survey of Registered Nurses (NSSRN) since 1977. This survey is the nation's most extensive and comprehensive source of statistics on registered nurses (RNs) with current licenses to practice in the United States. The NSSRN asks respondents to report demographic characteristics, average number of hours per week worked, family characteristics, and other data. The California Board of Registered Nursing (BRN) has conducted its own surveys of licensed RNs in 1991, 1993, 1997, 2004, and 2006.<sup>6</sup> Many of the BRN survey questions are similar to those of the NSSRN.

Figure 5.4 reports the average number of hours RNs and LVNs work per week based on the Census 2000 Public Use Micro-data one percent sample (PUMS), NSSRN, and 2004 California BRN Survey of RNs. According to the PUMS, only 27 percent of RNs and 21 percent of LVNs work less than 35 hours per week. Approximately one in six nurses works more than 40 hours per week. These data combine hours worked for nurses who hold multiple jobs. The lower share of part-time workers reported in the PUMS data as compared with the CCOIS data is consistent with the notion that some nurses work more than one job.

The second panel of Figure 5.4 presents the distribution of hours per week in all jobs, as reported in the California Board of Registered Nursing 2004 Survey of RNs.

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<sup>6</sup> The report on the 2006 Survey can be downloaded from <http://www.rn.ca.gov/forms/pdf/survey2006.pdf>.

These data indicate a higher share of RNs working less than 35 hours per week than the PUMS, as well as a higher share working more than 40 hours per week.

The National Sample Survey of Registered Nurses provides information about hours worked in the nurses' principal nursing positions as well as secondary positions. The bottom two panels of Figure 5.4 present the distribution of hours per week in 1996 and 2000 from these data. In 2000, 36 percent of RNs worked part-time at their principal job. This percentage is lower than the percent of part-time and temporary jobs reported in the CCOIS, suggesting that some nurses are taking on part-time or temporary jobs in addition to their principal nursing position.

**Figure 5.4: Average Number of Hours Worked per Week by California Nurses**

	Registered Nurses			Licensed Vocational Nurses					
	Overall	Hospitals	Other	Overall	Hospitals	Other			
<b>PUMS, 2000, all jobs</b>									
Less than 35	27.0%	27.4%	26.7%	21.4%	19.4%	23.1%			
35 to 40	56.7%	57.9%	52.7%	63.1%	66.8%	59.7%			
More than 40	16.3%	14.7%	20.6%	15.5%	13.8%	17.2%			
<b>BRN, 2004, all jobs</b>									
Less than 35	33.4%	34.2%	32.2%	Not available					
35 to 40	46.8%	46.2%	47.6%						
More than 40	19.9%	19.6%	20.3%						
<b>NSSRN, 1996, primary job</b>									
Less than 35	33.9%	34.1%	33.4%						
35 to 40	60.1%	60.6%	59.2%						
More than 40	6.1%	5.3%	7.4%						
<b>NSSRN, 2000, primary job</b>									
Less than 35	36.0%	36.6%	34.9%						
35 to 40	56.7%	55.8%	58.2%						
More than 40	7.3%	7.6%	6.9%						

Sources: National Sample Survey of Registered Nurses (NSSRN), 1996 and 2000; Census 2000 Public Use Micro-data Sample (PUMS), 2000; Board of Registered Nursing 2004 Survey of RNs.

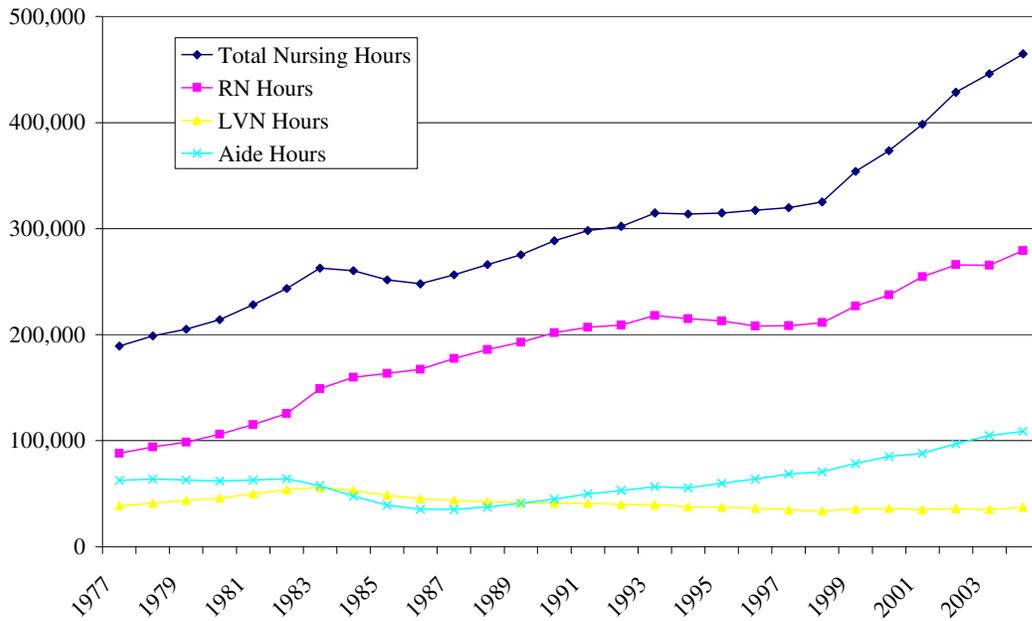
Notes: For the NSSRN, respondents reported on the average number of hours per week at their principal nursing position. For the 2000 PUMS and BRN 2004 surveys, respondents reported on the average number of hours per week at all jobs.

### *Employment Levels in Key Industries*

As seen in Figures 5.1 and 5.2, hospitals are the dominant employers of RNs and LVNs in California. Long-term care facilities also are important employers of licensed nurses, particularly for LVNs. The Office of Statewide Health Planning and Development (OSHPD) provides data on staffing levels at California hospitals and long-term care facilities. These data provide the number of “productive hours” worked by RNs, LVNs, and unlicensed nursing assistants, meaning the paid hours less vacation and sick hours. Figure 5.5 presents the average number of hours worked by nursing personnel per hospital in California from 1977 through 2004. The average number of hours worked by RNs in hospitals rose from 1977 to 1993, declined slightly from 1993 to 1996, and grew significantly after 1997. LVN employment in hospitals has declined since 1983, although average LVN productive hours per hospital have been stable for the past five years. The relatively limited scope of practice for LVNs in California is the likely explanation for the decline in their hospital-based employment. The use of aides has risen continuously since 1987, after declining for a decade.

The number of hours worked by nursing personnel can be directly compared with the number of patient discharges and days. Because the degree of illness of patients may have changed over time, it is useful to adjust patient discharges and days for changes in the “case mix.” For this report, case-mix adjustment was conducted using the OSHPD Patient Discharge Abstracts. Each patient is assigned a Diagnosis-Related Group (DRG), which is a categorization of the patient’s diagnosis developed by the federal government for Medicare. Each DRG is given a weight, which reflects the relative cost of that DRG compared to an “average” DRG that has a weight of 1. A hospital’s case-mix index is the average of the DRG weights of the hospital’s patients. If a hospital has a case-mix index greater than 1, the hospital’s patients are sicker than average. Although case-mix adjusting in this way does not fully account for differences in nursing care needs across hospitals, it is an improvement over unadjusted discharges and patient days.

**Figure 5.5: Average Per-Hospital Nursing Hours in All Daily Services, 1977-2004**

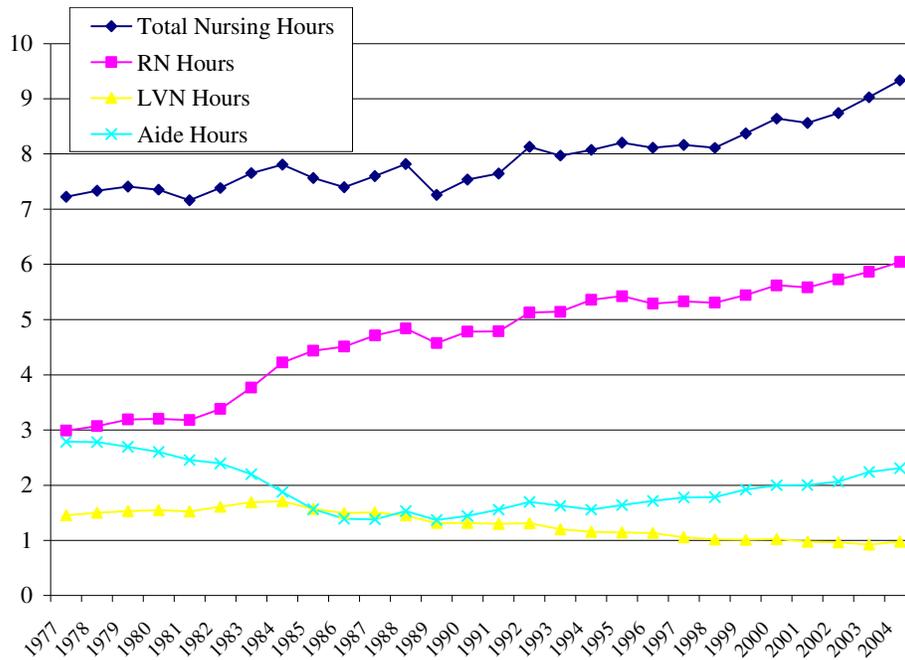


Source: California Office of Statewide Health Planning and Development

As seen in Figure 5.6, the average number of hours worked by RNs per case-mix adjusted patient day rose almost continuously from 1977 through 1988, was stable for a few years, and rose again from 1991 through 1995. After 1995, RN hours per case-mix adjusted patient day were fairly stable through 1999, and have risen since then. Since 1984, hours worked by LVNs per case-mix adjusted patient day declined, while unlicensed aide hours have increased since 1989. It is expected that average RN and LVN hours per patient day have increased over the past two years, due to the implementation of minimum nurse-to-patient ratios in January 2004.

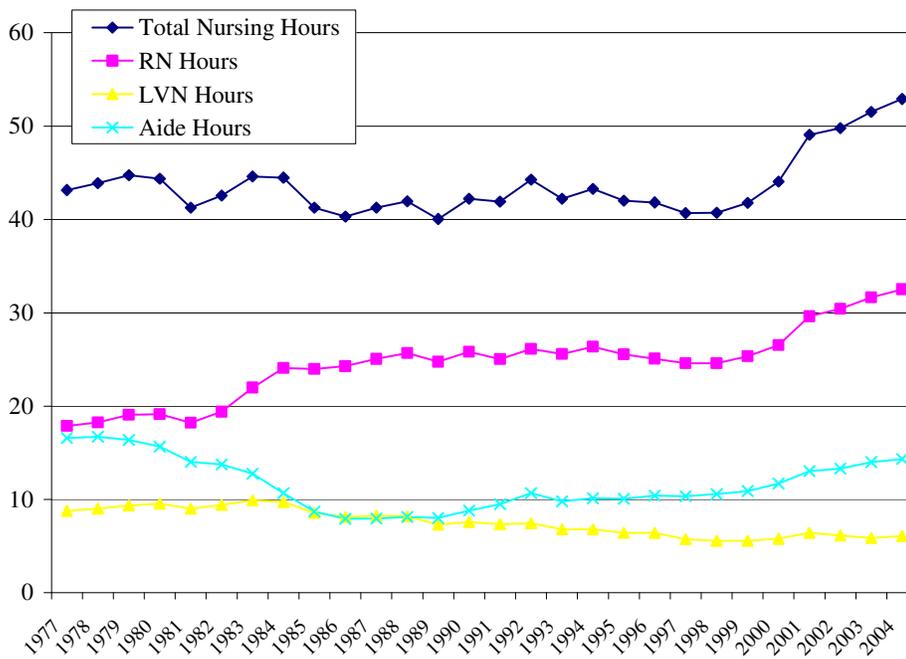
Average RN hours per case-mix adjusted discharge also rose from 1977 to 1984, and then did not change substantially through 1998 (Figure 5.7). Since then, however, there has been an increase in RN nursing service hours per discharge. As seen in Figure 5.8, there also has been a precipitous increase in the share of RN hours worked by temporary and agency personnel. This rise is likely the result of the statewide nursing shortage, as discussed below.

**Figure 5.6: Average Per-Hospital Nursing Hours per Case-Mix Adjusted Patient Day, All Daily Services, 1977-2004**



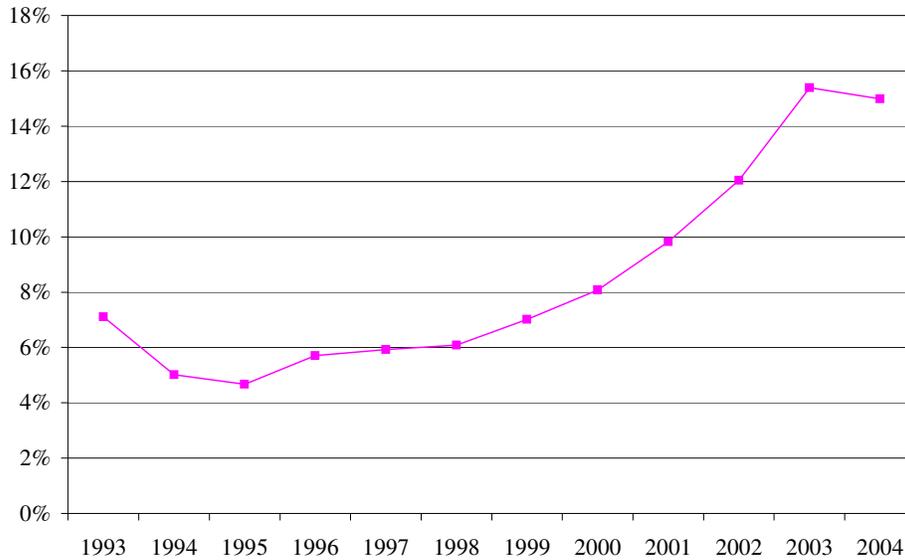
Source: California Office of Statewide Health Planning and Development

**Figure 5.7: Average Per-Hospital Nursing Hours per Case-Mix Adjusted Discharge, All Daily Services, 1977-2004**



Source: California Office of Statewide Health Planning and Development

**Figure 5.8: Average Percent of RN Hours Worked by Agency or Temporary Personnel, 1993-2004**



Source: California Office of Statewide Health Planning and Development

Figure 5.9 reports nurse staffing levels for long-term care facilities in the 2001-2002 fiscal year, based on OSHPD data. On average, long-term care facilities staff approximately 17 minutes of RN work for every patient day and about 36 minutes of LVN work for every patient day. RNs account for approximately nine percent of all nursing hours (including LVN and nurse assistant hours) at long-term care facilities while LVNs account for about 19 percent of all nursing hours. Temporary nurses only account for two to three percent of nursing hours at long-term care facilities.

**Figure 5.9: Nurse Staffing Levels for Long-Term Care Facilities in California**

	Median	Mean	Std. Dev.
<i>RN Hours of Work</i>			
Average Hours per Patient Day	0.28	0.35	0.55
Percent of All Nursing Hours	8.9%	9.7%	6.4%
Percent Temporary Staff	0.0%	3.2%	22.9%
<i>LVN Hours of Work</i>			
Average Hours per Patient Day	0.60	0.68	0.65
Percent of All Nursing Hours	18.9%	19.5%	7.6%
Percent Temporary Staff	0.0%	1.9%	9.2%

Source: Long-term Care Annual Financial files, Office of Statewide Health Planning and Development (OSHPD), July 2001-June 2002.

Note: N=1,220

### B. Wage Levels for the California Nursing Workforce

Analysis of nursing wage levels suffers from the same data problems as the analysis of employment levels, but paints a fairly consistent picture. Figure 5.10 reports mean wages for RNs and LVNs for 1998 to 2006 (adjusted to 2006 dollars) based on the OES. The same caveats and concerns regarding across-year comparisons of OES employment data applies to comparisons of the OES wage data. According to the OES data, average real wages for RNs in California increased 12.2 percent between 1998 and 2006. Growth in wages has been greater in the past few years, with wages rising 5.5 percent between 2004 and 2006. Real wages for LVNs in California, however, did not increase as much as for RNs, rising 5.9 percent between 1998 and 2006. As expected, nurses in California earned more than the national average throughout the period. The average hourly wage levels reported in the PUMS and the NSSRN are similar to those reported in the OES (see Figure 5.11), suggesting some reliability in the OES data. The 2004 BRN Survey of RNs did not include precise information about nurse earnings.

Within California in 2003, RNs working in doctors' offices and clinics earned more on average than RNs working in other identifiable sectors, while RNs working in nursing care facilities earned less than other RNs. In 2003, LVNs working in personnel supply services earned more than LVNs working in other sectors, while LVNs working in home health care services earned less than other LVNs.

**Figure 5.10: Mean Wages for RNs and LVNs, 1998 to 2006 (in 2006 constant dollars)**

	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b><i>Mean RN Hourly Wage</i></b>									
National	\$25.62	\$25.87	\$26.12	\$26.39	\$26.85	\$26.99	\$27.81	\$28.23	
California	\$30.81	\$30.32	\$30.72	\$30.97	\$32.51	\$32.80	\$32.79	\$33.99	\$34.58
Hospitals	\$31.46	\$32.39	\$32.15	\$31.95	\$32.50	\$33.56	\$32.92	Not available	
Doctors Offices/Clinics	\$31.72	\$33.60	\$35.00	\$33.71	\$35.59	\$34.56	\$34.59		
Nursing Care Facilities	\$25.70	\$26.61	\$27.23	\$27.38	\$27.36	\$28.38	\$28.11		
Home Health Care Services	\$30.61	\$30.72	\$30.28	\$30.28	\$32.12	\$32.28	\$31.63		
Personnel Supply Services	\$31.61	\$31.93	\$32.10	\$31.84	\$32.32	\$33.55	\$32.88		
Other		\$29.76	\$29.93	\$30.47	\$32.68	\$35.30	\$33.13		
<b><i>Mean LVN Hourly Wage</i></b>									
National	\$16.68	\$16.88	\$17.15	\$17.23	\$17.40	\$17.50	\$17.88	\$17.97	
California	\$19.97	\$20.03	\$19.93	\$19.78	\$20.49	\$20.53	\$20.52	\$20.79	\$21.15
Hospitals	\$20.99	\$21.49	\$20.25	\$19.79	\$19.97	\$20.58	\$20.19	Not available	
Doctors Offices/Clinics	\$21.31	\$23.01	\$22.58	\$20.86	\$22.32	\$22.19	\$22.01		
Nursing Care Facilities	\$18.12	\$18.68	\$19.60	\$19.79	\$20.20	\$21.17	\$20.79		
Home Health Care Services	\$20.95	\$20.58	\$18.78	\$18.79	\$19.36	\$19.34	\$18.95		
Personnel Supply Services	\$19.24	\$19.90	\$20.51	\$21.86	\$22.34	\$22.75	\$22.29		
Other		\$18.64	\$18.49	\$18.65	\$20.08	\$21.18	\$20.62		

Source: Occupational Employment Statistics Survey, EDD, 1998-2006. Wages adjusted to 2006 dollars using the CPI-U.

**Figure 5.11: Mean Hourly Wages for RNs and LVNs (in 2001 constant dollars)**

	Registered Nurses			Licensed Vocational Nurses		
	Overall	Hospitals	Other	Overall	Hospitals	Other
<b>PUMS, 2000, all jobs</b>						
National	Not available			Not available		
California	\$27.47	\$28.49	\$25.23	\$17.77	\$17.94	\$17.61
<b>NSSRN, 1996, primary job</b>						
National	\$24.35	\$25.11	\$23.19	Not available		
California	\$29.11	\$29.66	\$28.14			
<b>NSSRN, 2000, primary job</b>						
National	\$24.78	\$25.50	\$23.74	Not available		
California	\$29.88	\$30.44	\$28.96			

Sources: National Sample Survey of Registered Nurses (NSSRN), 1996 and 2000, and Census 2000 Public Use Micro-data Sample (PUMS), 2000.

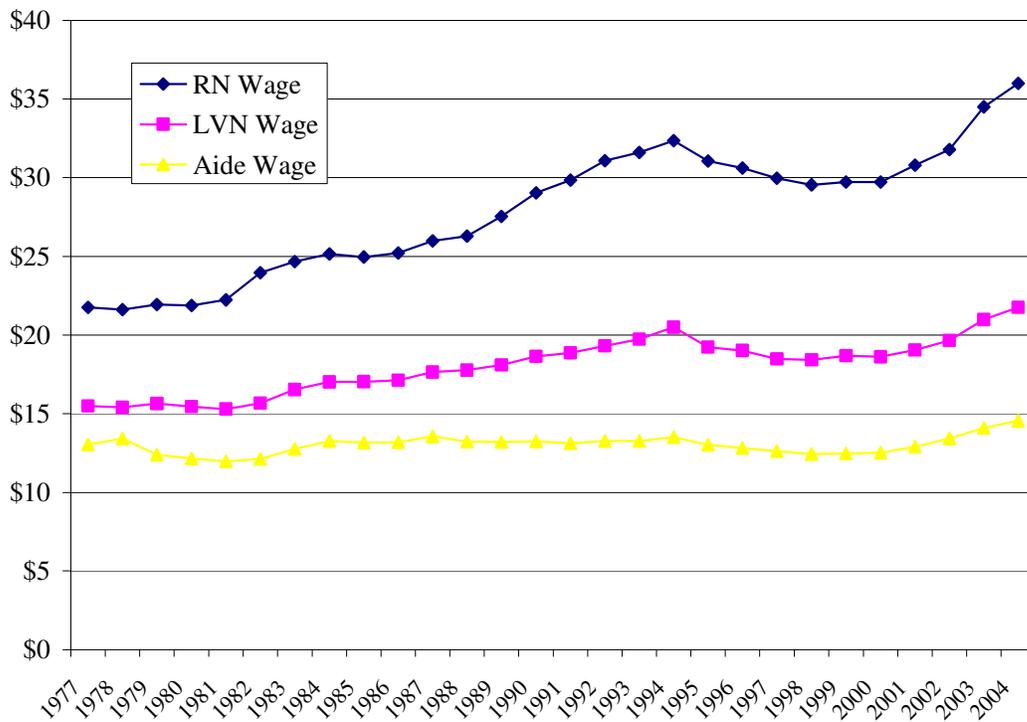
Notes: For the NSSRN, respondents reported their salary/wage at their principal nursing position. For the 2000 PUMS and 2004 BRN Survey, respondents reported on their salary/wage at all jobs.

The OSHPD data allow for a more detailed examination of wages for nurses in hospitals and long-term care facilities. Figure 5.12 presents average hourly wages paid to RNs, LVNs, and unlicensed nursing assistants in California hospitals from 1977 through 2004. All figures are in 2004 dollars. RN wages rose almost continuously through 1994, just as RN hours per case-mix adjusted patient day were increasing throughout this period. Between 1994 and 2000, RN wages declined, and since 2000 they have risen at a high rate. Average hospital LVN wages show a similar pattern of growth, decline, and recovery as do RN wages. The wages of aides have been relatively stable over the past two decades.

Figure 5.13 reports hourly wage levels for RNs and LVNs working in long-term care facilities. The mean hourly wage for RNs in long-term care facilities was about \$24.00 in 2001, which is nearly the same rate reported in the 2001 OES data for nursing care facilities, suggesting some reliability across data sources. RNs in long-term care facilities earn about 28 percent more than LVNs and have a wage rate about 40 percent higher than the average wage rate in their region. The mean hourly wage for LVNs in long-term care facilities is about \$19.00—almost two dollars more than the rate reported in the 2001 OES data for nursing care facilities. LVNs in long-term care facilities earn about 93 percent more than nurse assistants and have a wage rate about 10 percent higher than the average wage rate in their region.

Figure 5.14 shows median base wages reported in the CCOIS by experience level, and the wage spread (vertical bars) for the 25<sup>th</sup> to the 75<sup>th</sup> percentile range across employers. On average, the wages reported in the CCOIS data for RNs and LVNs are slightly lower than the wage levels reported in the other data sources. The difference between average wages based on the CCOIS data and wages based on the other data sources could be due to the CCOIS sampling framework, which does not generate a statewide representative sample of firms. Due to the CCOIS sampling methods, it is likely that employers in rural (most likely lower wage) counties are over-represented in the CCOIS, thus artificially making average wages appear lower.

**Figure 5.12: Average Per-Hospital Wages (in 2004 Dollars), 1977-2004**



Source: California Office of Statewide Health Planning and Development

**Figure 5.13: RN and LVN Hourly Wage Levels in Long-Term Care Facilities (2001)**

	Median	Mean	Std. Dev.
<i>RN Hourly Wages</i>			
Average Wage	\$24.33	\$24.37	\$4.32
As Percent of LVN Wages	128.1%	128.4%	19.2%
As Percent of Ave. Regional Wage	140.9%	140.8%	25.3%
<i>LVN Hourly Wages</i>			
Average Wage	\$18.50	\$19.13	\$3.37
As Percent of Nurse Assist. Wages	191.8%	193.4%	30.8%
As Percent of Ave. Regional Wage	107.8%	110.3%	17.9%

Source: Long-term Care Annual Financial files, Office of Statewide Health Planning and Development (OSHPD), July 2001-June 2002. Regional wage data from Occupational Employment Statistics Survey, EDD, 2000.

Note: N=1,220.

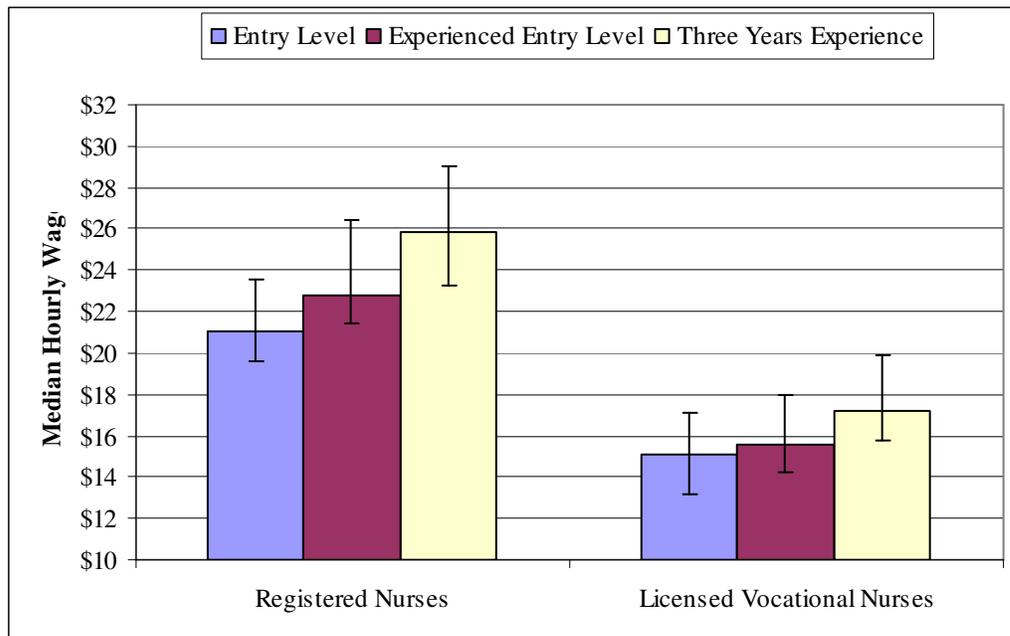
Figure 5.14 demonstrates that nurses earn much higher wages with the first few years of workplace experience. This is particularly true for RNs, where the median wage for a three year experienced nurse is about 23 percent higher than the entry level wage (\$25.87 vs. \$21.05). The median wage for LVNs with three years of experience is about 14 percent higher than the entry-level wage for LVNs (\$17.22 vs. \$15.50). In comparison, an analysis of wages for teachers in the same dataset indicates an 18 percent increase from entry level to experienced.

The wide range of wages seen in Figure 5.14 suggests that wages vary significantly across employers. Variation in work and skill requirements across industry sectors may be one reason for this variation. For example, RNs working in medical doctor offices and clinics earn more than RNs working in nursing care facilities, as discussed above. Even within industries, however, a substantial wage range exists across employers. Figures 5.15 and 5.16 plot the distribution of hourly wages across firms, by industry, for RNs and LVNs respectively. In the figures, each box represents the wage range across firms from the 25<sup>th</sup> percentile to the 75<sup>th</sup> percentile, with the median (50<sup>th</sup> percentile) designated by a “+” and the 10<sup>th</sup> percentile to the 90<sup>th</sup> percentile range designated by the vertical bars. For RNs in doctor offices and clinics the wage spread is about \$12 per hour from the 25<sup>th</sup> to the 75<sup>th</sup> percentile and about \$25 from the 10<sup>th</sup> to the 90<sup>th</sup> percentile. The distribution is slightly tighter around the median in the other industries, and much tighter in the nursing care facilities industry. For LVNs, the wage

spread is not as pronounced as it is for RNs. The largest wage spread is found for doctors' offices and clinics and employment services—both of which are primarily comprised of private, for-profit businesses.

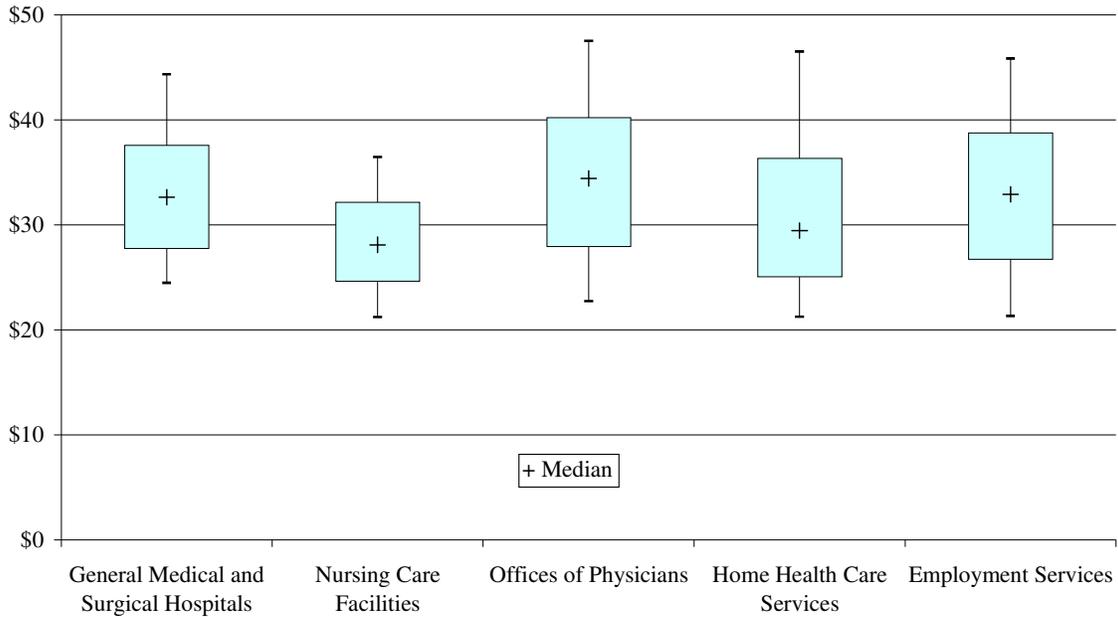
Geographic wage differentials explain some of the variation in nurse wages across employers. For example, nurses working in the San Francisco Bay Area earn more, on average, than nurses in other regions of the State. Most regional variation in wages, however, is a result of regional variation in the cost of living. One way to control for the regional variation in the cost of living is to examine the geographic variation in the ratio of average nursing wage to the overall average wage in the region. Figures 5.17 and 5.18 show the variation in this ratio across California regions for RNs and LVNs respectively. For both RNs and LVNs, the wage ratio is lower in the Bay Area relative to other California regions. RNs and LVNs in the Central Valley, Sierra Nevada counties, and the Northern Sacramento Valley tend to have a higher wage ratio relative to other regions.

**Figure 5.14: Average Hourly Wages for RNs and LVNs, by Experience Level (2003)**



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2003 pooled.  
 Notes: Hourly wages are adjusted to 2003 dollars and reflect the median wage offered by each firm, weighted by the number of employees at the firm. The vertical bars indicate the 25th to 75th percentile range.

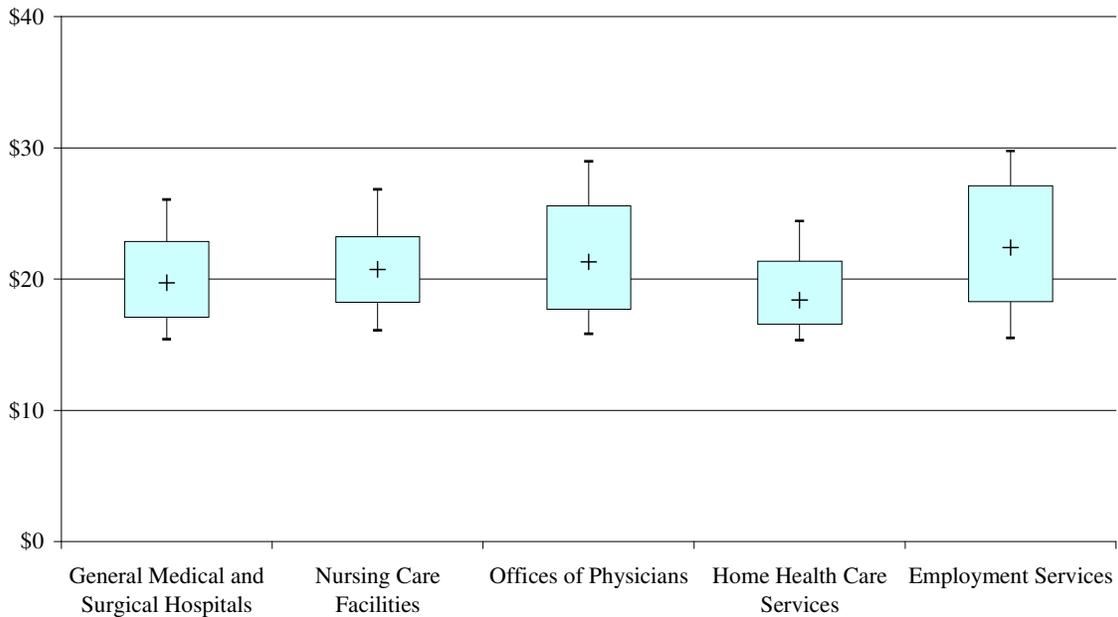
**Figure 5.15: Distribution of RN Hourly Wages across Firms, by Industry (2004)**



Source: Occupational Employment Statistics Survey, EDD, 2004.

Notes: Each box represents the wage range across firms from the 25<sup>th</sup> percentile to the 75<sup>th</sup> percentile, while the vertical bars represent the range from the 10<sup>th</sup> percentile to the 90<sup>th</sup> percentile.

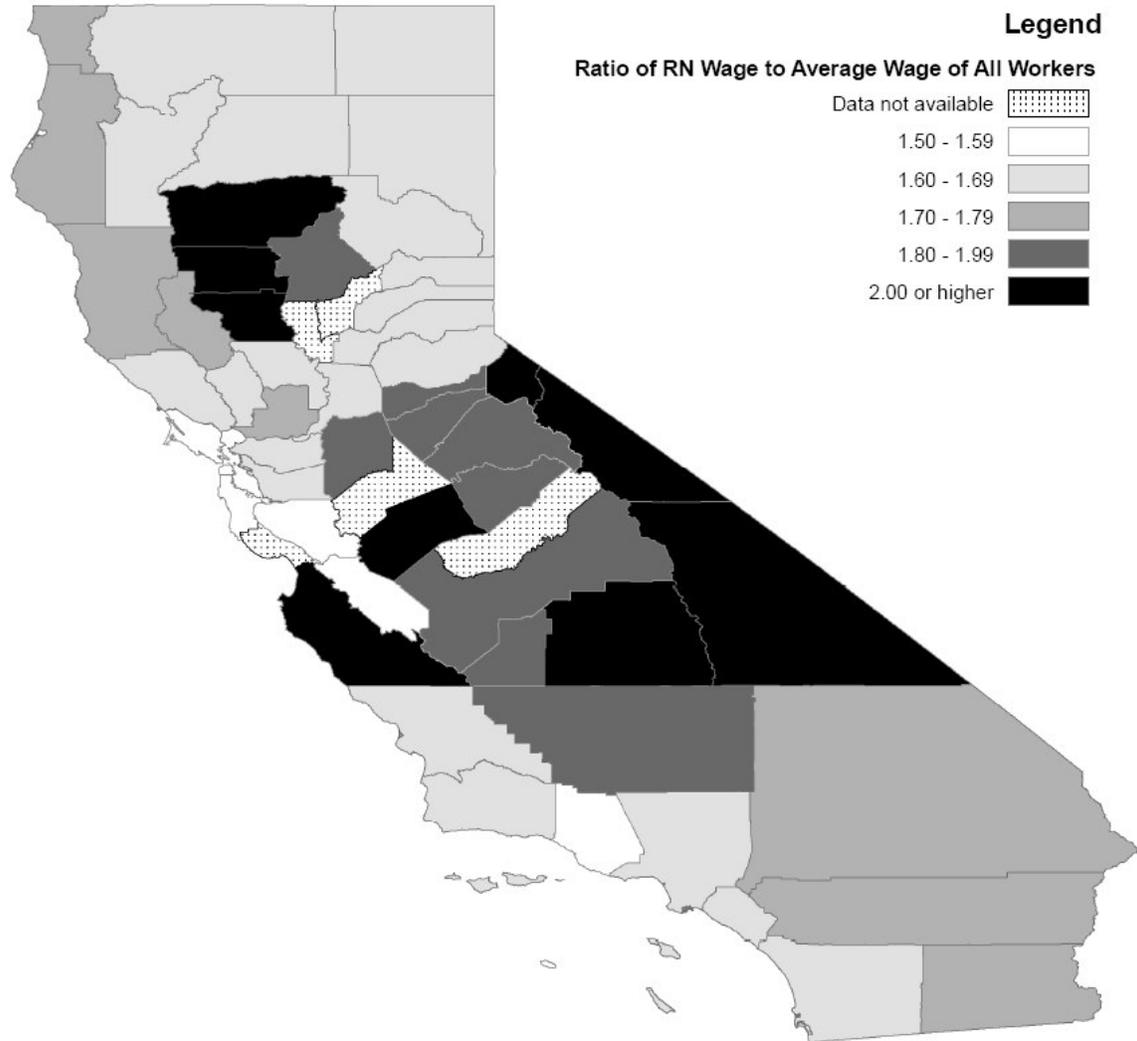
**Figure 5.16: Distribution of LVN Hourly Wages across Firms, by Industry (2004)**



Source: Occupational Employment Statistics Survey, EDD, 2004.

Notes: Each box represents the wage range across firms from the 25<sup>th</sup> percentile to the 75<sup>th</sup> percentile, while the vertical bars represent the range from the 10<sup>th</sup> percentile to the 90<sup>th</sup> percentile.

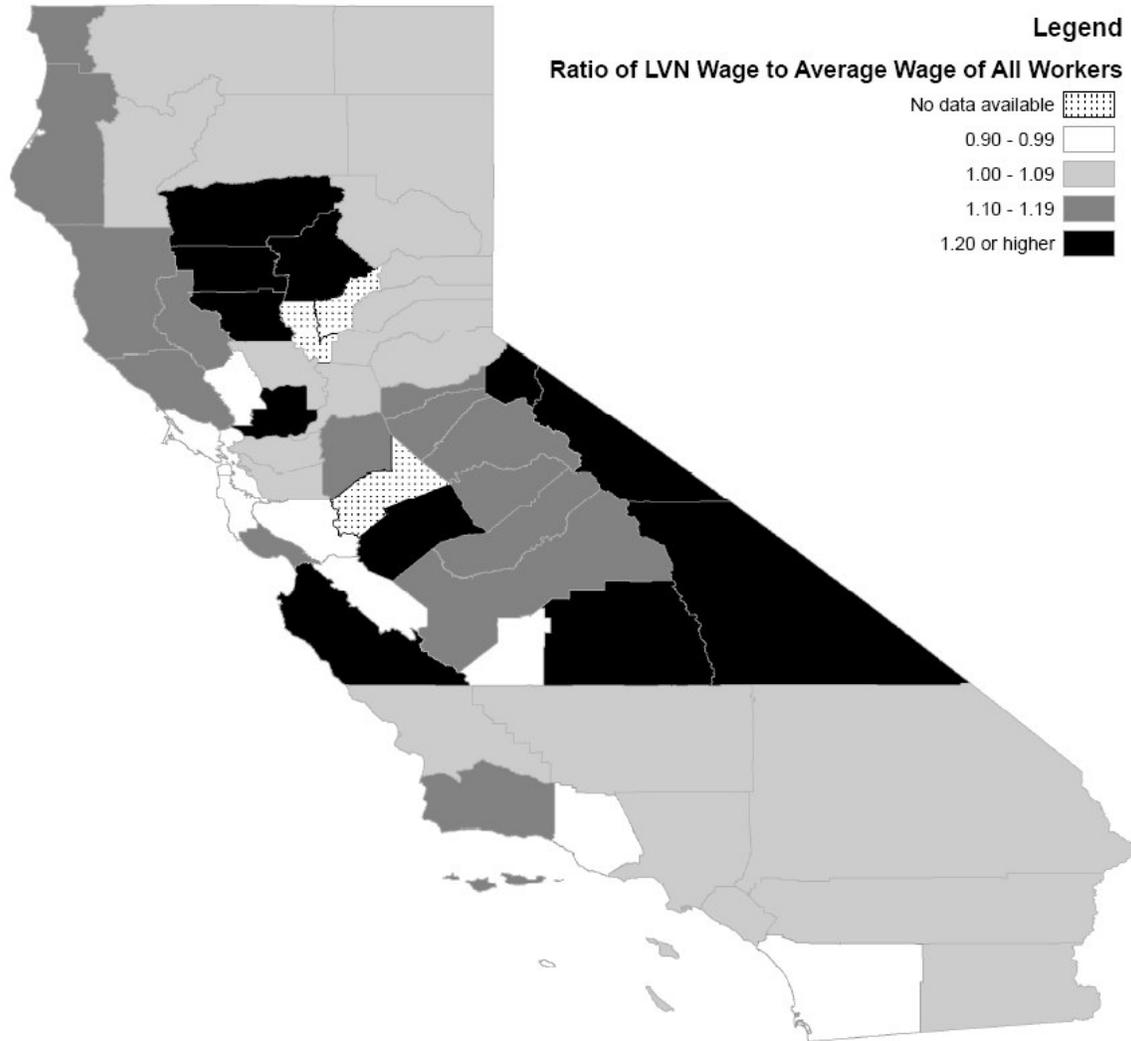
**Figure 5.17: Relative Level of RN Hourly Wages across California Regions (2001)**



Source: Occupational Employment Statistics Survey, EDD, 2000.

Notes: Regions reflect county groupings based on U.S. Census defined metropolitan areas and EDD defined regions for counties not included in a metropolitan area. Each region's wage ratio equals the mean hourly wage for RNs in the region divided by the mean hourly wage for all occupations in the region.

**Figure 5.18: Relative Level of LVN Hourly Wages across California Regions (2001)**



Source: Occupational Employment Statistics Survey, EDD, 2000.

Notes: Regions reflect county groupings based on U.S. Census defined metropolitan areas and EDD defined regions for counties not included in a metropolitan area. Each region's wage ratio equals the mean hourly wage for LVNs in the region divided by the mean hourly wage for all occupations in the region.

### C. Job benefits

Analysis of CCOIS data suggests that most full-time and part-time nurses are offered job benefits.<sup>7</sup> Figure 5.19 reports the percent of full-time and part-time nurses and teachers (a comparable/competing occupation) offered employer provided medical benefits. Figure 5.20 reports the percent offered retirement benefits. Almost all full-time RNs are offered medical benefits and over 90 percent of part-time RNs are offered medical benefits. The offer rate for full-time LVNs is slightly lower than the full-time RN rate, but the rate for part-time LVNs is significantly lower than the part-time RN rate (60 percent vs. 90 percent). The offer rate for part-time RNs also is high relative to the rate for part-time teachers (90 percent vs. 65 percent).

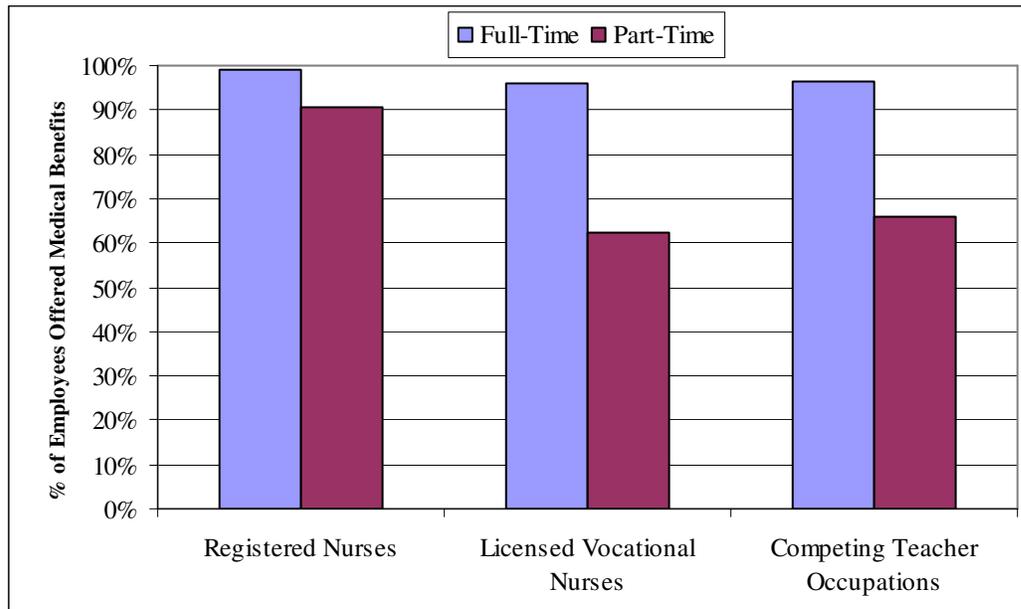
Just fewer than 90 percent of RNs are offered retirement benefits, while about 75 percent of full-time and 60 percent of part-time LVNs are offered retirement benefits. The rate for full-time RNs is a little lower than the rate for full-time teachers, but the rate for part-time RNs is significantly higher than the rate for part-time teachers. Not shown are the rates for dental benefits, sick time, and vacation time. For RNs, LVNs, and teachers, the offer rates for these benefits were similar to, although slightly lower than, the medical benefits rates. The one exception is that less than one-third of teachers are offered paid vacation time, which is likely due to the vacation time built into their work schedule.

A qualitative assessment of job benefits available to nurses comes from the Survey of California Nurses conducted by the California Board of Registered Nursing (BRN). While we do not have similar information for other occupations or time periods, the BRN survey results indicate that a majority of RNs are satisfied or very satisfied with the job benefits available to them (see Figure 5.21). However, one-quarter of RNs are either dissatisfied or very dissatisfied with their available benefits. Since the vast majority of nurses are offered benefits, this dissatisfaction is likely due to the quality of the available benefits and not the lack of benefit availability.

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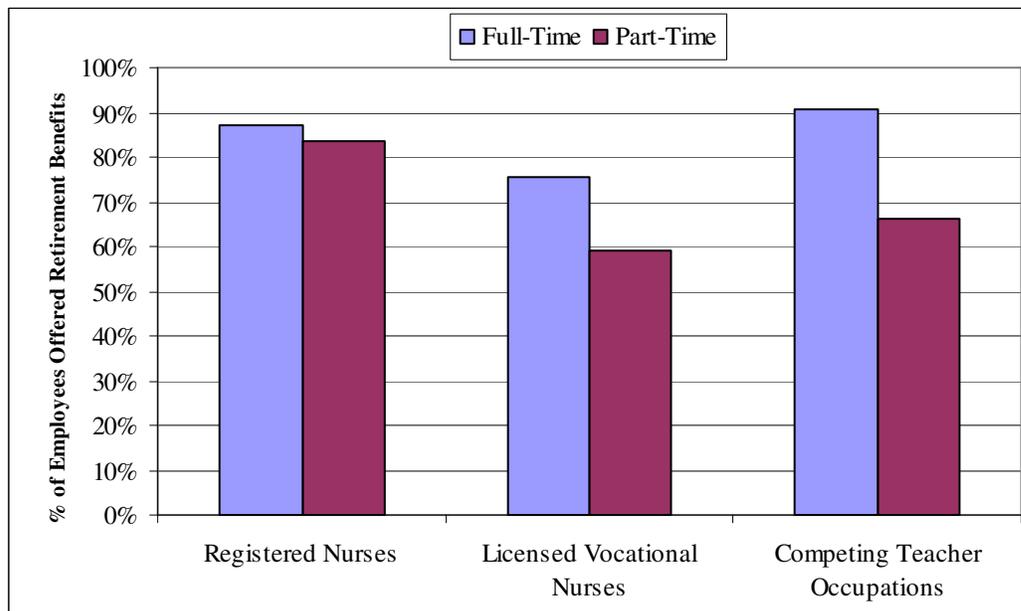
<sup>7</sup> The CCOIS data only allow us to examine benefits *offered* to employees, and not how many employees actually use the benefits (take-up rates). Also, the data do not allow us to identify which firms offer benefits to the worker's family.

**Figure 5.19: Availability of Employer Provided Medical Benefits**



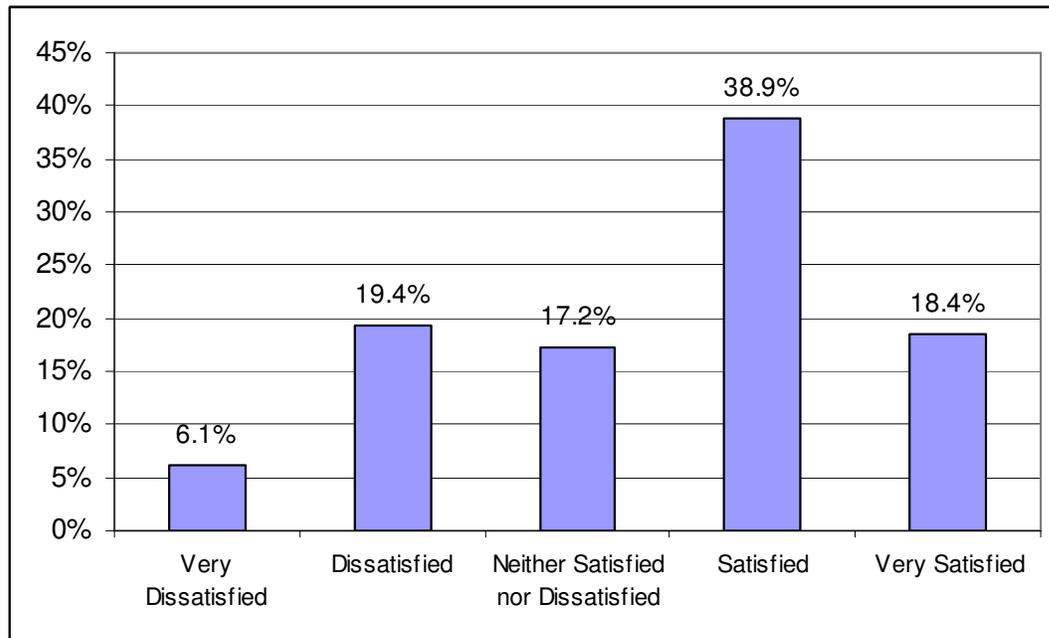
Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

**Figure 5.20: Availability of Retirement Benefits**



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2002 pooled.

**Figure 5.21: Registered Nurse Attitude toward Available Job Benefits**



Source: Survey of Registered Nurses in California, BRN, 2004.  
Notes: N=4,741

#### D. Inter-firm and Inter-industry Mobility

An examination of cross-sectional data on job tenure suggests that, on average, registered nurses work for an employer about the same length of time as other employees. At a given point in time, registered nurses on average have worked about five to seven years for their current employer, which is similar to the average for all workers and slightly less than the average for elementary school teachers (see Figure 5.22). Job tenure of registered nurses appears to vary across industries, however. Nurses working in hospitals have the longest tenure with their employer (about six to eight years), while nurses working in home health care services have the shortest tenure (about two to four years).

**Figure 5.22: Number of Years of Continuous Work with Current Employer, Registered Nurses**

	Sample Size	Mean	25th %tile	Median	75th %tile
California Registered Nurses <sup>a</sup>	6,836	7.3	2.0	5.0	10.4
Hospitals	4,026	8.0	2.4	6.0	11.6
Doctors Offices/Clinics	685	6.8	1.8	4.2	9.8
Nursing Care Facilities	380	6.5	1.4	3.6	9.3
Home Health Care Services	310	4.0	1.0	2.5	5.0
Personnel Supply Services	416	5.0	1.3	2.7	6.6
Other	1,019	7.1	2.0	4.7	10.1
Registered Nurses <sup>b</sup>					
California	123	7.4	2.0	6.0	10.0
United States	1,710	7.5	1.8	5.0	11.0
Elem. School Teachers <sup>b</sup>					
California	145	8.1	1.0	6.0	12.0
United States	1,775	9.9	2.2	7.0	15.0
All Workers <sup>b</sup>					
California	8,632	6.6	1.0	4.0	10.0
United States	105,710	7.1	1.0	4.0	10.0

Sources:

<sup>a</sup> Survey of Registered Nurses in California, BRN, 2004.

<sup>b</sup> Current Population Survey, February Supplement, 1998 and 2000 pooled.

Analysis of the NSSRN and the CCOIS also suggests that nurses have relatively stable employment. In the 2000 NSSRN, over 80 percent of registered nurses in California worked for the same employer as they did in 1999, and 76 percent were in the same position (see Figure 5.23). About 11 percent of RNs in the 2000 survey worked for a different employer in 1999. These rates are consistent with the rates in 1996, the rates for RNs working in California hospitals, and the rates for RNs working in other states (not shown).

From an employer perspective, the CCOIS reports that just over 26 percent of the RN workforce is comprised of employees hired within the past year, at a given point in time; 30 percent of the LVN workforce is hired within the past year (see Figure 5.24).

About seven percent of the nursing workforce is added over a year to expand the size of the workforce (growth).<sup>8</sup>

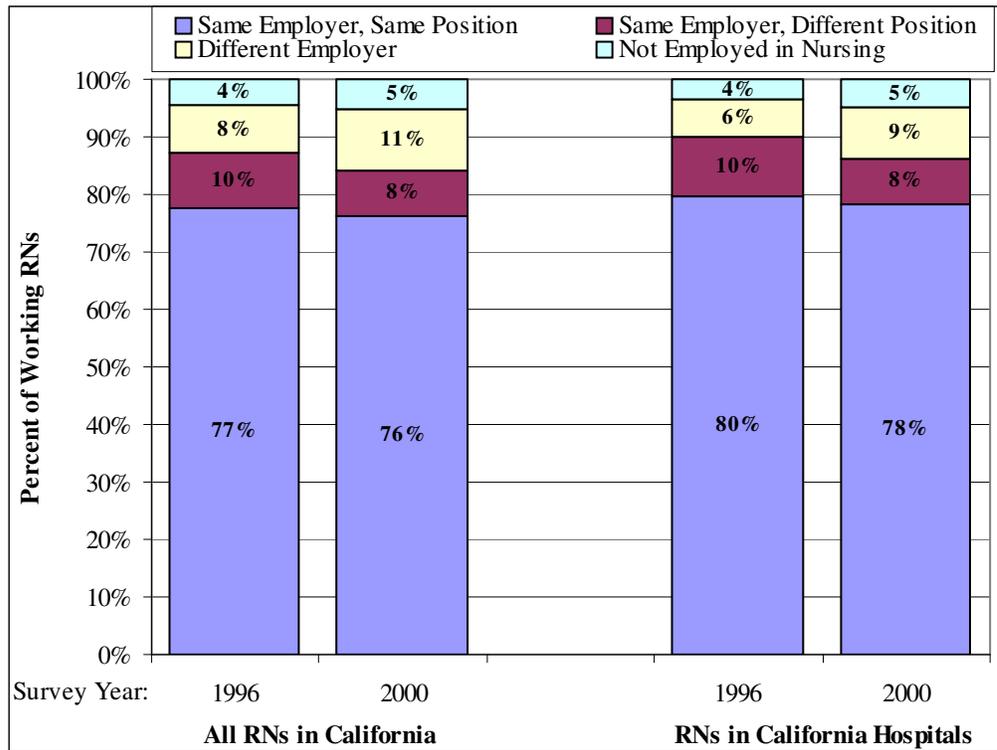
We can estimate a firm-based one-year turnover rate for nurses by restricting the analysis of the CCOIS to new hires resulting from vacant positions (i.e., excluding jobs added for growth). The mean turnover rate for firms is 20 percent for registered nurses and 24 percent for licensed vocational nurses. These turnover rates are higher than the rate for competing teacher occupations (13 percent), but close to the rates for competing health occupations (19 percent) and other competing occupations (23 percent). Figure 5.25 shows the distribution of firms by their estimated occupational turnover rate. The majority of firms have occupational turnover rates less than 20 percent. A small percent of firms actually have turnover rates greater than 100 percent, but these extreme turnover rates do not appear to be more prevalent for nurses.

The analysis of the cross-sectional data provides a fairly consistent picture of job turnover and stability for nurses, but is limited by the fact that the data do not track individual nurses over time. To get a more comprehensive understanding of the labor market dynamics of nurses, one needs to analyze longitudinal data on nursing employment patterns. One way to examine employment patterns in more detail is to match individual-level RN and LVN licensing administrative records with state individual-level employment data. Privacy laws do not permit the California Boards of Registered and Licensed Vocational Nursing to share the Social Security Numbers of licensed nurses with other government agencies, so we could not examine the employment histories of all licensed nurses. The California Community College Chancellor's Office (CCCCO), however, has a long-standing agreement with the Employment Development Department (EDD) to share information to study employment trends of community college graduates. Thus, the CCCCCO provided EDD with information about RN and LVN program graduates, and we examined the employment histories of these graduates over time.

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<sup>8</sup> New hires added for growth should not be counted as job turnovers.

**Figure 5.23: Previous Year Employment Status of Working Registered Nurses**



Source: National Sample Survey of Registered Nurses (NSSRN), 1996 and 2000.

We studied the employment histories of two cohorts of community college RN and LVN program graduates: nurses completing their education in the 1992-93 academic year, and those graduating in the 2000-01 academic year. We had employment and earnings data from EDD for 1998 through 2004. Of the 2,541 graduates with unique Social Security Numbers in the 1993 cohort, we were able to match 2,147 of them in the employment data for at least one quarter between 1998 and 2004. A large share of these – 2,007, or 79 percent – were matched in the 1998 data. Similar rates of matching were found for the 2001 cohort: of the 4,289 graduates, 4,180 were matched with at least one quarter of employment data between 2001 and 2004, and 4,020 matched in 2001. Nurses who were not found in the employment data either did not work during the time period we examined, or they moved to another state.

The shares of licensed nurses in the graduating cohort of 2000-2001 with any job in the health care industry are presented in Figure 5.24. The vast majority of these recent graduates were working in health care in California in 2002, with 89 percent of RNs in

California health jobs and 86 percent of LVNs in the state's health industry. By 2004, the share of RNs in California's health industry dropped only slightly to 88 percent, while the share of LVNs declined to 83 percent. High shares of these RNs worked in California hospitals in 2002, at 82 percent. By 2004, this share dropped only three percentage points to 79 percent. In contrast, only 54 to 57 percent of LVNs worked in California hospitals over the first three years after graduation.

Figure 5.25 examines the movements of nurses from employer to employer, by presenting the share of RNs who had the same employer in 2002, 2003, and 2004 as in 2001. As seen here, there is substantial job-changing among nurses. Overall, only 58 percent of nurses had the same employer in 2004 as in 2001. Sixty-four percent of nurses employed by hospitals in 2001 were with the same employer in 2004, but only 37 percent of nurses working for other health care employers stayed with the same firm. RNs had slightly higher attachment to their employers than did LVNs. Hospital employers retained 66 percent of RNs between 2001 and 2004, but only 56 percent of LVNs. Other health care employers retained 40.5 percent of RNs and 33 percent of LVNs.

Where do recently graduated RNs go when they leave the hospital industry? Figure 5.26 explores that question by identifying the industries in which nurses were working in 2004 if they had been working in hospitals in 2001. Over 42 percent of these nurses moved to ambulatory health services, including physicians' offices and ambulatory surgery centers, after leaving hospitals. Another 15 percent were in government support positions, including public health and regulatory agencies. Thirteen percent moved to "administrative and support services," which includes a variety of employers, some of which are related to the delivery of health care. The remainder was working in nursing and residential care facilities, educational services, and other industries.

**Figure 5.24: Percent of the 2000-2001 Cohort of Community College Nursing Graduates with Any Job in Health Care**

	<b>Percent remaining in industry in...</b>		
	2002	2003	2004
<b>All Health Care</b>			
All Nurses	88.4%	87.7%	87.0%
RNs	89.0%	88.3%	88.1%
LVNs	86.1%	85.2%	83.1%
<b>Hospitals</b>			
All Nurses	76.3%	75.7%	73.8%
RNs	82.1%	80.8%	79.0%
LVNs	55.2%	56.7%	54.3%

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

**Figure 5.25: Percent of the 2000-2001 Community College Nursing Graduates That Had the Same Employer after 2001**

	<b>Percent remaining with same employer in...</b>		
	2002	2003	2004
<b>All Nurses</b>			
All Industries	82.8%	66.9%	57.8%
Hospitals	84.1%	71.4%	64.4%
Other Health Care	80.2%	54.0%	36.6%
Other Industries	79.8%	59.2%	48.3%
<b>RNs</b>			
All Industries	83.9%	69.7%	61.6%
Hospitals	84.7%	72.4%	65.7%
Other Health Care	79.3%	55.1%	40.5%
Other Industries	82.9%	64.8%	53.6%
<b>LVNs</b>			
All Industries	78.7%	56.3%	43.5%
Hospitals	80.6%	65.1%	56.1%
Other Health Care	81.1%	52.9%	32.8%
Other Industries	71.8%	44.3%	34.0%

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

**Figure 5.26: Primary Industries of 2000-2001 Cohort of Community College Nursing Graduates Who Were Employed in Hospitals in 2001, 2004**

Number	Percent	Industry Title
119	42.2%	Ambulatory Health Services
42	14.9%	Executive, Legislative, and Other General Government Support
38	13.5%	Administrative and Support Services
27	9.6%	Nursing and Residential Care Facilities
19	6.7%	Educational Services

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor’s Office data on nursing program graduates.

In general, a high share of community college nursing program graduates work in the health care industry for the first few years after graduation, but job turnover is relatively high in the first three years of work. By examining the employment histories of graduates from the 1992-1993 academic year, we can understand how more experienced nurses fare in the labor market. Figure 5.27 presents the industries of primary employment for the 1992-1993 cohort in 1998, based on data from EDD. Subcategories of major industry groups are shown only for the largest subcategories. Nearly 50 percent of RNs and LVNs who completed their nursing education in a community college in 1992-1993 were working in California hospitals in 1998. Most of these were employed in general medical-surgical hospitals. Fifteen percent were employed in the ambulatory health services industry, including physicians’ offices and home health care services. Nearly ten percent worked in nursing and residential care facilities, including nursing care facilities and developmental facilities. The remaining 26 percent worked in other industries, but it appears that many had jobs related to their nursing education. The dominant industries in the “other” category were public administration (such as health services and regulatory agencies), colleges and universities (student health and nursing education), correctional institutions (forensic nursing), temporary help services (temporary and traveling nurses), and elementary and secondary schools (school nursing).

**Figure 5.27: Industries of Primary Employment for the 1992-1993 Cohort of Community College Nursing Graduates, 1998**

<b>Number</b>	<b>Percent</b>	<b>2002 NAICS Title</b>
<b>999</b>	<b>49.8%</b>	<b><i>Hospitals</i></b>
955	47.6%	General Medical and Surgical Hospitals
34	1.7%	Psychiatric and Substance Abuse Hospitals
<b>299</b>	<b>14.9%</b>	<b><i>Ambulatory Health Services</i></b>
127	6.3%	Office of Physicians
105	5.2%	Home Health Care Services
38	1.9%	Other Outpatient Care Centers
<b>194</b>	<b>9.7%</b>	<b><i>Nursing and Residential Care Facilities</i></b>
136	6.8%	Nursing Care Facilities
27	1.3%	Residential Mental Retardation Facilities
22	1.1%	Community Care Facilities for the Elderly
<b>515</b>	<b>25.7%</b>	<b><i>Other</i></b>
154	7.7%	Public Administration: Executive and Legislative Offices
49	2.4%	Colleges, Universities, and Professional Schools
33	1.6%	Correctional Institutions
27	1.3%	Temporary Help Services
21	1.0%	Elementary and Secondary Schools
<b>2007</b>	<b>100%</b>	

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

Note: Totals in bold for Number and Percent do not equal subcategory totals because only the largest subcategories are included in the table.

**Figure 5.28: Percent of the 1992-1993 Cohort of Community College Nursing Graduates with Any Job in Health Care**

	1999	2000	2001	2002	2003	2004
All Health Care						
All Nurses	79.6%	78.4%	78.0%	77.4%	77.1%	76.3%
RNs	78.5%	77.3%	76.9%	76.5%	77.0%	75.9%
LVNs	81.8%	80.6%	80.3%	79.4%	77.3%	77.2%
Hospitals						
All Nurses	56.7%	55.7%	55.0%	54.3%	53.3%	53.3%
RNs	61.7%	60.1%	59.4%	58.4%	57.8%	57.7%
LVNs	46.5%	46.9%	46.0%	45.7%	44.0%	44.2%

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

The shares of licensed nurses in the graduating cohort of 1992-1993 with any job in the health care industry are presented in Figure 5.28. More than a decade after graduation, the majority of these nurses were working in health care in California, with 76 percent remaining in the health industry in 2004. Note that many jobs not included in the “health industry” are nursing related, as indicated by Figure 5.27. By 2004, the share of these RNs employed in the hospital industry was 58 percent, while 44 percent of LVNs were employed in hospitals.

Figure 5.29 presents the shares of nurses in the 1992-1993 graduating cohort who did not change industry of employment after 1998. Overall, 86 percent of nurses were in the same industry in 2004 as in 1998. Eighty-nine percent of nurses employed by hospitals in 1998 were still in the hospital industry in 2004, and 85 percent of nurses working for other health care employers stayed in that industry over this period. RNs had slightly higher attachment to their industry than did LVNs.

Figure 5.30 examines the movements of nurses from employer to employer, by presenting the share of RNs who remained with the same employer after 1998. As seen here, job-changing rates are somewhat lower for more-experienced nurses than for the younger 2000-2001 graduating cohort. Overall, 61 percent of nurses changed employers between 1998 and 2001, and 43 percent changed employers by 2004. Hospital-employed nurses were somewhat more loyal to their employers, with 68 percent with the same employer in 2001 as in 1998, and 48 percent remaining with the same employer in 2004. RNs changed employers at a lower rate than LVNs. For example, 48 percent of RNs employed in hospitals in 1998 were with the same employer in 2004, but only 46 percent of LVNs remained with the same employer.

Where do members of the 1992-1993 graduating cohort go when they leave the hospital industry? Figure 5.31 explores that question by identifying the industries in which nurses were working in 2004 if they had been working in hospitals in 1998. Over 42 percent of these nurses moved to ambulatory health services, including physicians’ offices and ambulatory surgery centers, after leaving hospitals. Twelve percent were in “administrative and support services,” which includes a variety of employers, some of which are related to the delivery of health care. Another 11 percent worked in

educational services settings, and nine percent worked for nursing and residential care facilities.

**Figure 5.29: Percent of the 1992-93 Community College Nursing Graduates That Stayed in the Same Industry after 1998**

	Percent remaining in industry in...					
	1999	2000	2001	2002	2003	2004
All Nurses						
All Industries	96.3%	93.3%	91.2%	89.2%	87.1%	86.0%
Hospitals	96.9%	95.0%	92.8%	91.3%	90.0%	88.7%
Other Health Care	96.8%	92.7%	90.9%	88.2%	86.0%	84.8%
Other Industries	94.6%	90.5%	88.5%	86.2%	82.7%	82.1%
RNs						
All Industries	96.6%	93.2%	91.6%	89.8%	87.8%	86.7%
Hospitals	97.2%	94.5%	92.7%	91.7%	90.6%	89.4%
Other Health Care	97.1%	92.5%	90.8%	87.9%	85.8%	84.9%
Other Industries	95.3%	91.1%	89.7%	87.2%	83.2%	82.4%
LVNs						
All Industries	95.5%	93.4%	90.6%	88.2%	85.9%	84.7%
Hospitals	96.1%	96.5%	93.0%	90.2%	88.3%	86.7%
Other Health Care	96.5%	92.9%	90.9%	88.6%	86.2%	84.6%
Other Industries	93.0%	89.2%	86.0%	84.1%	81.5%	81.5%

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

Hiring data can provide more insight about the turnover and retention of nurses. Figure 5.32 presents data on reasons for new hires reported by employers of RNs, LVNs, and competing occupations. The data are derived from the California Cooperative Occupation Information System, and pool data from 1999 through 2003. Employers indicated that replacements of RNs who left their jobs accounting for 16 percent of their workforce per year, on average. This suggests that the annual turnover rate for RNs is about 16 percent. This turnover rate is fairly consistent with the data presented in Figure 5.30. Another two percent of the workforce was added to replace RNs who were promoted, and two percent was added to replace temporary positions. Another seven percent was added due to growth in demand for staff.

**Figure 5.30: Percent of the 1992-93 Community College Nursing Graduates That Had the Same Employer after 1998**

	Percent remaining with same employer in...					
	1999	2000	2001	2002	2003	2004
All Nurses						
All Industries	87.4%	71.7%	61.3%	52.5%	47.0%	42.6%
Hospitals	90.5%	77.6%	68.3%	59.0%	51.8%	47.7%
Other Health Care	79.7%	56.2%	44.6%	35.9%	33.3%	27.3%
Other Industries	88.7%	74.9%	63.4%	55.4%	50.5%	47.0%
RNs						
All Industries	88.7%	73.8%	64.6%	56.4%	50.6%	46.0%
Hospitals	91.1%	78.2%	69.7%	59.9%	52.6%	48.3%
Other Health Care	80.6%	55.7%	47.9%	41.9%	39.5%	34.0%
Other Industries	89.2%	76.7%	65.1%	58.3%	53.7%	49.2%
LVNs						
All Industries	84.6%	67.4%	54.5%	44.6%	39.6%	35.6%
Hospitals	88.6%	75.7%	64.3%	56.3%	49.6%	45.9%
Other Health Care	78.8%	56.8%	41.6%	30.2%	27.4%	20.9%
Other Industries	87.7%	70.7%	59.3%	48.5%	43.0%	42.2%

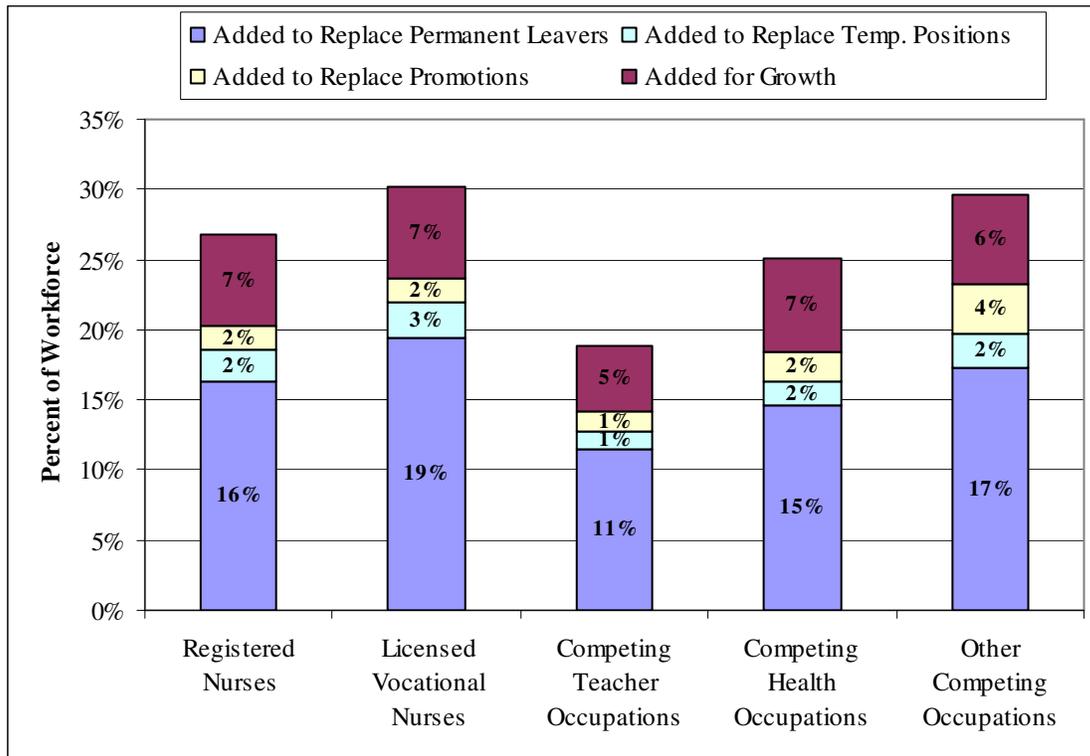
Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

**Figure 5.31: Industries of 1992-1993 Cohort of Community College Nursing Graduates Who Were Employed in Hospitals in 1998, 2004**

Number	Percent	2002 NAICS Title
22	12.09	Administrative and Support Services
20	10.99	Educational Services
76	41.76	<i>Ambulatory Health Services</i>
16	8.79	<i>Nursing and Residential Care Facilities</i>

Source: California Employment Development Department Base Wage File data merged with California Community Colleges Chancellor's Office data on nursing program graduates.

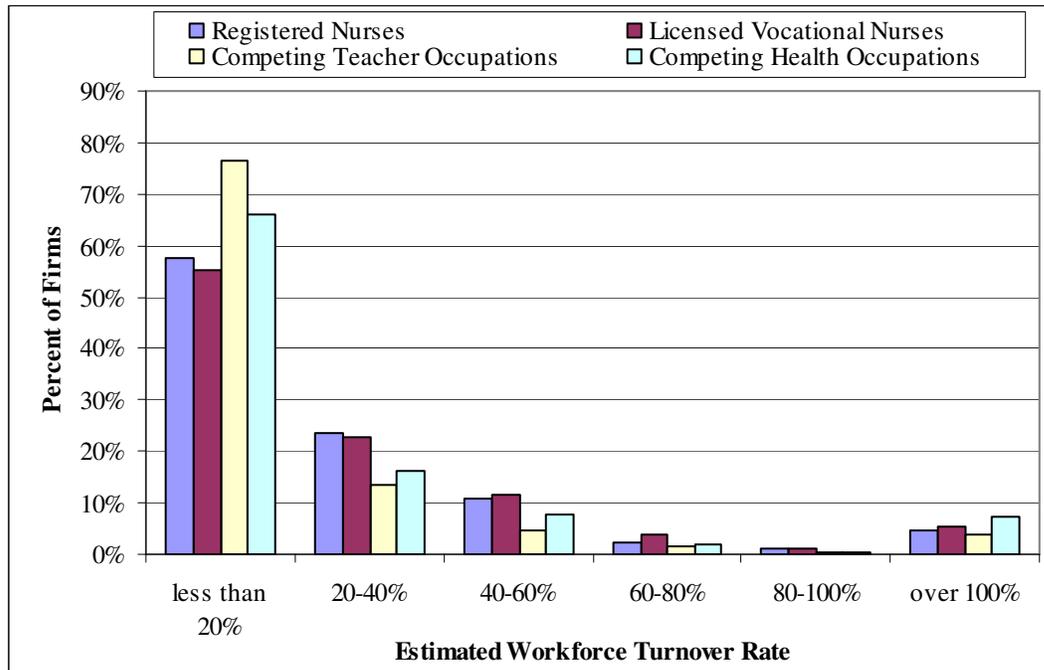
**Figure 5.32: Reasons for New Hires within the Past Year, by Occupation**



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2003 pooled.

LVN turnover occurred at a greater rate than for RNs; 19 percent of positions were hired to replace people who left the employer. Similar rates of hiring for replacement of promoted staff, replacement of temporary positions, and new staff to meet growth needs were reported. These hiring rates are higher than those observed in competing teacher and health occupations. Replacement hiring for those who leave jobs is only 11 percent in teacher occupations and 15 percent in other health occupations. “Other” competing occupations, which reflect all other employment sectors, have a replacement hiring rate of about 17 percent. Thus, relative to other professions to which nurses are often compared, RN and LVN replacement hiring is fairly higher, but in comparison with the economy as a whole, RN and LVN turnover rates are not unusual.

**Figure 5.33: Distribution of Firms by Occupational Turnover Rate**



Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2003 pooled.

Figure 5.33 examines total occupational turnover more carefully, by presenting the frequency distribution of turnover rates for RNs, LVNs, competing teacher occupations, and competing health occupations. Note that occupational turnover is defined as the number of replacements due to people who permanently leave the employer. Over half of employers in all four occupational groups have less than a 20 percent turnover rate. However, over 20 percent of employers report turnover rates of 20 to 40 percent for RNs and LVNs. Another 10 percent of employers face turnover rates of 40 to 60 percent. In comparison, only about 20 percent of employers of other occupational groups face turnover rates of 20 to 60 percent (inclusive). High RN and LVN turnover rates are observed in more firms than turnover rates for other competing occupations.

## E. Working Conditions

The relatively high turnover rates for RNs and LVN, compared with teaching and other health occupations, could result from dissatisfaction with working conditions. Working conditions, particularly in acute care hospitals, have drawn attention from a variety of groups, most notably nursing unions. Nurse advocates believe that poor nurse-to-patient ratios, “mandatory” overtime, problems with workplace safety, and other factors have driven people away from nursing (Service Employees International Union, 2006). Objective research and analysis also supports this view (General Accounting Office, 2001; Pindus, Tilly, and Weinstein, 2002; Sochalski, 2002; Newman et al., 2002; Stone et al., 2007). Research also suggests that working conditions affect the quality of care provided to patients (Institute of Medicine, 2004; Agency for Healthcare Research and Quality, 2006; Stone et al., 2004). In 2004, California implemented minimum nurse staffing requirements in acute care hospitals; it is not yet known whether and to what extent this regulation improved working conditions, nurse turnover, and quality of patient care.

Many analysts, researchers, and advocates argue that without workplace reform, the nursing shortage will not be permanently remedied. In some states, advocacy groups have turned to legislative action to address working conditions. For example, legislation passed in California in 1999 requires that the State establish minimum nurse-to-patient ratios in acute care hospitals. Similar legislation has been considered or is being considered in at least 12 other states. In March 2002, five state nursing organizations broke away from the American Nurses Association (ANA) because these organizations intend to lobby for minimum nurse-to-patient ratios, which the ANA does not support. Legislation restricting “mandatory” overtime has been introduced in at least 14 states and in the U.S. Congress.

## F. The Role of Unions in the Labor Market for Licensed Nurses

In the past decade, there has been resurgence in union activity in the health care industry in California, particularly in hospitals (Engstrom, 1994; Sherer, 1994; Forman and Davis, 2002). For example, between 1997 and 2002 the California Nurses

Association won elections to represent registered nurses (RNs) in over 20 hospitals. The importance of unions in determining how hospitals are managed, how patients are cared for, and what legislation is enacted is rising, with unions taking credit for wage increases across the nation, hospital worker safety improvements, and the implementation of minimum nurse-to-patient ratios in California (Forman and Davis, 2002; Raine, 2002; Wolkinson and Lundy, 2000).

In theory, unions primarily are interested in the wages, employment security, and working conditions of their members (Baumol and Blinder, 1991). They bargain with employers to ensure that any profits (or net revenues) received by employers are distributed to employees, at least in part. Researchers generally have found that hospital unions increase the wages and fringe benefits of workers represented by the unions (Link and Landon, 1975; Becker, 1979; Feldman and Scheffler, 1982; Hirsch and Schumacher, 1995), and that there is a corresponding increase in total hospital costs (Miller, Becker, and Krinsky, 1979).

Unions have both direct and indirect effects on wages and benefits; that is, unions can affect wages both at the hospitals they organize and at neighboring hospitals (Feldman and Scheffler, 1982; Hirsch and Schumacher, 1998). Direct wage premiums arise from union contract bargaining for higher wages. Indirect wage effects usually are attributed to employers that do not have unionized employees facing a threat of unionization. These employers offer higher wages to stave off union activity (Sloan and Steinwald, 1980; Feldman and Scheffler, 1982; Lewis, 1990).

The improved wages and benefits enjoyed by union members affect their attachment to their jobs. Research has shown that job tenure is higher and quit rates are lower in unionized firms (Bruggink et al., 1985), and that hospital unions reduce turnover rates for hospitals (Becker, 1978).

## **VI. Shortage and surplus cycles**

### A. Labor Market Dynamics of Shortage

Reports of nursing shortages in the United States have arisen regularly over the past 60 years (Yett, 1975; Friss, 1994). Prior to the current shortage, the most recent shortage was reported in the late 1980s and early 1990s (Aiken and Mullinix, 1987). By the mid-1990s, complaints of shortage were replaced with concerns that there was an oversupply of nurses, largely due to the growth of managed care in the United States (Aiken, Sochalski, and Anderson, 1996; Buerhaus and Staiger, 1996). However, by 1998, stories of shortage resurfaced, particularly in nursing specialties such as critical care and on the western and eastern coasts of the United States (Gurnon, 1997; Kilborn, 1999). Estimates of average nursing vacancy rates at hospitals range from 10.2 percent to 13 percent, with one in seven hospitals reporting more than 20 percent vacancy rates for RNs (First Consulting Group, 2001; The HSM Group Ltd., 2002).

A shortage of labor is defined as occurring when the supply of labor is not as large as the demand for that labor, at the current wage. When there are shortages of labor, employers respond by increasing the wages they offer. These wage increases have three effects on the supply of labor. First, they make currently employed individuals more likely to take jobs with the employers who offer the higher wages, thus increasing supply to particular employers. This does not affect the market-wide shortage. Second, individuals who previously chose to not work are more likely to seek employment and individuals who are presently working will increase the number of hours they work because the financial gain from working is higher. This will alleviate the shortage to the extent that net labor supply is increased. Third, individuals are more likely to select the field of work, and thus will seek appropriate training. This will increase the supply of labor in the long-term, as individuals complete their training.

Wage increases also affect the demand for labor. As workers become more expensive, employers look for ways to reduce their need for those workers. Employers might substitute different types of workers, or they might invest in new equipment and processes that reduce the demand for labor.

The combined effect of these increases in supply and decreases in demand is a closing of the shortage. If supply and demand do not change rapidly, the shortage can persist for some period of time, with continuing wage increases. For example, changes in supply or demand might not occur immediately because of a pre-established delay, such as the time it takes to train a worker. In this case, wages can continue to rise even as the new supply of workers is in the pipeline, thus inducing even more people to enter the training pipeline. The delay between individuals' choice of the nursing profession and the time they are licensed as nurses is a central reason for recurrent RN shortages. RN licensure requires three to five years of study in a college, university, or hospital-based diploma program. Growth in wages has historically led to growth in graduations, three to four years after the wage increases (Spetz and Given, 2003).

During the period when growth in supply is delayed due to educational requirements, the supply of nurses could rise because presently licensed nurses increase their employment. However, the data and research suggest that there is little room in the RN labor market for short-term supply increases. As reported earlier, labor force participation of RNs is very high, and of those not employed in nursing, nearly 70 percent were 50 years or older in 2000. Furthermore, a number of studies have examined the relationship between wages for RNs and their labor supply, generally finding that RNs are relatively unresponsive to wage increases (Link, 1992; Brewer, 1996; Buerhaus, 1993).

Demand for RNs should decline as the wages of RNs increase during a shortage, if all other factors are held constant. Indeed, there is some evidence that the wages of RNs and other nursing personnel affect the demand for RNs by hospitals. However, due to regulatory and institutional factors, demand for RNs may not be as responsive to wage increases as is necessary to close the gap between demand and supply. Most healthcare leaders recognize that nurse staffing affects quality of care, and thus are reluctant to reduce staffing. Moreover, many California hospitals are increasing their demand for RNs and LVNs to meet the new minimum nurse-to-patient ratios. Because of these factors, it is not clear that hospitals can reduce staffing of RNs even when they face extraordinary financial incentives to lower labor expenditures.

Shortages also may persist if wages do not adjust to signal to the market that increased supply and reduced demand are needed. Wages might not change if hospitals engage in monopsonistic behavior; that is, if hospitals collude or base their own wages on those of competitors. This creates a long-term distortion in the supply/demand equilibrium, suppressing wages and perpetuating nursing shortages (Yett, 1975).

Nursing shortages also might be hospital-specific; in other words, a particular hospital might experience a shortage of nurses even when the market at large does not face shortage. Seago et al. (2001) found that demographics of a hospital's local population and a hospital's type of nursing care delivery system consistently predict hospitals that face nursing shortages. In particular, hospitals with high shares of their patients insured by Medicaid and Medicare are more likely to report an RN shortage.

### B. Measurement of Nursing Shortage

The notion of a nursing shortage has been highly publicized and widely discussed. This section attempts to add to this discussion by providing some empirical indicators of a nursing shortage. The following does not, by itself, identify the existence of a shortage nor quantify the extent of a shortage. It does, however, present analysis that is consistent with the notion of a shortage.

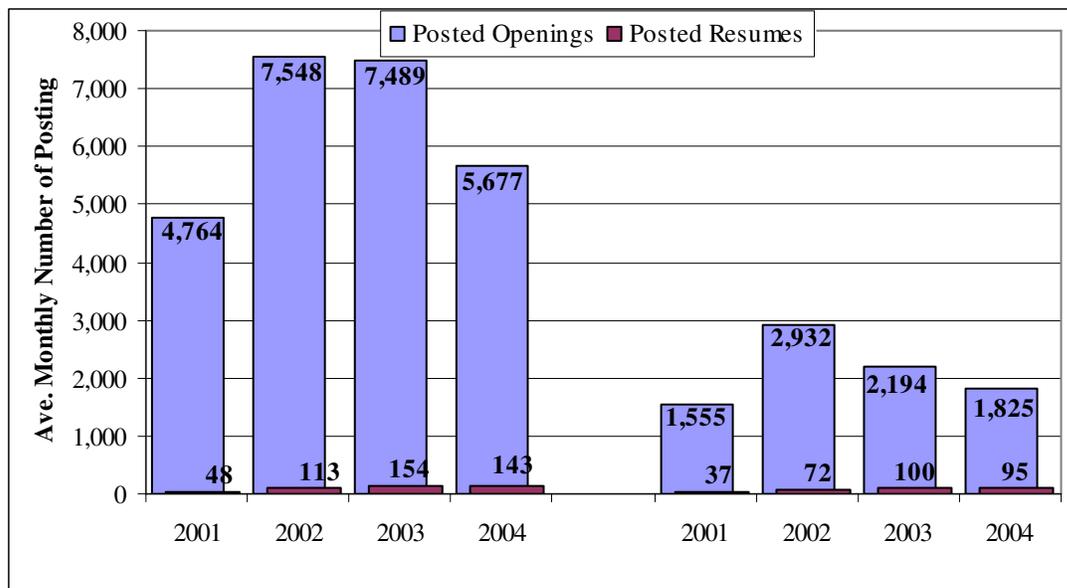
The discrepancy between the number of openings and resumes posted on the CalJOBS Electronic Database provides a clear example of the nursing shortage (see Figure 6.1). The monthly average number of registered nurse job openings posted on CalJOBS in 2003 is almost 50 times greater than the number of resumes posted to fill those positions. For licensed vocational nurses the difference is not as great, but still represents an extreme discrepancy between job openings and resumes. Furthermore, the gap between openings and resumes appears to have shrunk somewhat in the first half of 2004, although it remains large. While the differences between job openings and resumes could simply be the result of disparate use of the CalJOBS system (i.e., potential workers are less likely to use the database than potential employers), it nevertheless documents a mismatch between demand and supply.

Another indicator of a labor market shortage is the extent of unemployment. According to the 2000 PUMS, only about 1.3 percent of registered nurses, and about 3.7

percent of licensed vocational nurses were unemployed in California. These rates are significantly lower than the overall California unemployment rate of about 6.9 percent, suggesting the labor market is much tighter for nurses. Analysis of state unemployment insurance (UI) claims in 2002 also indicates a tighter labor market for nurses. Of individuals making a valid UI claim in 2002, about 23 percent of the registered nurses and 15 percent of the licensed vocational nurses were not unemployed long enough to collect benefits (see Figure 6.2). Only about 11 percent of all other occupations were not unemployed long enough. Furthermore, of those who did collect UI benefits, registered nurses and licensed vocational nurses collected benefits for a shorter period of time relative to other occupations at the median (see Figure 6.3).

Employer-based data from the CCOIS also documents a shortage of nurses. About 78 percent of employers reported difficulty (difficult or very difficult) finding qualified RN applicants and about 67 percent reported difficulty finding qualified LVN applicants (see Figure 6.4). These rates are higher than those reported for competing occupations. Just over half of employers reported that it was very difficult to find qualified RNs, which is about twice as great as those reporting that it was very difficult to find qualified applicants for other competing occupations.

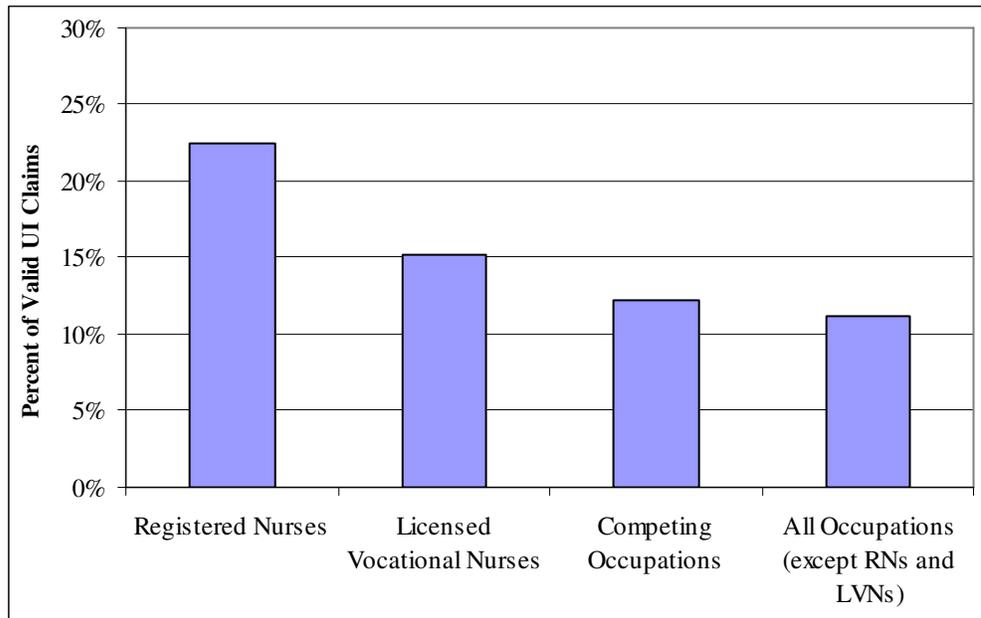
**Figure 6.1: Posted Job Openings and Resumes in the CalJOBS Electronic Database**



Source: CalJOBS Database, EDD, 2001-2004.

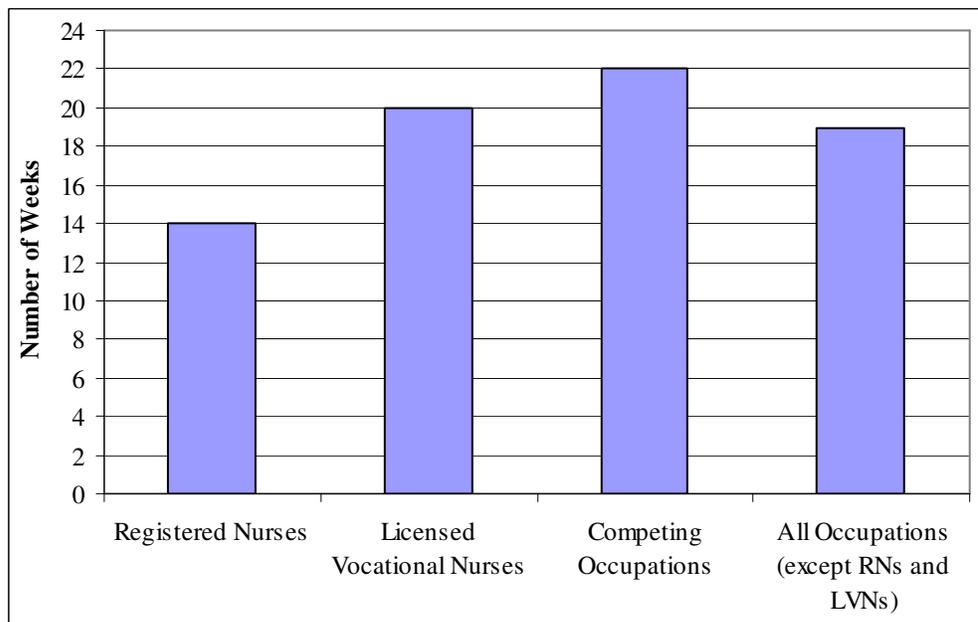
Note: Data for 2004 only includes the first six months of 2004.

**Figure 6.2: Percent of UI Claimants not Collecting Benefits, by Occupation (2002)**



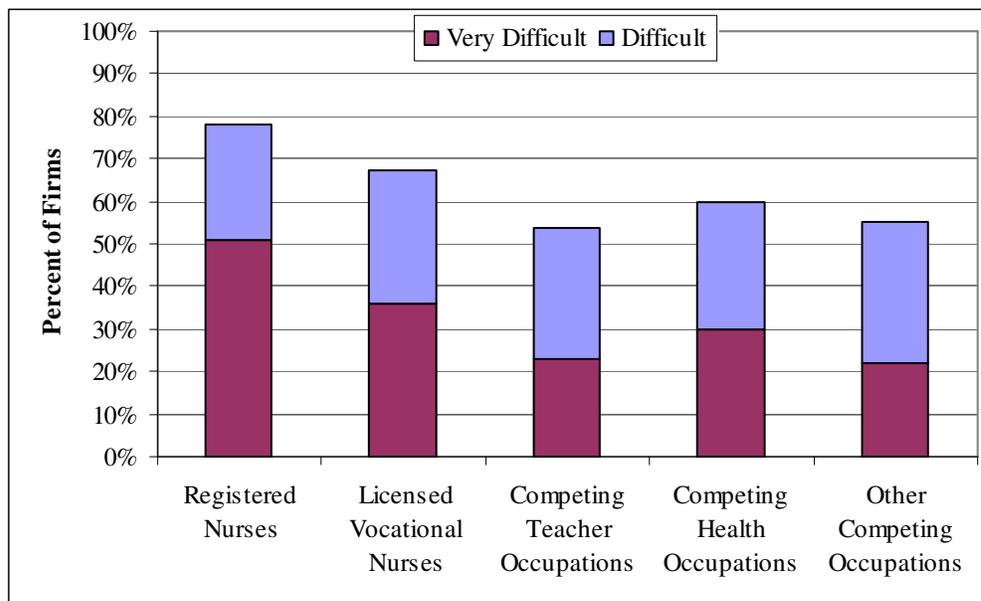
Source: Unemployment Insurance (UI) Claims data, EDD, 2002.

**Figure 6.3: Median Number of Weeks Collecting UI Benefits, by Occupation (2002)**



Source: Unemployment Insurance (UI) Claims data, EDD, 2002.

**Figure 6.4: Employer Perceived Difficulty of Finding Qualified Applicants, by Occupation**

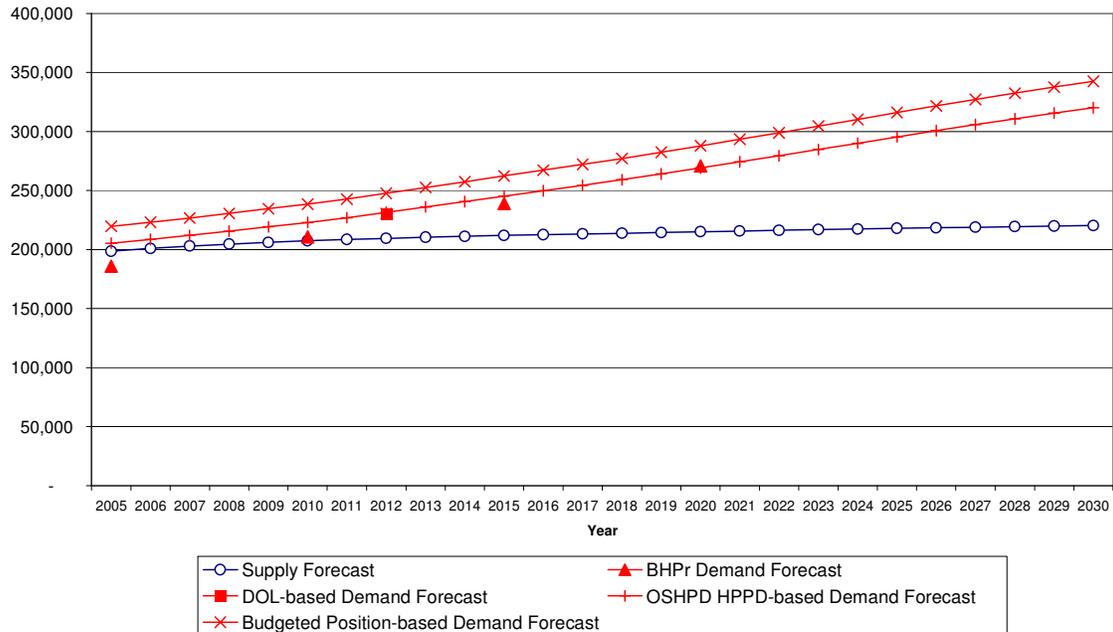


Source: California Cooperative Occupational Information System (CCOIS), EDD, 1999-2003 pooled.

### C. Future Prospects for Nursing Shortages

Most forecasts that have been published to date see no end to the shortage of RNs (Spetz and Dyer, 2005; Coffman and Spetz, 1999; Buerhaus, Staiger, and Auerbach, 2000; Levine, 2001; Maher, 2003). The Bureau of Health Professions in the U.S. Department of Health and Human Services projects that the shortage will worsen dramatically over the next 20 years, with a shortage of 800,000 nurses projected by 2020 (US Bureau of the Health Professions, 2002). In a more recent analysis, Spetz and Dyer (2005) found California’s RN shortage will worsen each year through 2030, and will range between 99,945 and 122,223 full-time equivalent (FTE) RNs. They estimated that the current shortage ranges between 6,872 and 21,161 FTE RNs. Figure 6.5 presents the future supply and demand for RNs estimated by Spetz and Dyer (2005); the gap is the forecasted shortage. The nursing shortage is made even more worrisome by the fact that many other nations are experiencing similar shortages. The United Kingdom, Canada, Australia, Southeast Asia, and Southern Africa are among many nations and regions that report nursing shortages of varying magnitudes (Aiken, Clarke, and Sloane, 2002).

**Figure 6.5: Projected Shortage of Registered Nurses (FTEs) in California, 2005-2030**



Source: Spetz and Dyer, 2005.

Hospitals have not idly watched the shortage worsen. They actively are seeking solutions to their own recruiting difficulties as well as the nationwide nursing shortage. The most obvious strategy is that of offering higher wages to nurses, as has been observed over the past few years. Given the likelihood that demand for RNs will not decline substantially even as wages rise, the labor market will depend on growth in the supply of RNs to reach equilibrium.

Most analyses of the State’s nursing shortage find that too few nurses are being educated to meet future demand. Spetz and Dyer (2005) estimated that State nursing programs need to graduate about 11,000 students per year between 2005 and 2020 to maintain an adequate nursing workforce. Rural counties, communities with high rates of poverty, and those that do not have RN education programs have the greatest difficulty attracting nurses (Seago et al., 2001). Unless California’s nursing education programs can produce additional graduates, the nursing shortage could jeopardize public health.

## VII. Directions for Continued Analysis

This analysis of the labor market for licensed nurses suggests several areas in which policy action and more research are needed.

### A. Policy Action

1. *Nursing schools need to expand to meet demand for nursing education.* The wage increases observed during a nursing shortage should increase interest in nursing education. However, most California nursing programs have more applicants than spaces. Nursing programs need funding to expand their programs, but they may face other barriers, such as a lack of faculty. Some NWI grantees focused their efforts on expansion of nursing education programs; the results of this evaluation will help policymakers determine whether this was an effective strategy to increase nursing supply. Whether state government grants or private contributions are more effective and appropriate for the expansion of nursing education must be debated by the Legislature and Governor's Office.
2. *Nursing program efficiency must be improved.* A large share of nursing students never complete their education programs, despite having met the requirements for admission to nursing programs. Colleges, universities, and policymakers must ensure that our educational programs are as efficient as possible, and that the maximum number of students graduate and pass the board examination. The Chancellor's Office of the Community Colleges, California State University, and University of California have a substantial role in this effort. However, EDD also can play a role in improving retention of students, by providing financial support to students and grants to nursing programs with the goal of retaining students. Financial aid strategies such as those supported by the NWI may improve graduation rates.

## B. Research Recommendations

1. *California needs ongoing analysis of the labor supply of nurses.* The California Board of Registered Nursing conducts a survey of RNs every two years to ascertain the status of the nursing workforce in California. The nurses are not surveyed repeatedly; each survey provides a “snapshot” of the current workforce. No publicly available source of data offers information about individual nurses over time. Thus, while one can examine the labor supply of nurses in a cross-sectional survey, individual nurses cannot be tracked to learn how their employment changes. The Employment Development Department might be able to work with the Boards of Registered Nursing and Licensed Vocational Nursing and Psychiatric Technicians to fill this gap, since the Base Wage Files provide information about the behavior of workers over their working lives. At the present time, the Boards are not permitted to release Social Security Numbers of RNs or LVNs to any other state agency for research purposes, under Section 30 of the California Business and Professions Code. A legislative change to give the Board authority to release Social Security Numbers would greatly improve the State’s ability to understand the dynamics of RN and LVN employment.
2. *Strategies to forecast the demand for nurses are needed.* At present, forecasts have used disparate strategies to estimate the future need for nurses in California. EDD should work with other agencies to evaluate and develop accurate forecasts of future demand for nurses. Such information would help EDD craft policies to avert future nursing shortages.
3. *Evaluation of the effect of minimum nurse-to-patient ratios on licensed nurse demand.* In January 2004, California implemented minimum staffing ratios in hospitals. While it is forecasted that these ratios will result in demand for an additional 5,000 nurses, it is not clear whether these nurses are available, or whether hospitals will employ RNs or LVNs to meet the new requirements. Research is now underway to study the effects of these ratios on the demand for nurses, wages, and quality of care. EDD has a strong interest in learning how these regulations affected the demand for nurses.

As policymakers and researchers improve their knowledge of how the nursing labor market functions, and what interventions help bring the market into balance, State leaders can work proactively to avert nursing shortages.

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