Chapter Two
The North Carolina Nursing Workforce in 2003

Overview of the Nursing Workforce Shortage*

As of 2000 there were approximately 2.2 million registered nurses (RNs) working in various healthcare settings across the United States, making registered nurses the single largest group of healthcare professionals in an industry that represents approximately 14% of the US gross domestic product.[1] The federal Bureau of Labor Statistics estimates that there were 679,470 Licensed Practical Nurses (LPNs) employed in the nursing workforce in that year along with almost 1.3 million nurse aides, orderlies and nursing attendants.[2] Disruptions, maldistributions, and shortages in the nursing labor market have important consequences for access to care and for the quality of care patients receive once in the healthcare delivery system. Therefore, the nursing and nursing assistive labor market, particularly the workforce of registered nurses (RNs), has been the topic of numerous articles, reports, and books. Several recent and high profile reports either assert that there currently is a national shortage of registered nurses or predict that there will be one soon.[3,4,5,6] An analysis by the National Center for Health Workforce Analysis showed a shortfall of 110,000 RNs as of 2000, or six percent of total demand, that is expected to reach 12% by 2010 and will escalate to a shortage of a half-million RNs—about 20% of the total needed—by just 2015.[6] Such forecasts bring into question whether there will be sufficient numbers of registered nurses to meet the future demands of an aging society.[7]

Whether there is currently a nursing workforce crisis in North Carolina is open to debate. Yet, there is little question that, without some intervention, North Carolina is likely to experience a severe shortage in the coming decade due to the combination of an aging population and an aging nursing workforce. Although there is no way to determine the exact number of nurses that will be needed in North Carolina in the future, long-range forecasts of supply and demand for RNs in North Carolina predict a shortage of anywhere from 9,000 in 2015 to almost 18,000 by 2020.[8] The actions recommended in this report to be taken by legislators, educators, researchers, healthcare delivery organizations, and members of the business community are proposed in an effort to attenuate what many have characterized as a future "crisis" in regard to our state's nursing workforce.

Both the supply and the demand for nurses are affected by a variety of elements, but there are a number of circumstances that suggest a shortage of registered nurses and other nursing assistive personnel will most likely develop over the next two decades. North Carolina's population continues to grow at a rapid pace and the age groups most likely to use healthcare services (those age 65 and older) are among the fastest growing groups. At the same time, the nursing workforce in North Carolina is aging at an even faster rate. Traditionally, registered nurses move out of full-time employment rapidly after the age of 55. In 2001 about 14% of the RN workforce was age 55 or older. [9] Another 31% were between the ages of 45 and 54. The LPN workforce is even older: 18% were 55 or over in 2001 and another 32% were age 45 - 54.[10] These two factors, along with others, will exert enormous pressure on the balance between supply and demand for nurses in North Carolina over the next ten to twenty years. This chapter briefly discusses the various factors that affect demand and supply, as well as forecast estimates of future supply and demand in North Carolina.

Factors Influencing Demand for Nurses

The factors that affect demand for nursing care are likely to lead to an increased demand for all categories of nursing personnel, from nurse aides to registered nurses to advanced practice registered nurses in future years. The demand for nurses is determined by the intersection of two factors: the number of people who need nursing services and the amount of money available to pay for those services. These, in turn, are

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affected by healthcare technology and medical advances, labor productivity, healthcare payment systems, and the general economy.

The number of people needing services

Population growth will increase the demand for healthcare of all types in our state. Between 1990 and 2000 North Carolina's population grew by about 1.4 million people, from a total of 6,632,448 to 8,049,313—a growth rate of 21%. Our population is expected to maintain that rate of growth and increase by another 1.5 million by the year 2010, and by another 1.5 million to a total of almost 11 million people by the year 2020.[11] In addition, the number of persons age 65 and older in North Carolina is expected to double from 969,048 in 2000 to more than 2.2 million in the year 2030, at the same time increasing as a proportion of the total population from 12% in 2000 to almost 18% by 2030.[12] The number of persons age 85 and older is projected to increase by more than 150%, from about 105,000 in 2000 to 268,000 in 2030.[12]

Individuals age 65 and older spend, on average, three times more on healthcare than younger persons,[8] these statistics have strong implications for the future demand for nurses. Not only will more nurse aides, LPNs and RNs be needed to meet this growing demand, but there will also be a growing demand for nurses with specialized skills in areas such as geriatrics, oncology, dialysis, critical care, cardiology, home care, and case management to handle the multiple conditions, severity of chronic illness, and multiple treatment regimes that are characteristic needs of the elderly. More RNs in advanced practice, such as Nurse Practitioners, Nurse Midwives, Clinical Nurse Specialists, and Certified Registered Nurse Anesthetists, will also be needed as the size of the general population expands and the demand for services increases from all age groups.

Technological changes and medical advances

The impact of technological change and medical advances on the demand for nurses is more difficult to predict. Medical advances that result in the need for intensive and/or complex nursing interventions will increase the demand for nurses in the future. On the other hand, some technologies may decrease the demand for nurses inasmuch as they increase nurse productivity or allow patients to care for themselves, as has happened with new pain management technologies. Over the past 20 years, changes and advances in healthcare have generally increased the overall demand for nurses and have created new arenas of patient care that require nurses with highly specialized skills. It is reasonable to expect that trend to continue. The growing technical complexity of care over the next 20 years will most likely create an increasing demand for nurses with specialized clinical skills who are prepared to practice at advanced levels to meet patient needs.

Labor productivity, nurse staffing and quality

The healthcare industry is often cited as one of the least efficient when it comes to using new technologies to improve worker productivity.[13,14,15,16] The non-standard nature of the work makes it difficult to find pre-existing technology fixes that actually decrease workload rather than add to it, but it can be expected that productivity aids, such as point-of-service electronic charting and real-time access to patient records, will become more widespread, improving the productivity of nurses. Generally, productivity improvements in any industry have the effect of reducing the demand for labor.

Conversely, an increase in demand for registered nurses is being fostered by several recent and high profile studies which provide evidence of the link between higher RN staffing levels and lower incidences of patient pneumonia, urinary tract infections, pressure sores, shock or cardiac arrest, deep vein thrombosis, failure to rescue, 30-day mortality, and upper gastrointestinal bleeding.[17] This body of literature empirically validates the registered nurse as a central and critical component in the delivery of quality care to patients. Additionally, this literature reinforces the importance of having a nursing workforce of adequate size. For example, Aiken et al. found that for every additional patient added to a registered nurse's workload, the probability of patient mortality increases by 7%.[18] This research suggests that substantial decreases in mortality rates could result from decreasing the size of patient loads assigned to nurses and increasing nurse staffing ratios in our nation's hospitals. Aiken, et. al also found that by increasing the proportion of staff nurses with baccalaureate degrees, mortality decreased 5%. Higher adverage education levels of the nursing workforce has a significant effect on patient mortality.[18] As hospitals and other quality-oriented healthcare delivery systems implement the staffing standards identified in this body of research, the overall demand for registered nurses, and the demand for

more highly educated registered nurses will probably increase over current levels.

Factors Influencing the Supply of Nurses

The current and future supply of nurses in North Carolina is affected by a variety of factors: the rate at which we can enroll and graduate new professionals from our educational institutions, the capacity of our educational system to expand or contract to meet market demands, the rate at which nurses move out of or into our state from other states or other countries, social revolutions such as the increase of women in the workforce in the past 30 years, new and expanding career options for women, demographic trends that affect the size and age of the labor force now and in the future, and workplace issues such as wage levels and working conditions that affect people's willingness to work in certain environments. We will review each of these factors in turn after a brief review of how the supply of nurses has been changing in recent years.

Overview of current nurse supply trends

On the national level, the RN workforce (those employed in nursing positions) grew by 73% from 1980 through 2000.[19] However, between 1996 and 2000 the growth rate slowed to less than one-half the rate of the previous four-year period. Specifically in the period 1996-2000, only 86,000 registered nurses were added to the national nursing workforce. This is the lowest number added in a four-year period over the past two decades, and importantly, only comprises two-thirds of the growth rate that occurred during the last national nursing shortage (1984-1988).[20]

In North Carolina our RN workforce grew by 111% between 1982 and 2000, due in part to the high rates of in-migration (including newly educated and licensed nurses) that the state enjoyed during that period. And, in spite of the fast growth in our general population, the ratio of RNs-to-population in North Carolina improved from 47.4 full-time employed (FTE) RNs for each 10,000 persons in 1982 to 72.3 RN FTEs per 10,000 in 2001.[21] There was a slight and temporary decline in this ratio in 1995 and 1996 congruent with national trends, but the ratio has risen consistently since then. This growth in the RN labor market reflects the growth of the healthcare industry in this state, as well as a widening of job opportunities for nurses as their knowledge and skills become more widely recognized outside of traditional healthcare settings. For instance, one of the fastest growing job markets for RNs in the past few years has been in clinical trials research sponsored by pharmaceutical companies, another growing industry in North Carolina.

Recently, however, the rate of growth in the total number of RNs holding an active license to practice has declined. The same is true for the number of RNs employed in nursing positions within the state and the number of full-time equivalent RNs (a translation of the number employed in nursing based on the actual number of hours spent in the workforce per week). All of these different views of the RN workforce in the state have shown declines in the past few years. (See Table 2.1)

The general trend for licensed practical nurses (LPNs) (who must work under the supervision of a registered nurse or physician) has been very different from that of RNs. While the overall numbers of LPNs licensed to practice in the state have increased slightly, the rate of growth totaled only 18% over the 19-

Table 2.1.
Declining growth rates in the number of RNs in North Carolina

	Total Number of RNs Licensed	Growth Rate From Previous Year	Total Number of RNs Employed In Nursing	Growth Rate From Previous Year	Total Number of RN FTEs in the Workforce	Growth Rate From Previous Year
1997	83,770	4.9%	56,203	5.4%	51,502.23	5.3%
1998	86,799	3.6%	58,516	4.1%	53,657.60	4.2%
1999	89,798	3.5%	61,255	4.7%	56,076.65	4.5%
2000	92,488	3.0%	63,288	3.3%	57,862.89	3.2%
2001	94,157	1.8%	65,115	2.9%	59,179.10	2.3%

year period from 1982 to 2001. The actual number of LPNs employed in the nursing workforce has dropped from 15,055 in 1994 to 14,474 in 2001. In addition, there has been a decrease in the total number of LPNs holding an active license to practice in the state in three out of the past six years. Table 2.2 shows how the rates of growth for LPNs have been declining. The reasons for this are complex, but most nursing leaders agree that the LPN role of assistant to an RN or a physician has been squeezed from both sides. Many hospitals in the state—once the primary place of employment for LPNs—have replaced LPNs with less educated and less expensive nursing assistants.

The aging of the nursing workforce

In North Carolina the primary factor leading to a nursing shortage in the coming years is the combination of an increase in demand due to an aging population and the concurrent aging of the nursing workforce. Nationally, the rate at which registered nurses have been aging exceeds that of the general workforce in the US.[22] The average age of working registered nurses in the US increased 4.5 years between 1983 and 1998, from 37.4 years to 41.9 years. By comparison, the average age of the entire US workforce increased by less than two years during that same period, from 37.4 to 39 years of age. In addition, the proportion of RNs in the workforce who were younger than 30 declined from 30.3% to 12.1% over the same period, compared to a decline of less than 1% for the total labor force.[22]

In North Carolina, the RN workforce aged even faster than the national trend, going from an average age of 38.3 in 1983 to 43.1 in 1998—a difference of 4.8 years. Since then, the average age has continued to climb, but at a slower rate. In both 2000 and 2001 the average age was 43.6 in the RN workforce. As a group, the LPN workforce tends to be slightly older than their RN colleagues. In 1983 the average age was 40.5 and had increased by 4.9 years to 45.4 in 1998. By 2000 it had increased to 46 years on average, but declined by just over a year to 44.9 years in 2001.[23]

More significant to the future prospect of a nursing shortage is the fact that a large portion of both the RN and LPN workforces are expected to retire within the next 10 years. In 2001, more than one-quarter of the North Carolina's active RN workforce and almost one-third of LPNs were over the age of 50.[23] Previous research conducted by the North Carolina Center for Nursing (2001) showed that after age 55 workforce participation drops significantly for both RNs and LPNs. The percent of nurses actively employed in full-time nursing positions is about 70% among all nurses age 46 - 55, but drops to 50% for RNs and about 44% for LPNs in the 56 - 65 age bracket. By age 66, almost all RNs and LPNs are out of the nursing workforce.[24] If these results are applied to the current nursing workforce, North Carolina can expect to lose at least 18,000 RNs and 4,000 LPNs by the year 2020 due to retirement alone.[24] Another segment of the NCCN study asked nurses the age at which they intend to retire and then translated that information into the number of years they expect to stay in the workforce. The results showed that 36% of all nurses over the age of 45 when the study was conducted in 2001 planned to retire by 2006.[25]

Traditionally the supply of licensed nurses who are not currently employed in nursing has been looked to as a source of additional personnel to ameliorate any temporary nursing shortage. However, the majority of

Table 2.2.
Declining growth rates in the number of LPNs in North Carolina

	Total Number of LPNs Licensed	Growth Rate From Previous Year	Total Number of LPNs Employed In Nursing	Growth Rate From Previous Year	Total Number of LPN FTEs in the Workforce	Growth Rate From Previous Year
1997	21,665	2.5%	14,240	2.5%	13,024.15	2.5%
1998	21,559	-0.5%	14,312	0.5%	13,146.60	0.9%
1999	21,568	0.0%	14,402	0.6%	13,268.02	0.9%
2000	21,544	-0.1%	14,341	-0.4%	13,222.03	-0.3%
2001	21,474	-0.3%	14,474	0.9%	13,401.65	1.4%

the registered nurses in North Carolina who reported they were not employed in nursing positions are at or nearing retirement age. In 2001, about 52% of the 14,350 licensed RNs not working in nursing were under the age of 50.[25] Nationally, the problem is even more severe: only about 35% of licensed RNs out of the workforce are under age 50. And, even if all of them returned to nursing, it is estimated their numbers would not fill all the vacancies currently available in just the hospital sector alone, where approximately 59% of all registered nurses work.[26]

Demographic factors affecting the supply of nurses

The number of young women between the ages 15-19 in the United States declined in the late 1980s and 1990s, decreasing the number of potential candidates for nursing education.[27] In fact, many nursing education programs saw a decline in the number of applicants during that period. In addition, young women in this age cohort are 30% - 40% less likely to become registered nurses than those graduating from high school in the 1960s and 1970s, due no doubt to expanding career opportunities in fields such as law, medicine, and business. Those new opportunities have drawn women away from nursing careers.

When women do choose nursing, they are doing so at later ages. Results from the 2000 National Sample Survey of RNs show that in 1980, 25.1% of all RNs were under the age of 30, but that by 2000, only 9.1% of RNs were under age 35.[28] This reduces the number of years they have available for nursing employment. Nationally, the average age at graduation from an entry-level nursing education program was 24.3 for RNs who graduated prior to 1985 and were in the workforce in 2000. For those who graduated between 1986 and 1994 the average age was 28.7. And for those who graduated between 1995 and 2000, the average age was 30.5.[28]

Although the number of nurses under the age of 30 has declined sharply over the past twenty years, the overall number of registered nurses has steadily grown until recently. This growth has been due in large part to nursing being an attractive second career option.[29,30] Nursing is unique in that there are currently three educational options that allow students to become registered nurses: non-degree diploma programs offered through hospitals; two-year associate degree programs offered at most community colleges; and four-year baccalaureate programs. In addition, baccalaureate nursing programs are now offering accelerated programs for students who already hold a four-year degree in another field, but want to make a career switch into nursing. These multiple educational opportunities offering choice and flexibility make it easier for people to consider a nursing career later in life, or after pursuing other educational or career options. While the number of people over age 30 entering the registered nurse workforce has increased, this has not been the case with regard to people under the age of 30. If this trend is allowed to continue, the registered nursing workforce will cease to expand and actually begin contracting by the year 2010 at a time when the demand for nursing services will be increasing most dramatically.[31] This scenario brings into question whether the supply of trained professional nursing personnel will be able to meet the future healthcare demands of an expanding population of older adults.[32]

One strategy for increasing the future supply of nurses is to improve recruiting efforts targeting those groups who have not previously been very interested in nursing as a career. Men and racial minority groups are two such groups. In North Carolina, for example, only about 6% the RN workforce and about 5% of the LPN workforce is composed of men.[33] Many stereotypes and biases exist within our culture that act as barriers to male participation in the nursing workforce. For example, participants in focus groups of male nursing students conducted in 1996 stated that they fear being perceived as unmanly by peers and patients.[34] Efforts to recruit men into the nursing profession must contest gender stereotypes in order to overcome them. In addition, the relatively low pay, and lower professional status and value given to nursing as compared with some traditionally male-dominated health professions can also create barriers which discourage men from entering nursing.

A larger proportion of the nursing workforce is made up of nurses from racial and ethnic minority groups, but these proportions do not resemble the population as a whole.[35] Nationally, only 14% of the RN workforce were members of racial or ethnic minority groups, compared to 31% of the total US population in 2000.[36] In North Carolina, 12% of RNs and 26% of LPNs were members of racial or ethnic minority groups in 2001. In contrast, racial or ethnic minorities account for 28% of the state's population.[37] As with males, there are a variety of reasons why racial

and ethnic minority students do not choose nursing as a career option. First, academically talented minority students now have access to a wide range of career options, such as law, medicine, and business which offer greater financial and prestige opportunities than nursing. In addition, due to the small number of minority representatives currently in nursing, minority students lack sufficient role models and mentors to guide and support academic and career decisions that could lead to nursing.[38] Many minority students also face significant financial barriers in pursuing nursing education. Finally many students graduating from high school lack the basic science and math background needed to succeed in a nursing education program. Continued efforts to improve the recruitment of men and minority groups into nursing could help mitigate any future shortage and lead to a nursing workforce that more closely matches the racial, cultural and gender profile of our society.

In- and Out- Migration and its Effect on the Supply of Nurses

North Carolina has become the residential and occupational destination of choice for many people in the past 20 years. From 1980 - 1990, the state population grew by 12.8%, but increased sharply to a rate of 21.4% between 1990 and 2000. Our temperate climate, mountains, coastal beaches, and growing economy all helped to fuel a massive in-migration from other states and countries that added more than two million people to our state's population between 1980 and 2000. A number of those new citizens are nurses. And, as a result, a sizeable proportion of North Carolina's nursing workforce include nurses educated elsewhere. In 2001, of all the RNs with an active license to practice in North Carolina, 60.1% had been educated in the state. Over the past decade, the number of RNs applying for a *new* license to practice in the state has increasingly been educated in another state. (see Table 2.3 below)

The addition of new nurses educated elsewhere has been an important element in the growth of the nursing workforce in North Carolina over the past two decades. In order to maintain a growing workforce, North Carolina must either maintain a high level of in-migration of new RNs from other states and/or increase the number of new nurses educated in our state. North Carolina's general population is expected to continue to grow between 2000 and 2010, but at a slower pace of about 17.6%, according to the projection estimates provided by the Office of State Budget, Planning and Management.[39] This rate of migration has important implications for decisions about the extent to which North Carolina will need to expand nursing education programs in the future.

Table 2.3.
Educational Location of Newly Licensed RNs in the State over the Past Decade

	Total Number of New RN Licensees[a]	Educated in NC		Educated in Other States	
		#	%	#	%
1990 - 1991	5320	2231	41.9	3089	58.1
1991 - 1992	6185	2652	42.9	3533	57.1
1992 - 1993	6396	2710	42.4	3686	57.6
1993 - 1994	6391	3024	47.3	3367	52.7
1994 - 1995	7244	3086	42.6	4158	57.4
1995 - 1996	7128	2904	40.7	4224	59.3
1996 - 1997	7481	2970	39.7	4511	60.3
1997 - 1998	7128	2879	40.4	4249	59.6
1998 - 1999	6949	2720	39.1	4229	60.9
1999 - 2000	6542	2501	38.2	4041	61.8
2000 - 2001	7486	2684	35.9	4802	64.1

[a] These RNs did not hold an active license to practice in North Carolina during the first year in the range, but were granted an active license at some point in the second year in the range.

Capacity of Educational Institutions to Train New Nurses

An obvious solution to the nursing shortage is simply to produce more nurses. North Carolina has 100 nursing education programs awarding a variety of degrees from an LPN certificate to entry-level RN education to the doctoral level. While we have many geographically dispersed educational programs to train nurses, our educational system lacks the necessary infrastructure and faculty base to significantly increase the number of new nursing students at this time. In November of 2001, only 8% of our RN entry-level programs said their programs could absorb a 15% increase in enrollment without hiring additional faculty.[40] The ability to expand the number of newly trained nurses is hampered by a lack of nursing faculty, state and local budget constraints, limited physical plant capacity and inadequate numbers of clinical sites and preceptors. Many nursing programs in the state are willing to expand their programs to train additional nurses, but are unable to do so because of these faculty and budgetary constraints.

A recent study by the NC Center for Nursing (NCCN) over the summer of 2003 found that most RN entry-level programs reported turning away students in the previous 12 months, despite the growing need for more nurses. Last year, associate degree programs, turned away a total of 4,371 qualified applicants; hospital-based programs denied admission to 165 applicants; baccalaureate programs denied admission to approximately 910 fully qualified applicants; and LPN programs denied admission to 4,371 applicants. These applicants were denied admission primarily because all available student placement slots were filled; further, insufficient classroom space, an insufficient number of clinical training sites, and an insufficient number of program faculty made it impossible to expand the number of student placement slots. Most programs (59%) indicated a need for more budgeted faculty positions to meet the demands of their current student enrollment; expansion would require even more faculty positions. When asked to identify the obstacles that impede their ability to expand enrollments, the majority of associate degree programs identified budgetary constraints (80%), insufficient space (73%), insufficient clinical sites (66%), lack of sufficient faculty positions (66%) and an insufficient number of qualified faculty to teach in the program (59%).[41]

Altogether more than 5,400 potential new RNs and 4,300 potential new LPNs were denied admission to North Carolina nursing education programs last year because the programs are running at full capacity and are unable—due to budget constraints—to add more faculty, more clinical practice sites, and/or more space for students. These numbers could include duplication as persons denied admission at one institution may be accepted by another. No available data enable us to ascertain the extent ot which this occurs. These issues are addressed more fully in Chapter Three and the appendices to that chapter.

Nursing Faculty Needs and the Future Supply of Nurses

The supply of nurses in North Carolina is determined in large part by our ability to educate new nurses. Central to that activity is the availability of knowledgeable and experienced faculty and instructors. However, just as the general nursing workforce is aging, the nursing faculty in the state are aging even faster. In 2001 the average age of nursing faculty in the state was 49.6 and almost half of the existing faculty (46%) were age 50 or older.[42] We can expect a substantial number of nursing faculty to retire in the next decade, just when our need to educate more new nurses is peaking.

One of the factors that inhibit the ability to recruit nurses into the faculty role is the disparity in wages between what can be earned in clinical settings versus the pay levels in most nursing education programs. Pay inequity is most pronounced in our associate degree programs, but was mentioned frequently by all types of nursing education programs in the state when asked to identify school and system policies that negatively impact the ability to hire or retain faculty or clinical instructors.[43]

The Influence of Wage Levels on Nurse Supply

Real annual wages for registered nurses have been flat since the last nursing shortage was resolved at the beginning of the 1990s. While actual earnings increased over that decade, when adjusted for inflation the increases disappear.[44] In addition, the Bureau of Labor Statistics reports that, nationally, annual earnings for RNs have been steadily falling behind the level of annual earnings for elementary school teachers for two decades now. The difference by 2001 was more than $13,000 annually.[44] This comparison is relevant

because teaching is an alternative career choice for potential nurses. Similar wage issues also affect LPNs and nurse aides, who can earn similar or better wages in less stressful jobs.[45]

In theory, at least, labor market shortages are self-correcting. As demand increases, wages also increase since a scarce commodity is worth more. Rising wages bring more people into the labor force, or demand decreases in the face of rising wages. In either case, an equilibrium is achieved between supply and demand. Historical trends in nurse wages suggest that this self-correcting mechanism was at work in solving the nursing shortage that occurred in the last half of the 1980s.[46] However, the financial constraints that have been imposed on our healthcare delivery systems by managed care and reduced reimbursement from federal and state insurance programs make it more difficult to raise wages now.

Working Conditions

Registered nurses report job satisfaction levels that are 11 to 25 percentage points lower than those reported by other professional workers in the US.[47] According to a study done by the NC Center for Nursing, less than half of the RNs and LPNs in North Carolina agreed with the statement: "I am happy with my current work environment" or "I would encourage other nurses to apply for a job with my employer".[48] These statistics are alarming because research shows that when job satisfaction is high nurses are less likely to leave their current position, less likely to leave nursing, less likely to burn out, and more likely to encourage others to enter into a career in nursing.[49] Numerous factors affect working conditions and job satisfaction for nurses: management support and in particular the quality of nurse management; the quality of relationships with physicians and other coworkers; nurses having autonomy and control over their practice; the physical demands of the job; physical and emotional stress; staffing levels; reasonable hours; flexible scheduling; adequate pay and benefits; career ladders and advancement opportunities; paperwork burdens; ergonomics; the use of technology; and having a safe and secure environment in which to work. These issues will be addressed more fully in Chapter 4. But it is safe to say that poor working conditions and stressful environments contribute to the nursing shortage.

Anticipating the Balance of Supply and Demand in the Future

In anticipating the demand for new nurses in the future, we must consider both the number of additional nursing jobs that are likely to be added to the health care industry, as well as the number of nurses that will be needed to replace nurses that retire or leave the occupation. Even if the total number of jobs for nurses were to remain constant over the next decade, we already know that the aging of the nursing workforce will result in the loss of at least 18,000 RNs and 4,000 LPNs by the year 2020 from retirement alone.

New job growth for nurses

The federal Bureau of Labor Statistics (BLS) expects employment for RNs to grow faster than the average for all occupations through 2010, increasing by 21% to 35% nationally during that period. Because nursing is one of the largest occupational groups, a very large number of new jobs are expected to be created.[50] Nationally, about 561,000 new jobs will be created for RNs between 2000 and 2010. This new job growth for RN positions is the largest of any occupation in the United States. The national estimates for LPNs show that employment is expected to grow for them about as fast as the average occupation through 2010 and will constitute approximately 322,000 new positions. Most of that growth will be in response to the long-term care needs of a rapidly growing elderly population and the growth of healthcare in general.[51] In addition, three other nursing-related occupations are projected to have higher than average national growth in new jobs: 496,000 additional positions for nurse aides, 370,000 additional positions for home health aides, and 322,000 new positions for home care aides.[52]

The BLS is able to compile these national estimates because each state conducts its own forecasts, based on in-state industries and employers, and makes the results available to the BLS. In North Carolina those forecasts are produced by the Labor Market Information section of the NC Employment Security Commission. They are predicting a 35% increase in new job growth for RNs between 2000 and 2010 and a 24% growth in new jobs for LPNs. This translates into an expectation of 21,975 new jobs for RNs and 3,822 new jobs for LPNs in North Carolina. The creation of these new jobs means that we will need this many more new nurses just to accommo-

date the expansion of the healthcare delivery system in the next decade.

Replacement openings for nurses

In addition to estimating the number of new jobs that will be created, the NC Employment Security Commission and the federal Bureau of Labor Statistics also calculate the number of job openings that will come about as people leave an occupation and start working in another, stop working altogether, or leave the state. These openings are referred to as "replacement openings." In North Carolina, a total of 12,837 net replacement openings are expected for RNs and 4,052 for LPNs between 2000 and 2010.[53]

In order to understand how the total demand for nurses will be affected, new job growth and replacement openings should be added together. For North Carolina the result is that the state needs to add a total of 34,812 more RNs to the workforce over 2000 levels (21,975 new jobs plus 12,837 replacement openings) by 2010 in order to meet the demands of both new job growth and replacement openings. Given that approximately 65,000 RNs were in the workforce in 2000, these figures suggest that North Carolina will need to increase it's RN workforce by approximately 50% by the end of the decade in order to avoid a shortage. For LPNs, projected new job growth of 3,822 positions plus the expected 4,052 net replacement openings means that 7,874 additional positions will need to be filled above 2000 levels. In 2000 there were approximately 14,500 LPNs in the workforce. In order to meet expected demand in 2010, the LPN workforce will also need to grow by approximately 50% in that short period of time.

Where will they come from?

Growth in the RN labor force during the past decade has come from a combination of new professionals educated in the state, as well as an influx of new and experienced professionals educated outside of North Carolina. During the past 12 years, the number of RNs holding an active license to practice and employed in a nursing position within the state has grown from a total of 42,717 in 1990 to 65,115 in 2001. During the last five years for which data are available, about 40% of the new RNs entering the state's workforce each year were educated in North Carolina nursing programs and about 60% were educated in other states. (See Table 2.4 for the annual numbers in the RN workforce.)

A similar pattern of in-migration has occurred in the LPN workforce as well, although in that case, LPNs coming into North Carolina from other states or other countries account for about 55% of the new licensees each year. About 45% come from the new LPNs produced in North Carolina practical nurse education programs. (See Table 2.5 for the source of new LPN licensees each year.)

Table 2.4.
Newly Licensed RNs Actively Employed in the North Carolina Workforce

	Educated Outside of NC			Educated Within NC			*Total # of Newly Licensed RNs Being Added to the Nursing Workforce*	*% of Total:*	
	New RN Grads	Graduated More Than 2 years Ago	RNs Re-activating a license	New RN Grads	Graduated More Than 2 years Ago	RNs Re-activating a License		*Educated Within NC*	*Educated Outside NC*
1997	854	3,224	286	2,669	103	125	7,261	42%	58%
1998	686	3,158	245	2,624	67	117	6,897	43%	57%
1999	647	3,138	264	2,404	61	153	6,667	41%	59%
2000	504	3,074	225	2,176	65	133	6,177	40%	60%
2001	539	3,414	576	2,201	144	179	7,053	41%	59%

Note: The term "new grad" refers to an RN who has graduated from their entry-level RN education program within the current or preceding calendar year.
Note: The numbers in this table are smaller than those in Table 2.3 because this table is restricted to just those new licensees that were employed in the nursing workforce within North Carolina. Table 2.3 is based on all newly licensed RNs regardless of their employment status

Table 2.5.

Newly Licensed LPNs Actively Employed in the North Carolina Workforce

	Educated Outside of NC			Educated Within NC			*Total # of Newly Licensed LPNs Being Added to the Nursing Workforce*	*% of Total:*	
	New LPN Grads	**Graduated More Than 2 years Ago**	**LPNs Re-activating a license**	**New LPN Grads**	**Graduated More Than 2 years Ago**	**LPNs Re-activating a License**		*Educated Within NC*	*Educated Outside NC*
1997	166	507	28	793	49	27	1570	55%	45%
1998	130	457	28	603	25	15	1258	51%	49%
1999	76	455	38	227	430	22	1248	54%	46%
2000	106	398	40	602	48	26	1220	55%	45%
2001	78	456	69	645	69	31	1348	55%	45%

Note: The term "new grad" refers to an LPN who has graduated from their entry-level RN education program within the current or preceding calendar year.

Table 2.6.

Historical and Future Production Levels of New RNs and the Amount of Increase Needed to Meet Projected Demand Levels in North Carolina

	Current Production of New RNs		Additional Production of New RNs Needed		Total Number of RN Graduates Needed to Meet Minimum Training Needs	Minimum Training Needs for RNs: New Job Growth + Replacement Openings	Percent of Increase Needed in New RN Graduates
	Graduated	*Pass NCLEX* *	*Graduates*	*Pass NCLEX* *			
	a	b	c	d	a + c	b + d	c / a
2000	2,306	2,075	1,563	1,407	3869	3,482	67.8%
2001	2,348 [a]	2,113	1,521	1,369	3869	3,482	64.8%
2002	2,459 [b]	2,213	1,410	1,269	3869	3,482	57.3%
2003	2,556	2,300 *	1,313	1,182	3869	3,482	51.4%
2004	2,556	2,300	1,313	1,182	3869	3,482	51.4%
2005	2,556	2,300	1,313	1,182	3869	3,482	51.4%
2006	2,556	2,300	1,313	1,182	3869	3,482	51.4%
2007	2,556	2,300	1,313	1,182	3869	3,482	51.4%
2008	2,556	2,300	1,313	1,182	3869	3,482	51.4%
2009	2,556	2,300	1,313	1,182	3869	3,482	51.4%
2010	2,556	2,300	1,313	1,182	3869	3,482	51.4%

* As of September 30, 2003 a total of 2,261 students has passed the NCLEX. Statistics for the final quarter of 2003 are not yet available. For purposes of this table we are assuming that a total of 2,300 students will pass the NCLEX in 2003 (a 90% pas rate). All years beyond 2003 assume North Carolina will maintain that level of production for new RNs.

[a] The actual number of RNs graduated in NC in 2001 was 2363.

[b] The actual number of RNs graduated in NC in 2002 was 2467.

Note: The calculations in this table assume a consistent 90% pass rate each year.

Table 2.7.
Historical and Future Production Levels of New LPNs and the Amount of Increase Needed to Meet Projected Demand Levels in North Carolina

	Current Production of New LPNs		Additional Production of New LPNs Needed		Total Number of LPN Graduates Needed to Meet Minimum Training Needs	Minimum Training Needs for LPNs: New Job Growth + Replacement Openings	Percent of Increase Needed in New LPN Graduates
	Graduated	*Pass NCLEX**	*Graduates*	*Pass NCLEX**			
	a	b	c	d	a + c	b + d	c / a
2000	867	806	0	0	846	787	na
2001	802	746	44	41	846	787	5.5%
2002	759	706	87	81	846	787	11.5%
2003	726	675*	120	112	846	787	16.5%
2004	726	675	120	112	846	787	16.5%
2005	726	675	120	112	846	787	16.5%
2006	726	675	120	112	846	787	16.5%
2007	726	675	120	112	846	787	16.5%
2008	726	675	120	112	846	787	16.5%
2009	726	675	120	112	846	787	16.5%
2010	726	675	120	112	846	787	16.5%

* As of September 30, 2003, a total of 668 LPN graduates from North Carolina PNE programs had passed the licensure exam. For purposes of this table, we are assuming that a total of 675 will pass the exam by the end of the year. All years beyond 2003 assume North Carolina will maintain that level of production for new LPNs.

Note: The calculations in this table assume a consistent 93% pass rate each year.

One of the reasons that North Carolina has been able to avoid the severity of shortage experienced by other states in the past few years is that we have been able to import—through in-migration—more than half of the growth needed in the RN workforce. This is not really surprising, given that North Carolina had the fourth highest net in-migration rate in the country from 1995 to 2000.[54] And, although the NC Department of Commerce projects that net in-migration will continue to add about 17%-18% to our total population between 2000 and 2010, depending on high rates of in-migration to solve the pending nursing shortage would be high-risk public policy.

In their occupational projections, the Bureau of Labor Statistics claims that new job growth, added to net replacement openings, identifies the minimum level of training slots that will be needed for an occupation over the projection period.[55] It is a very conservative estimate,[56] and is probably an under-estimate of the true need for new nurses in our state.

When applying those estimates in a strategic planning initiative, it is important to remember that not all persons who complete a nursing education program will necessarily enter into the nursing workforce. In North Carolina the percentage of RNs that graduate from in-state entry-level RN programs and pass the NCLEX-RN licensing exam (and thus are able to enter to nursing workforce) hovered around 90% during the past three years for which data are available (2000 to 2002). For LPNs the average NCLEX-PN passing percentage has been around 93%. Table 2.6 reports the annual need for new RNs created by new job growth and replacement openings, and estimates the additional number of new graduates that North Carolina RN education programs must produce in order to meet those minimum training needs identified by the BLS. The result is that we have had a shortfall in the number of RN graduates needed to meet the minimum training needs identified by the BLS projections since 2000 and, although RN graduation levels rose by about 10% between 2000 and 2003, North Carolina will need to increase the number of RN graduates and the number passing the NCLEX-RN exam each year by more than 46% and maintain that level through the end of the decade. That assumes, of course, that North Carolina's entire need for new RNs should be met by our in-state educational institutions. These findings do not take into account the effect of in-migration.

Table 2.7 presents the same information for LPNs. Both tables use an average of the NCLEX pass rates from 2000 - 2002 (90% for RNs and 93% for LPNs) when figuring the number of graduates needed to achieve a certain number of new RNs passing the NCLEX and eligible to join the workforce. And, as with RNs, the assumption is that the nursing education system in North Carolina should be responsible for producing all of the LPNs that will be needed. The size of the increase needed for LPN graduating classes is much smaller than for RNs. In the case of LPNs, the size of the graduating class in 2000 and the number passing NCLEX was slightly larger than the annualized estimate of demand projected by the BLS. But since then, the size of graduating classes and the number passing the NCLEX exam have fallen short. North Carolina will need to increase the number of LPN graduates and the number passing the NCLEX each year by about 16% and maintain that level through the end of the decade.

Other Uncertainties in Relation to Nursing Workforce Supply

Over the course of the Task Force's investigation of nursing workforce issues in North Carolina, it was noted that there was no mechanism at this time for registering the number of nurses who are practicing in North Carolina while holding a license to practice in one of the "compact" states, but no license issued by the NC Board of Nursing. Because nurses licensed in these other jurisdictions are allowed to practice in North Carolina as part of the agreement among compact states, it is impossible to estimate precisely the number of additional nurses who have entered practice in our state through this means and what these numbers might do to estimates of either supply or demand for nursing personnel in the future. In view of this situation, the first recommendation of the Task Force is as follows:

2.1 Employers of nurses (RN and LPN) who hold licenses in compact states other than North Carolina should be required to report annually to the NC Board of Nursing the names, states in which licensed, license numbers, and period of employment of these nurses working in their facilities and programs.

Conclusion

Chronic understaffing in our hospitals and nursing homes, unsafe working conditions, low job satisfaction among nursing professionals, a bottleneck in our ability to enroll more students interested in a nursing career, and the under-representation of males and minorities in the workplace must all be confronted as we seek solutions to a coming crisis in the healthcare workforce.[57] While the nursing workforce shortage has not yet reached "crisis" proportions in North Carolina, the projected loss of our most experienced nurses due to aging and retirement, at a time when demand for nurses will be increasing, will undoubtedly lead to a severe shortage of trained nursing personnel by the end of the decade. Although the vacancy rate for registered nurses in North Carolina hospitals recently improved somewhat (from 8.4% in 2000 to 6.0% at the end of 2002) it appears this relief will be only temporary. The economic downturn in North Carolina and the nation as a whole has postponed retirement plans for a great many people, including nurses. However, large numbers of nurses who have targeted 2006 as their retirement date will undoubtedly follow through with these plans when economic conditions improve. Other sectors of our healthcare system are already showing signs of the problems to come. Vacancy rates of 10% or more for RNs with experience in critical care, geriatrics, and mental health have been recently reported, as have vacancy rates of 12.4% for Nurse Practitioners and Certified RN Anesthetists.[58] More than half of all long-term care facilities reported an RN turnover rate greater than 33% in 2002.[59] And public health departments in the Eastern and Central regions of the state are having a more difficult time finding experienced public health nurses than departments in the West.[60] These signs and others show that the workforce challenges facing our healthcare facilities are serious and require an immediate response.[61] Therefore, the remaining chapters of this report will explore specific policy and private sector options that will help North Carolina prepare for, and possibly avoid, the severe nursing shortage that is currently anticipated.

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