

NACNPEP

National Advisory Council on Nurse Education and Practice

Meeting the Challenges of the New Millennium

Challenges Facing the Nurse
Workforce in a Changing
Health Care Environment

Sixth Annual Report

To the Secretary of the U.S. Department of Health and Human
Services and the U.S. Congress

January 2008

**The 113th and 114th Meetings of the
NATIONAL ADVISORY COUNCIL ON
NURSE EDUCATION AND PRACTICE
(NACNEP)**

**Sixth Report to the
Secretary of Health and Human Services
and the Congress
January 2008**

Meetings held November 2005 and April 2006

NATIONAL ADVISORY COUNCIL ON NURSE EDUCATION AND PRACTICE

Sixth Annual Report

Meeting the Challenges of the New Millennium

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The National Advisory Council on Nurse Education and Practice (NACNEP) advises the Secretary of the U.S. Department of Health and Human Services and the U.S. Congress on policy issues related to programs authorized by Title VIII of the U.S. Public Health Service Act and administered by the Health Resources and Services Administration (HRSA), Bureau of Health Professions (BHP), Division of Nursing (DN), including nurse workforce supply, education, and practice improvement.

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Purpose

The Secretary and, by delegation, the Administrator of the Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services, are charged under Title VIII of the Public Health Service Act, as amended, with responsibility for a wide range of activities in support of nursing education and practice which include: enhancement of the composition of the nursing workforce; improvement of the distribution and utilization of nurses to meet the health needs of the Nation; expansion of the knowledge, skills, and capabilities of nurses to enhance the quality of nursing practice; development and dissemination of improved models of organization; financing and delivery of nursing services; and promotion of interdisciplinary approaches to the delivery of health services particularly in the context of public health and primary care.

Authority

42 USC 297t; section 845 of the Public Health Service Act, as amended. The Advisory Council is governed by provisions of Public Law 92-463 which sets forth standards for the formation and use of advisory committees.

Function

The Advisory Council advises and makes recommendations to the Secretary and Congress on policy matters arising in the administration of Title VIII including the range of issues relating to the nurse workforce, education, and practice improvement. The Advisory Council may make specific recommendations to the Secretary and Congress regarding programs administered by the Division of Nursing, particularly within the context of the enabling legislation and the Division's mission and strategic directions, as a means of enhancing the health of the public through the development of the nursing workforce.

Additionally, the Advisory Council provides advice to the Secretary and Congress in preparation of general regulations and with respect to policy matters arising in the administration of this title including the range of issues relating to nurse supply, education, and practice improvement.

Structure

The Advisory Council shall consist of the Secretary or delegate who shall be an ex officio member and shall serve as the Chairperson and not fewer than twenty-one (21) nor more than twenty-three (23) members selected by the Secretary. Two of the appointed members shall be selected from full-time students representing various levels of education in schools of nursing; two shall be selected from the general public; two shall be selected from practicing professional nurses; and nine shall be selected from among the leading authorities in the various fields of nursing, higher, secondary education, and associate degree schools of nursing and from representatives of advanced education nursing groups (such as nurse practitioners, nurse midwives, and nurse anesthetists), hospitals and other institutions and organizations which provide nursing services. The Secretary shall ensure a fair balance between the nursing

professions, with a broad geographic representation of members, a balance between urban and rural members, and an adequate representation of minorities. The majority of members shall be nurses.

The Secretary shall appoint members to serve for overlapping four-year terms. Members will be appointed based on their competence, interest, and knowledge of the mission of the profession involved. Members appointed to fill vacancies occurring prior to the expiration of the term for which their predecessors were appointed shall be appointed only for the remainder of such terms. Members may serve after the expiration of their term until their successor has taken office. A student member may continue to serve the remainder of a four-year term following completion of a nurse education program.

Subcommittees composed of members of the parent Advisory Council shall be established to perform specific functions within the Advisory Council's jurisdiction. The Department Committee Management Officer will be notified upon establishment of each of the subcommittees and will be provided information on its name, membership, function, and established frequency of meetings.

Management and support services shall be provided by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration.

Meetings

Meetings shall be held at least two times a year at the call of the Chair, who shall also approve the agenda. Meetings shall be held jointly with related entities established under this title where appropriate, including the Council on Graduate Medical Education; Advisory Committee on Interdisciplinary, Community-Based Linkages; and the Advisory Committee on Training in Primary Care Medicine and Dentistry.

Not later than 14 days prior to the convening of a meeting, the Advisory Council shall prepare and make available an agenda of the matters to be considered by the Advisory Council at such meeting. At any such meeting, the Advisory Council shall distribute materials with respect to the issues to be addressed at the meeting. Not later than 30 days after the adjournment of this meeting, the Advisory Council shall prepare and make available to the public a summary of the meeting and any actions taken by the Advisory Council based upon the meeting.

Meetings shall be open to the public except as determined otherwise by the Secretary or other official to whom the authority has been delegated. Notice of meetings shall be given to the public. Meetings shall be conducted and records of the proceedings kept as required by applicable laws and departmental regulations.

Compensation

Members who are not full-time Federal employees shall be compensated at a rate equal to the daily equivalent of the annual rate of basic pay prescribed for Level IV of the Executive Schedule under section 5315 of title 5, United States Code, for each day (including travel time) during which such member is engaged in the performance of the duties of the Advisory Council.

Members shall be allowed travel expenses, including per diem in lieu of subsistence, at rates authorized for employees of agencies under subchapter I of chapter 57 of title 5, United States Code, while away from their homes or regular places of business in the performance of services for the Advisory Council. Any such travel shall be approved by a Federal Government official in accordance with Standard Government Travel Regulations.

Annual Cost Estimates

Estimated annual costs for operating the Advisory Council, including compensation and travel expenses for members but excluding staff support, is \$189,370. Estimate of staff-years of support required is 2.15 at an estimated annual cost of \$248,311.

Reports

The Advisory Council shall annually prepare and submit to the Secretary, the Committee on Health, Education, Labor, and Pensions of the Senate, and the Committee on Energy and Commerce of the House of Representatives, a report describing the activities of the Advisory Council including its findings and recommendations.

In the event a portion of a meeting is closed to the public, a report shall be prepared which shall contain, at a minimum, a list of members and their business addresses, the Advisory Council's functions, dates, and places of meetings, and a summary of Advisory Council activities and recommendations made during the fiscal year. A copy of the report shall be provided to the Department Committee Management Officer.

The information or content and conclusions of reports are those of the authors and should not be construed as the official position or policy of, nor should any official endorsement be inferred by, the Division of Nursing (DN), Bureau of Health Professions (BHP), Health Resources and Services Administration (HRSA), Department of Health and Human Services (DHHS) or the U.S. Government.

Termination Date

The duration of the National Advisory Council on Nurse Education and Practice is continuing. Unless renewed by appropriate action prior to its expiration, this charter will expire on November 30, 2006.

Abstract

Delivery of health care services in the United States is becoming ever more challenging as the health care system grows more complex and the demand for services escalates. Factors underlying the mounting challenges include: an aging population that is demanding increasing amounts of health care services; cost pressures that are creating economic challenges; consumers who are demanding greater focus on the quality of health care; innovations in patient care such as new medications and new technologies that require new skills and knowledge; and an increasingly diverse population for whom the most effective care requires increased cultural competence and sensitivity.

The nursing workforce plays a critical role in addressing such challenges. Nurses are the single largest component of the health care workforce. However, projections show a shortage of registered nurses (RNs) expanding to potentially insurmountable levels over the next decade and a half. In addition, both newly educated nurses and those already in the workforce need educational and practice opportunities that will provide new capabilities that are attuned to the increasingly complex health care environment. Necessary new capabilities include: the critical thinking skills to rapidly acquire and assimilate new information to make appropriate patient care decisions; the skills and knowledge required to adopt innovations in patient care; and increased cultural competence that corresponds to the cultural diversity of the population.

Thus, it must be the objective of policymakers to produce greater numbers of nurses to meet growing demand; and build a nurse workforce with the skills and abilities required to work competently in a changing and increasingly complex health care environment.

The National Advisory Council on Nurse Education and Practice (NACNEP) reviewed these challenges at its November 2005 and April 2006 meetings and developed a set of recommendations that are put forward in this report. The recommendations described herein address the objectives by supporting policy initiatives that will:

- Prioritize funding for initiatives to increase the proportion of BSNs in the nursing workforce;
- Prepare RNs for future challenges through increased support for improving nursing education;
- Increase the diversity of nursing students and the cultural competence of RNs; and
- Support initiatives to optimize the nursing work environment.

Executive Summary

More Nurses are Needed, but More is Not Enough

The organization and delivery of health care in the United States is continually changing in order to meet new economic challenges and to adopt improvements and innovations in patient care. Delivery of health care services in the United States is becoming more demanding as the health care system is becoming more complex and the expectation for services is growing. Factors underlying the increased challenges include: an aging population that is demanding increasing amounts of health care services; cost pressures; consumers who are demanding greater focus on the quality of health care; innovations in patient care such as new medications and new technologies that require new skills and knowledge; and an increasingly diverse population for whom the most effective care requires increased cultural competence and sensitivity.

The nurse workforce plays a critical role in addressing such challenges. Nurses are the single largest component of the health care workforce. However, projections show a shortage of registered nurses (RNs) expanding to potentially insurmountable levels over the next decade and a half. In addition, both newly educated nurses and those already in the workforce need educational and practice opportunities that will provide new capabilities that are attuned to the increasingly complex health care environment. Necessary new capabilities include: the critical thinking skills to rapidly acquire and assimilate new information to make appropriate patient care decisions; the skills and knowledge required to adopt innovations in patient care; and increased cultural competence that corresponds to the cultural diversity of the population.

Thus, it should be the objective of policy makers to: produce greater numbers of nurses to meet growing demand; and build a nurse workforce with the skills and abilities required to work competently in a changing and increasingly complex and diverse health care environment.

Enhancing Education

There are different avenues for entry-level RN education. These include associate degree programs, diploma programs, and baccalaureate degree programs. At present there are more nurses in the workforce with associate degrees or diplomas than with baccalaureate degrees or higher. RN-to-BSN programs exist to facilitate RNs with diplomas or associate degrees to obtain baccalaureate nursing degrees and augment their existing skills. These programs build on previous learning to enhance critical thinking skills; provide further professional development; prepare RNs for a broader scope of practice; and expand their understanding of complex issues affecting patients and health care delivery. It takes one to two years to complete the RN-to-BSN program, depending on the RN's past academic achievement, type of program, and the school's requirements. This time frame could be shortened by increasing the number of accelerated RN-to-BSN programs. Such programs currently exist and are preferred by prospective diploma or associate degree RNs who have families and also hold full-time employment.

The current nursing shortage is made worse as qualified applicants continue to be turned away from nursing schools because of insufficient faculty and facilities. The capacity for nursing education programs can be expanded through collaborative linkages and partnerships including more

articulation agreements between Associate Degree in Nursing (ADN) programs and four-year institutions offering the Bachelor of Science in Nursing (BSN) programs, and through greater deployment of funding. Accelerated baccalaureate and master's degrees in nursing programs for non-nursing graduates provide a way for individuals with undergraduate degrees in other disciplines to build on prior learning experiences and to transition into the field of nursing.

Because a major impediment to expanded student enrollment capacity involves nurse faculty shortages, approaches for addressing this shortage also need to be implemented. Such approaches include stimulating interest in academic careers, combining clinical experience with training in academic disciplines, and distance learning.

Nursing and the Work Environment: Improving Outcomes

The increased complexity in health care delivery systems requires changes in the nursing work environment. Identifying approaches for accommodating the increased complexity is a key step in improving the quality of patient care as well as in retaining nurses in the workforce. Improving the work environment may involve increasing staffing ratios, making better use of technology, and developing, expanding, and enhancing processes. Dysfunctional work environments are a significant contributor to stress and burnout. Any issue that contributes to nurse dissatisfaction is particularly problematic at a time when a shortage in the supply of nurses makes retention so important.

Recommendations

The National Advisory Council on Nurse Education and Practice (NACNEP) reviewed these challenges at its November 2005 and April 2006 meetings and developed a set of recommendations that are put forward in this report. The recommendations are outlined below:

1. Prioritize funding for initiatives to increase the proportion of BSNs in the nursing workforce. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Prepare nursing faculty to meet the increased demand for BSN-level and higher degree graduates through expansion in number and capacity of PhD programs and provide incentives to encourage practicing nurses to become clinical faculty. Increase the number of MS-to-PhD programs in nursing.
- Give funding preference to pre-baccalaureate (associate degree/diploma) education programs that demonstrate a plan to foster baccalaureate preparation with partnerships between baccalaureate and pre-baccalaureate programs.
- Employ and integrate technology (e.g., distance learning, simulation) into the educational process and curriculum content.
- Facilitate partnerships between health care systems and nursing programs to matriculate existing nursing personnel into baccalaureate degree programs.

2. Prepare RNs for future challenges by increasing support for efforts to improve nursing education. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Create shared regional clinical simulation centers, technology centers, and virtual skills labs to complement clinical rotation and provide access to evidence-based practices.
- Prepare students and faculty to deal with surge demands (e.g., sudden increases in the need for nursing services), in order to more effectively address health crises, such as natural or man-made disasters.
- Continue to examine the relationships between the level of nursing education of Registered Nurses in various practice settings and patient outcomes.
- Support partnerships between hospitals and academic nursing institutions to assist hospitals in achieving evidence-based status.
- Identify and disseminate evidence-based practice curriculum models.

3. Increase the diversity of nursing students and the cultural competence and sensitivity of RNs. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Prioritize funding for schools and colleges of nursing that identify and implement plans for recruiting, retaining, and graduating more diverse students, and for recruiting and retaining more diverse faculty.
- Apply evidence-based curricular models that prepare existing and future nurses to provide culturally competent care.
- Evaluate and disseminate best-practice models that increase nursing school graduation rates for those groups with lower completion rates.

4. Support initiatives to optimize the nursing work environment. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Support nursing outcomes research to identify effective nursing practices such as studies of patient-centered care delivery models, the impact of nurse-to-patient ratios, and the use of nursing-sensitive performance measurement.
- Evaluate and improve the nursing work environment and work-flow processes to enhance nurse retention, safety, satisfaction, productivity, and patient outcomes (e.g., via “Enhancing Patient Care” grants that address the aging workforce, decrease job burnout, reduce latent errors, lessen burdensome paperwork, and facilitate technological solutions).
- Improve non-mortality incident (e.g., falls, pressure ulcers) outcome measures and associated data collection in Federally mandated datasets (e.g., Center for Medicare and Medicaid Services data reporting requirements).
- Implement evidence-based RN retention models across the health care system.

1. More Nurses are Needed, but More is Not Enough

1.1. Introduction: Nursing Challenges in a Rapidly Changing, Complex Health Care Environment

The organization and delivery of health care in the United States is continually changing in order to meet economic challenges and adopt improvements and innovations in patient care. At the same time financial pressures are driving organizations to reduce costs and increase efficiency, the funders and consumers are demanding greater focus on the quality of health care and its impact on patients' outcomes. The health care system in the United States is becoming ever more complex at a time when a growing and aging population is demanding increasing amounts of health care services.

Nurses are the single largest component of the health care workforce. They not only provide the majority of direct care to patients, but also are major partners in health care management and policy. The supply of Registered Nurses (RNs) is not keeping up with demand and that problem will worsen as more of this aging workforce retires. According to projections from the United States Bureau of Labor Statistics, more than one million new and replacement RNs will be needed by 2012 (United States Department of Labor, Bureau of Labor Statistics, 2004). A recent projection shows that by 2010, the largest group of working RNs will be in their 50s, and by 2020 there will be a significant increase in RNs in their 60s. There are predictions that the shortage of nurses will become a crisis long before 2020 (Buerhaus, 2005).

It is critical that the United States produce greater numbers of nurses to meet the growing demand. It is equally important that the country build a nurse workforce with the skills and abilities needed in this increasingly challenging health care environment.

There are three different avenues for entry-level RN education: associate degree programs, diploma programs, and baccalaureate degree programs. It takes approximately two years to complete an associate degree program, three years for a diploma program, and four years for a baccalaureate program.

Given the shortage of nurses in the United States and the changing health care environment, policymakers are faced with major challenges. However, producing more nurses quickly will not meet the overall needs of the health care system. Both newly educated nurses and those already in the workforce need educational and practice opportunities to better prepare them to meet the new challenges in the health care environment. The specific expanded or new capabilities required for success include: the critical thinking skills to rapidly acquire and assimilate new information and to use that information to make appropriate patient care decisions; skills and knowledge required for working with innovations in patient care; and increased cultural competence to interact appropriately with individuals from a variety of backgrounds.

1.2. The Capabilities, Skills, and Nursing Resources Required in Modern Nursing Practice

The rapidly changing health care environment requires nurses with strong critical thinking and analytical skills as well as the ability to provide professional and compassionate care. These critical thinking and analytical skills are required to acquire and assimilate data in order to make appropriate patient care decisions. Nurses need interdisciplinary competencies supported by backgrounds in the sciences as well as the humanities. In order to ensure patient safety, provide quality care, and deliver patient care efficiently, nurses must be able to gather and synthesize new information and address needs as they emerge. This is critical not only for health care delivery systems – where the workforce must be able to adapt to new developments and technologies – but also for communities that need a workforce prepared to provide emergency response for natural and man-made disasters.

With the prospect of the nursing shortage worsening, nurse-patient staffing ratios become more important. There is a growing body of research that associates inadequate nurse staffing with adverse patient outcomes, including mortality and other adverse events. For example, studies by Aiken, Clarke, Sloane, Sochalski, and Silber (2002) found that each additional patient per nurse results in a seven percent increase in the likelihood of dying within 30 days of hospital admission. Other studies have found associations between low nurse staffing levels and hospital-acquired pneumonia, urinary tract infection, sepsis, nosocomial infections, pressure ulcers, upper gastrointestinal bleeding, shock and cardiac arrest, medication errors, falls, and longer than expected length of stay (Needleman & Buerhaus, 2003). Evidence shows that more nurses are associated with better hospital outcomes (Needleman & Buerhaus, 2003). Needleman, Buerhaus, Mattke, Stewart, and Zelevinsky (2002) found higher rates of hospital RN staffing to be associated with a three to 12 percent reduction in adverse outcomes. Aiken and colleagues (2002) found RN job dissatisfaction levels were more elevated in hospitals with high patient-to-nurse ratios than in hospitals with low patient-to-nurse ratios.

Increased levels of nurse staffing means improved nurse-to-patient ratios. This leads to better patient safety (including more opportunities for patient monitoring and interaction) and reduces risks for unsafe conditions, thereby yielding better patient outcomes. Improved nurse-to-patient ratios also means more opportunities for patient monitoring and interaction, which includes attending to patients' psychosocial needs. Having more nurses available at a patient care site also improves the availability of cross-coverage when one patient's care demands a greater proportion of an individual nurse's time.

Larger numbers of nurses, regardless of their level of education, leads to better patient outcomes. However recent research suggests that increased proportions of nurses with baccalaureate degrees are associated with even better patient outcomes. Aiken, Clarke, Cheung, Sloane, and Silber (2003) found, among one state's hospitals, that every 10 percent increase in the proportion of RNs holding baccalaureate degrees was associated with a five percent decrease in mortality and failure to rescue following common surgical procedures. The study did not examine how baccalaureate-educated RNs contributed to better patient outcomes but more nursing education is likely to provide students with a broader and more in-depth knowledge base. Associate and baccalaureate students take the same licensing exam to achieve certification. The baccalaureate education program, as compared to the associate degree program, includes more liberal arts courses, and instruction in community health, public health, research, nursing leadership, and nursing management. This additional

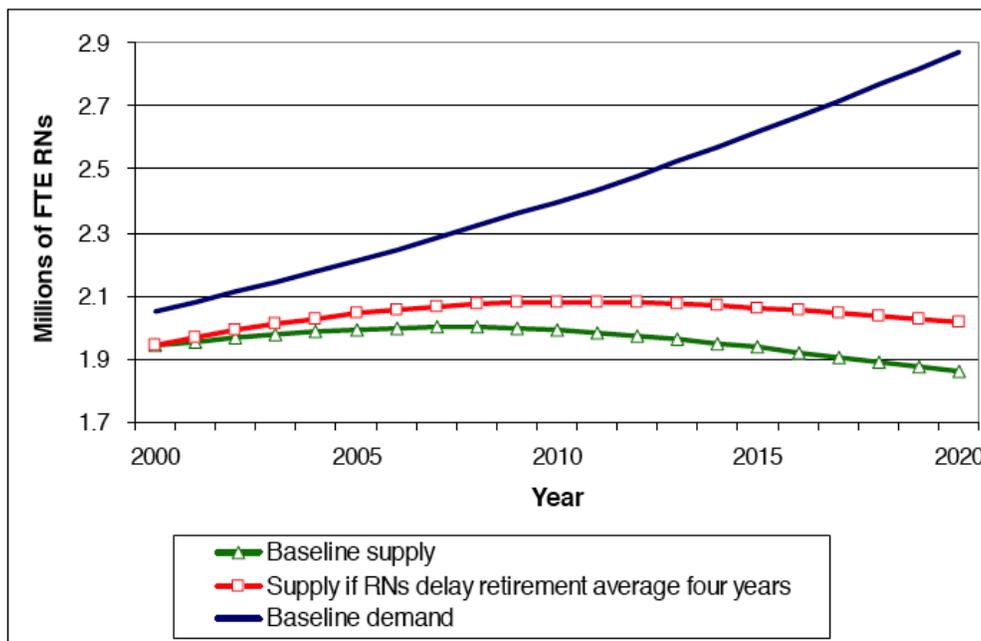
background enables nurses to anticipate and monitor for potential complications, recognize the onset of problems, and decrease the need for crisis management. These skills may lead to better patient outcomes. The skills and knowledge needed to practice evidence-based nursing are taught in most baccalaureate programs.

1.3. Current Trends in the RN Workforce

As the supply of RNs has grown, the demand for RNs has grown more rapidly. Projections show RN supply growth ending in the next few years (largely because of expected retirements among the large proportion of baby boom generation nurses). The gap between RN demand and supply is projected to expand to potentially insurmountable levels over the next decade and a half. Even if nurses begin to retire at older ages, without huge increases in the numbers of new RNs, or tremendous reductions in demand for their services, there will be greater and greater shortages of RNs in the United States (see figure 1) (Health Resources and Services Administration, 2006).

Figure 1

Exhibit 14. Impact of Changing Retirement Patterns on FTE RN Supply



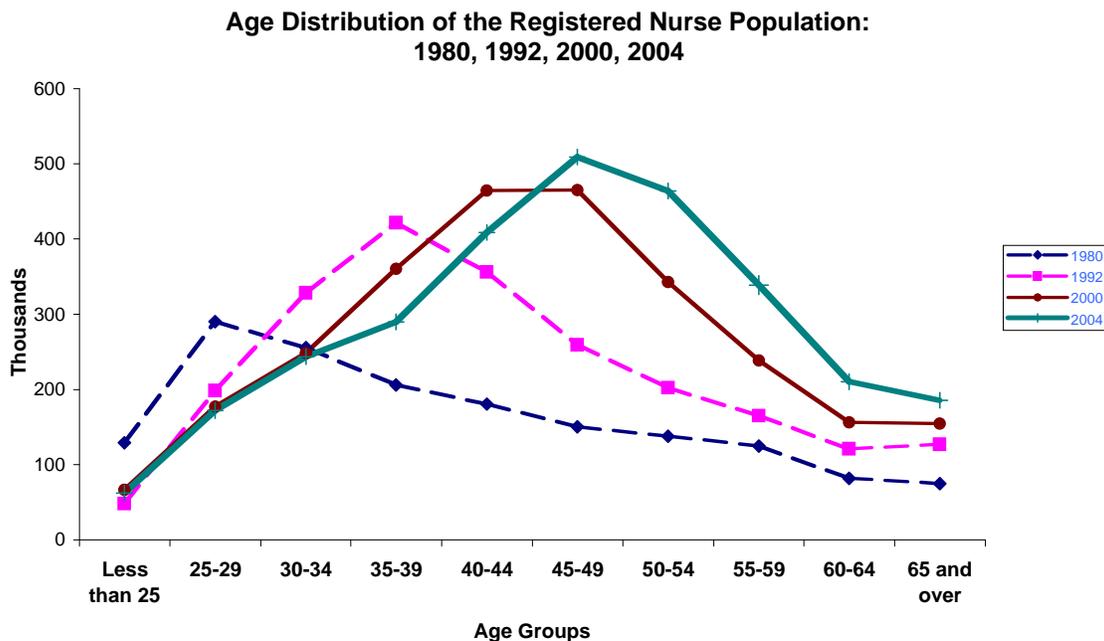
Source: Health Resources and Services Administration, 2006

Recent Trends in the Workforce

Between 2000 and 2004, the number of RNs in the United States grew by about 200,000 according to recent reports based on the 2004 National Sample Survey of Registered Nurses (NSSRN). As the

number of RNs has grown, they remain predominately female: the proportion of male RNs has grown from 5.4 to only 5.7 percent since 2000. The average age of RNs increased by 6.5 years since 1980 to an average of 46.8 years in 2004, and 73.4 percent of all RNs were age 40 years or older. Figure 2 shows the age shift of RNs since 1980 (Health Resources and Services Administration, 2004). This aging of the nurse population is the major factor supporting projections of a decline in the RN supply beginning in the next two to seven years as the baby boom generation reaches retirement age.

Figure 2



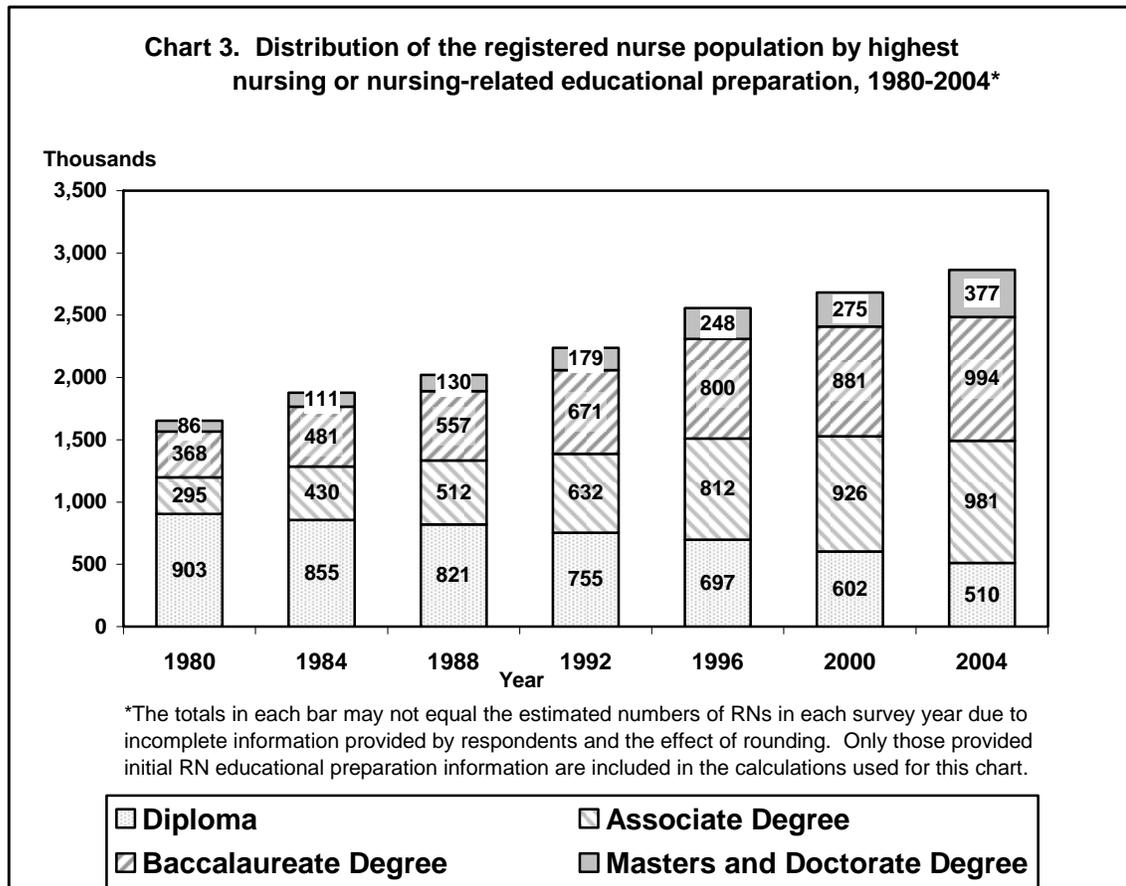
Source: Health Resources and Services Administration, 2004

Between 1977 and 1997, the number of RNs from minority backgrounds grew from 6.3 percent to 9.7 percent of the total population of RNs (Buerhaus & Auerbach, 1999). The 2004 NSSRN found 10.6 percent of RNs identified as non-white. Comparisons of racial/ethnic composition of the RN population across time are complicated because of changes in definitions of race/ethnicity initiated with the 2000 United States census. Regardless of the difficulty of closely tracking changes over time, the United States' RN population in 2004 remained significantly less racially and ethnically diverse than the overall population of the United States: 88.4 percent of RNs identified as white, non-Hispanic, compared with 67.9 percent for the overall United States population (Health Resources and Services Administration, 2004).

In 2004, 33.7 percent of nurses (981,238 RNs) reported the associate degree as their highest level of nursing or nursing-related education, 34.2 percent (994,276 RNs) reported the baccalaureate degree as their highest level and 13.0 percent (376,901) reported a master's or doctoral degree as their highest level (see Figure 3) (Health Resources and Services Administration, 2004).

From 2000 to 2004, the percentage of RNs whose highest nursing or nursing-related educational preparation was a baccalaureate degree increased from 32.7 percent to 34.2 percent (the number increased from 880,997 RNs in 2000 to 994,276 RNs in 2004). Overall, this is a 170 percent increase in RNs with a baccalaureate degree since 1980, when 367,816 RNs held baccalaureate degrees (Health Resources and Services Administration, 2004).

Figure 3



Source: Health Resources and Services Administration, 2004

Approximately 3.5 percent of RNs in 2004 (nearly 101,000 RNs) were foreign-educated. Nearly 60 percent of these nurses had BS degrees or higher, and over two percent (2,446 RNs) had advanced practice preparation. The majority of foreign-educated RNs came from the Philippines (50.2 percent), followed by Canada (20.2 percent), and the United Kingdom (8.4 percent) (Health Resources and Services Administration, 2004).

The United States has one-fifth of all the world's nurses (Larson, 2006). Congress allocated 50,000 additional visas for foreign-born nurses in 2005; legislation has been proposed by the hospital industry for 200,000 more visas (Aiken, 2005). As a result of capacity constraints, schools of

nursing in the United States are turning away tens of thousands of qualified students at the same time the country is increasing its reliance on foreign-born nurses.

Recent Trends in the Workplace

Between 2000 and 2004, fewer RNs left nursing than between 1996 and 2000, reflecting the lowest attrition rate since 1992 to 1996. However, new entrants to nursing decreased slightly between 2000 and 2004, far below the 1992 to 1996 numbers (Health Resources and Services Administration, 2004).

The majority of RNs in the United States in 2004, according to NSSRN findings, worked in hospitals, but that number dropped from 66.5 percent in the early 1990s to 57.4 percent in 2004. The proportion of RNs working in ambulatory care settings has continued to increase (from 7.8 percent in 1992 to 11.7 percent in 2004), while the proportion working in nursing homes or extended care settings (6.5 percent in 2004) changed only slightly in the past decade. Compared with the overall RN population, foreign-educated RNs are more likely than their U.S.-educated counterparts to work in hospitals (64.7 percent), and nursing homes and extended care facilities (11.1 percent) (Health Resources and Services Administration, 2004).

The average annual earnings of RNs employed full-time in 2004 were \$57,784 which is a 23.5 percent increase from average earnings in 2000 (\$46,782). From 2000 to 2004, the Consumer Price Index (CPI) increase was 9.5 percent. As such, the increase in earnings, in real terms, for this period was 14.0 percent (23.5 percent actual increase, less the 9.5 percent CPI) (Health Resources and Services Administration, 2004).

In 2004, the majority (78 percent) of working RNs with current licenses to practice in the United States were satisfied with their principal nursing positions: 27 percent of RNs were “extremely satisfied” and 50.5 percent were “moderately satisfied” (Health Resources and Services Administration, 2004). Buerhaus et al. (2005) surveyed hospital-employed RNs nationwide in 2002 and 2004, finding results that were similar to those of HRSA. Most hospital-employed RNs reported satisfaction with their jobs in both the 2002 and 2004 surveys by Buerhaus et al. Eighty-three percent of nurses said they were “very” or “somewhat” satisfied with their jobs in those surveys, and the percentage indicating “very” satisfied increased from 21 percent to 34 percent over the two years. The nurses in those surveys also were highly satisfied with their profession (87 percent in both 2002 and 2004), and more than 70 percent said they would “definitely recommend” the field of nursing to a qualified student.

Aiken and colleagues (2002) however found significant dissatisfaction levels among hospital nursing staff. For example, in a survey of nurses in Pennsylvania, 41.5 percent were dissatisfied with their jobs. In addition, 43.2 percent of these staff nurses reported high levels of emotional exhaustion. The potential stressors one might more commonly associate with nursing (coping with pain, disability, and death) were not found to be the root cause of burnout. Instead, causes of this burnout were attributed to dysfunctional organizations and the need to continually utilize workarounds. The National Database of Nursing Quality Indicators satisfaction survey, which included 400 hospitals in 2005, found hospital nurses to be highly satisfied with regard to interactions with other RNs, their professional status, and professional development opportunities, but reported very low satisfaction with decision-making, tasks, and pay (Blakeney, 2005).

The leading recommendation for solving the nursing shortage, as cited by RNs responding to national surveys in 2002 and 2004, was to improve the work environment (Buerhaus et al., 2005). The majority of nurses responding to the later survey indicated that the nursing shortage had negative effects on patient care including the timeliness, patient centeredness, effectiveness, efficiency, and the safety and equity of care. Some improvements in the work environment reported by respondents between the first and second surveys were decreased mandatory overtime, less job stress, more perceived job security, more recognition by front-line management of the importance of personal and family life, and better relationships among nurses.

1.4. The RN Workforce Challenge: Building Nursing Supply and Skills to Meet Changing Patient and System Demands

The demand for nurses is growing faster than the supply; meanwhile, the required skills and knowledge of the nursing workforce are expanding to meet the challenges of an increasingly complex health care environment. The challenges for educators, policymakers, health care systems, and the nursing workforce are to build the RN supply to meet demand, and promote development of the skills required in this changing environment.

Building the RN Supply

This section discusses factors affecting the Nation's supply of RNs. One of the key factors is output from schools of nursing. Producing more new nurses requires an increase in both qualified students applying to schools of nursing and capacity for educating students in the schools. A 2006 survey by the American Association of Colleges of Nursing (AACN) found that the number of graduates from entry-level baccalaureate programs increased by 18 percent from 2005 to 2006. The recent rise in graduations follows 3.2, 4.3, 14, and 13.4 percent increases in the number of graduates in 2002, 2003, 2004, and 2005, respectively (American Association of Colleges of Nursing, 2006c). In April 2006, HRSA projected that nursing schools must increase the number of graduates by 90 percent in order to adequately address the nursing shortage. With an 18 percent increase in graduations from baccalaureate nursing programs in 2006, educational institutions fell far short of meeting this target.

Recent public relations promotions, such as the Johnson & Johnson Campaign for Nursing's Future and the national media campaign by the coalition of Nurses for a Healthier Tomorrow, are viewed as successful efforts to promote a positive image of nursing and increase the number of applicants to nursing schools. The Johnson & Johnson campaign in particular aimed to show nursing as a well-paid profession for men and women from diverse backgrounds. The U.S. Bureau of Labor Statistics reported that in 2002, nurses earned significantly more than police officers, dietitians, and teachers. Nurses, with an annual median income of almost \$50,000, earned nearly \$11,000 more than social workers (LaRocco, 2006). These image-promotion campaigns, combined with economic factors such as increased nurse salaries and benefits, have fueled a problem now common at many schools: there are now more qualified applicants than available nursing school openings. Nursing programs and universities have not been able to keep up with strong student interest primarily because they do not have enough qualified faculty members, classroom space, and clinical training resources. AACN's findings show that in 2006, 32,323 qualified applications to entry-level baccalaureate programs were not accepted. The number of qualified applicants turned away each year from these programs remains high with 3,600, 15,944, 29,425, and 37,514 applicants turned

away in 2002, 2003, 2004, and 2005, respectively (American Association of Colleges of Nursing, 2006c).

More education funding, from tuition and from state and Federal sources, can help alleviate this problem. Even with more financial resources, however, it still may not be possible to pay teaching salaries that are high enough to lure RNs with advanced degrees (which are among the requirements for faculty positions) away from higher paying clinical positions. The 2005 American Association of University Professors (AAUP) survey of faculty compensation found the average salary in 2004–05 for full professors at baccalaureate institutions was \$74,408; for associate professors, it was \$57,468; for assistant professors, it was \$47,834. In contrast, the median 2002–03 salaries for nonacademic positions such as vice president for nursing was \$113,100; for nurse anesthetist, it was \$105,890; for nursing director, it was \$93,344; for nurse practitioners, it was \$69,407. The 2005 salary range for full-time clinical nurses at one Boston hospital was \$54,000 to \$116,000 (American Association of University Professors, 2006).

Finding clinical training sites and appropriate supervision for growing numbers of nursing students is becoming more and more difficult. Supervising students' clinical training is time and labor intensive for RNs in clinical settings. Beginning in their sophomore year, nursing students typically spend six to 12 hours per week in a hospital or other practice setting under the direction of a faculty member. The ratio of students to faculty is generally eight to one. Specialty practices, such as pediatrics, may allow a nursing instructor to supervise as few as six students. Part-time clinical faculty members provide most of this labor-intensive supervision. Although individual state boards of nursing regulate nursing education, clinical instructors must have a master's degree in nursing in most states. In 2002, however, because of the shortage of qualified faculty, Massachusetts began to allow schools to obtain a waiver of this regulation, allowing clinical-setting teaching by nurses holding bachelor's degrees with at least five years of full-time experience, those with master's degrees in fields other than nursing, and nurses enrolled in master's degree programs in nursing. Qualified (that is, master's prepared) faculty must supervise these instructors who have a waiver, which adds to the faculty members' workload (LaRocco, 2006).

Average retirement age of RNs is the primary factor affecting the supply of RNs in the United States. Because of the large proportion of RNs (73 percent) who are age 40 or older, their retirement will have a large impact on the workforce. As shown in Figure 2, if the average age of retirement of RNs is delayed by a few years, there can be a significant positive impact on the supply of RNs (Health Resources and Services Administration, 2004).

The number and proportion of RNs working part-time is another factor. This number increased between 2000 and 2004. In 2000, 23.2 percent of RNs (approximately 702,000 RNs) worked part-time, compared with 24.8 percent (approximately 724,500 RNs) who worked part-time in 2004 (Health Resources and Services Administration, 2004; Spratley, Johnson, Sochalski, Fritz, & Spencer, 2000). The greater the proportion of RNs who work part-time, as opposed to full-time, the more that are needed to meet nursing demand, putting additional strain on the RN education system. A dilemma for planners and policymakers is whether to encourage any limits to part-time employment when one successful strategy for RN retention is to accommodate nurses who desire to work less than full-time.

The number of nursing workforce exits and re-entrants also affects the total supply of RNs in the United States. In 2004, approximately 17 percent of licensed RNs were not actively working in

nursing (Health Resources and Services Administration, 2004). While some nurses regularly drop out of clinical practice, some nurses who had been part of the non-practicing pool in previous years return to active nursing each year. There is always flow in and out of the workforce, but because of the shortage and the education capacity problem, there are clear advantages to maximizing retention. Finding ways to encourage RNs to remain in the workforce as long as possible is critical to building the RN supply to needed levels.

Another factor affecting the supply of RNs is immigration of foreign-educated nurses. RNs educated in many other countries are attracted to the United States by comparatively high nursing salaries. As with many occupations, RNs from other countries move to the United States to work through employment visas or by immigrating. During times of RN supply shortfalls, the number of foreign-educated nurses may rapidly increase when U.S. employers actively recruit RNs from other countries by sending recruitment teams abroad, providing signing bonuses, paying travel expenses, and/or providing housing in the United States.

Solutions to meet the nursing supply challenge must address the factors described above. States, communities, and health care institutions are committing resources to these efforts to increase nursing supply. Where possible, these resources should be increased. But reaching the levels of nursing supply needed to meet the country's growing demand will require even more efficient use of these resources. The preparation of the nursing workforce and programs to recruit and retain nurses should be based on empirical data that identify the most effective and efficient methods and take into account trends and forecasts for future workforce needs.

Skills Required in an Increasingly Complex Health Care Environment

It will not be enough only to increase the supply of RNs. What is needed is adequate numbers of qualified, culturally diverse nurses prepared to practice competently in an increasingly complex health care environment. To achieve this end, the nursing curriculum needs to go beyond teaching students traditional skills — the curriculum must also provide a strong focus on science, technology, and the humanities to enhance the nurses' abilities to work with complex physical, social, and psychological problems in the delivery of safe, efficient, and effective care. In addition, curricula must provide the ability to critically analyze information in implementing evidence-based practice. Also important is the ability to enable patients to be key decision makers in care processes that respect the patients' preferences, values, and needs. Finally, curricula must impart cultural sensitivity and competence because those attributes are related to patient outcomes.

The additional education time and the focus of the curriculum in baccalaureate nursing programs provide the most conducive environment for producing RNs with these attributes. As described in Section 1.2 of this report, there is a growing body of evidence showing that having more baccalaureate-trained nurses in some hospital settings is associated with decreased mortality and adverse patient events. Thus, while graduates from associate degree and diploma programs are needed to make an important contribution to the workforce, the National Advisory Council on Nurse Education and Practice strongly recommends prioritizing funding for initiatives to increase the proportion of BSNs in the nursing workforce. This includes giving funding preference to pre-baccalaureate (associate degree/diploma) education programs that demonstrate a plan to foster baccalaureate preparation with partnerships between baccalaureate and pre-baccalaureate programs.

The First Report of the National Advisory Council on Nursing Education and Practice (NACNEP) recommended the goal of realizing a basic RN workforce with at least two-thirds holding baccalaureate or higher degrees by 2010 (National Advisory Council on Nurse Education and Practice, 2001). Statistics show the proportion increased from 43 percent in 2000 to only 48 percent in 2004 (Health Resources and Services Administration, 2004). At this rate of increase, the goal of 67 percent will not be reached for another decade without significant infusion of resources and energy.

2. Enhancing Education: Preparing New Nurses for New Challenges

2.1. RN Education Now

Quality education is central to quality patient care; effective instruction prepares individuals to be more capable in the care they provide (Bednash, 2005). There are three different entry-levels for RN education: associate degree programs, diploma programs, and baccalaureate degree programs. It takes approximately two years to complete an associate degree program, three years for a diploma program, and four years for a baccalaureate program or nursing doctorate. RN program settings include community colleges for educating associate degree nurses (ADN); hospitals for diploma programs; and colleges or universities for baccalaureate nurses (BSN). Before a student who has completed RN education can work as a nurse, he or she must complete the National Council Licensure Examination (NCLEX) of the National Council of State Boards of Nursing (NCSBN) exam. Every RN, regardless of his or her education pathway, has the authority to perform all of the duties and responsibilities within the scope of the RN license in the state where the nurse is licensed.

In 2004 there were 1,581 pre-licensure RN programs in the United States (National Council of State Boards of Licensing, 2004). RNs with diplomas or associate degrees can continue their education to obtain baccalaureate or higher nursing degrees and enhance their skills in the areas of problem solving, critical thinking, and care of aggregates and families in a variety of settings.

RN-to-BSN Programs

Opportunities for RNs to continue their education include RN-to-BSN programs which are for diploma or associate-degree prepared registered nurses interested in earning a baccalaureate degree. It takes one to two years to complete the RN-to-BSN program, depending on the student's past academic achievement, type of program, and the school's requirements. Many of these programs are offered online. In 2005, there were 628 RN-to-BSN programs across the United States (American Association of Colleges of Nursing, 2005a). RN-to-BSN programs offer more advanced education to help impart critical thinking, clinical reasoning, and analytical skills. As such, they facilitate understanding of complex issues affecting patients and health care delivery and prepare nurses for a broader scope of practice.

"RN-to-BSN programs bolster the skills and experience of a registered nurse with exposure to cutting edge technology. Nurses enrolled in RN-to-BSN programs also enjoy the opportunity to grow their business and management skills. In addition to the medical training they absorbed during their original nursing program, BSN degree candidates develop their critical thinking, leadership, and supervisory skills. As a result, RN-to-BSN degree holders qualify for some of the best jobs in the rapidly expanding nursing field."
(WorldWideLearn.com, n.d.)

Accelerated-BSN Programs

There has been a dramatic increase in the number of accelerated-BSN programs. In these programs, entering students have already earned a bachelor's degree in another discipline and have completed or are completing prerequisite science courses. These intense programs can be completed in 11 to 18 months and are the quickest route to

RN licensure for those with a prior degree. Many of these programs enable students to complete a master's degree in nursing within a total of three years.

Second degree students are often older, highly motivated, and have higher academic expectations than traditional entry-level students. Accelerated programs involve high admission standards, continuous study with no session breaks, and have the same number of clinical hours as traditional programs (American Association of Colleges of Nursing, 2005a).

Advanced Practice

RNs with baccalaureate degrees may continue their education in master's programs to prepare them for advanced practice roles as a nurse practitioner (NP), clinical nurse specialist (CNS), certified nurse midwife (CNM), certified registered nurse anesthetist (CRNA), or educator or manager/administrator. RNs who received their initial education in diploma and ADN programs can obtain a master's degree in RN-to-MSN programs, which bypass the need to obtain a baccalaureate degree to complete the master's degree. According to the AACN (2005a), there were 137 U.S. programs that can transition RNs with diplomas and associate degrees to a master's degree level (Master of Science in Nursing degree) in 2005. RN-to-MSN programs typically can be completed in approximately three years. Most of these programs are offered in a classroom setting, although some are offered online or in a blended online and classroom format. Specific requirements vary depending on previous coursework and the institution.

2.1.1. Trends in Nursing Education

Over the past three decades, there have been wide fluctuations in nursing program enrollment which complicates projections of future nurse supply as well as determination of educational and faculty capacity requirements (Yordy, 2006). More recently, there has been an upward trend in nursing education enrollment. Nursing school enrollments have risen for the fifth consecutive year (American Association of Colleges of Nursing, 2005c). Total enrollment in all nursing programs leading to the baccalaureate degree rose from 126,954 in 2003 to 147,170 in 2004. For example, there was an increase in enrollment in RN-to-baccalaureate-level education programs of 6.2 percent (or 1,826 students) between 2003 and 2004. In 2005 there were 151 accelerated BSN programs, up from 105 in 2002, with 6,090 enrollees in 2004.

“Enrollment in nursing programs has fluctuated in the last 30 years....In recent years, enrollment and graduations have started to rise again, but these fluctuations in enrollment may deter those interested in a nursing faculty career.”
(Yordy, 2006, p.4)

There has also been an increase in enrollments in nursing programs leading to master's degrees. For example, the number of RN-to-MSN programs has almost doubled over the past 10 years, from 70 to 137, and about 26 new RN-to-MSN programs are being planned as of 2005. In addition, enrollments and graduations rose in both master's and doctoral degree nursing programs, with a very slight increase in the number of graduates from master's degree and doctoral programs in 2004 (American Association of Colleges of Nursing, 2005a; American Association of Colleges of Nursing, 2005c).

These trends underline the importance of increasing the capacity of nursing education programs and faculty staff levels to accommodate growing numbers of students enrolling in nurse education programs and pursuing nursing careers. Effective approaches and strategies for achieving expanded capacity should be assessed and implemented. However, policies should consider fluctuations in enrollment and changing patterns as nursing students seek to enter or advance in their field.

While the increases in enrollments are a positive indicator, the representation of men in nursing education programs remains low. Men accounted for 8.8 percent of all baccalaureate graduates, 10.6 percent of master's, and 4.0 percent of doctoral program graduates in the fall of 2004. Racial and ethnic minorities accounted for 23.8 percent of undergraduate enrollees and 21.5 percent of graduate-level enrollees (Berlin, Wilsey, & Bednash, 2005). The National Advisory Council on Nurse Education and Practice recommends prioritizing funding for schools of nursing that identify and implement plans for recruiting and retaining more diverse faculty and students. The National Advisory Council on Nurse Education and Practice also supports evaluating and disseminating best-practice models that increase nursing school graduation rates for those groups with lower completion rates.

2.1.2. Education Level of New Entrants

According to findings from the 2004 NSSRN, the most common initial preparation for nursing in 2004 was an associate degree. Over the past two decades there has been a downward trend in the number of nurses whose initial education was a diploma. The number of RNs completing associate degrees has, since 1996, exceeded the number of RNs graduating from diploma programs. Out of all graduates, the percentage of RNs who initially completed a baccalaureate program increased from 17.3 percent in 1980 to an estimated 30.5 percent in 2004.

A small proportion (0.5 percent) of RNs is estimated to have received their initial nursing preparation through a master's degree or doctoral program in 2004 (Health Resources and Services Administration, 2004). However, from 2000 to 2004, there was a 37 percent increase in the number of RNs receiving their master's or doctorate degrees (Health Resources and Services Administration, 2004).

In their analysis of recent trends in the nurse workforce, Buerhaus, Staiger, and Auerbach (2004) reported that younger RNs have tended to enter those nursing programs requiring the least amount of time to complete: 71 percent of RNs ages 21–34 graduated from two-year associate degree programs, with the greatest numbers of graduates falling in the group aged 30–34. Berlin et al. (2005) cite NSSRN data showing that less than one-fifth (17.4 percent) of nurses educated in associate degree programs go on to complete a four-year nursing degree program.

2.1.3. Overcoming Barriers to Enrollment

A 2004 survey by the AACN found that 32,797 qualified applicants were not accepted into schools of nursing in 2004, largely due to faculty shortages and resource constraints (American Association of Colleges of Nursing, 2005b). The most common reasons for not accepting qualified applicants into entry-level programs, as cited by nursing schools responding to the survey, included

insufficient faculty (76.1 percent), admissions seats filled (75 percent), and insufficient clinical teaching space (54.5 percent).

In view of the current nursing shortage and with the prospect of the shortage worsening, the capacity of nursing education programs must be expanded. Approaches include addressing the faculty shortage, collaborative linkages and partnerships, and greater deployment of funding. One major source of Federal funding for nursing is the Nursing Workforce Development programs under Title VIII of the Public Health Service Act. Funding from Title VIII increased 129 percent between 2000 and 2005 (Health Resources and Services Administration, 2004). Other Federal funding for nursing is available through the Department of Labor's Workforce Investment Act (WIA) in which nursing has been identified as a high demand profession. As a result of the WIA, significant resources have been directed into nursing education and capacity-building (Skillman, Sadow-Hasenberg, Hart, & Henderson, 2004).

Enrollment in nursing education programs has historically grown through Federal programs that implement capitation grants which are formula grants to schools based on the number of students enrolled. Capitation grant funding helps schools of nursing to improve their ability to educate students, pay higher teacher salaries, and improve faculty recruitment. The Nurse Training Act of 1971 (P.L. 92-158) and the Nurse Training Act of 1975 (P.L. 94-63) facilitated increased enrollments in schools of nursing and mitigated nursing workforce shortages. From 1971 to 1978, Congress provided capitation grants to schools of nursing in support of nursing education. During the last two years of the program, Congress provided collegiate schools of nursing with \$400 for each full time baccalaureate student enrolled in the last two years of a nursing program. Associate degree schools of nursing were granted approximately \$275 for each student enrolled. Diploma schools of nursing received \$275 for each student enrolled. For FY 1977 and FY 1978, \$55 million was appropriated. To qualify, schools of nursing had to demonstrate increased enrollments over the previous year. These grants were not prescriptive in their conditions, but allowed schools of nursing the flexibility to direct dollars to areas of greatest need. Schools used the funds to hire new faculty, equip learning/audiovisual laboratories, enhance clinical laboratories, and recruit students (American Association of Colleges of Nursing, 2006a).

Carpenter's 2005 testimony to the United States House Subcommittee on Select Education summarized more recent legislative initiatives:

Congressional legislation also has been introduced in both the House and the Senate to increase the capacities of schools of nursing via capitation grants, conceptually rooted in the Nurse Training Act (P.L. 94-63)... The Nurse Education, Expansion, and Development (NEED) Act of 2005 (H.R. 3569) would provide capitation grants to schools of nursing to hire new and retain current faculty, purchase educational equipment, enhance audiovisual and clinical laboratories, expand infrastructure, or recruit students. In the Senate, Senators Jeff Bingaman (D-NM) and John Cornyn (R-TX) introduced the Nurse Faculty Education Act of

2005 (S. 1575). The grant funding provided by the bill may be used by schools to hire new or retain existing faculty, purchase educational resources, and support transition into the faculty role with the ultimate goal of increasing the number of doctorally-prepared nurse faculty. Priority would be given to those institutions from states experiencing the greatest nursing shortages. However, given the federal budget environment, these programs continue to receive inadequate funding to meet the demonstrated needs.

Full funding of these programs could have a dramatic impact on the capacity of nursing schools to educate new students, thus widening the pipeline and increasing the supply of nurses.

2.1.4. Nursing Faculty Shortage

“The shortage of nursing faculty in the United States is a critical problem that directly affects the Nation’s nurse shortage, which is projected to worsen in future years. A substantial increase in newly educated nurses will be needed to meet future demand; therefore, timely and sustainable interventions to reduce the nursing faculty shortage are required.”

(Yordy, 2006, p.1)

One of the major impediments to expanded enrollment in nursing education programs is the shortage of nursing faculty. As a result of this faculty shortage, nursing schools have insufficient capacity and are turning away qualified applicants (The Maryland Statewide Commission on the Crisis in Nursing, 2005, Buerhaus et al., 2004).

In 2006, the National League for Nursing (NLN) estimated the number of budgeted, unfilled, full-time positions nationwide was 1,390, when considering all nursing education programs in the United States and its territories. This represents a 7.9 percent vacancy rate in baccalaureate and higher degree programs, an increase of 32 percent since 2002; and a 5.6 percent vacancy rate in associate degree programs, an increase of 10 percent in the same period (National League for Nursing, 2006). According to a survey conducted by AACN, the shortage of faculty is a result of budget constraints; the aging of the faculty and a wave of retirements; and job competition from clinical sites and private sector arenas that provide higher compensation (American Association of Colleges of Nursing, 2006b). Areas of related concern include the increasing percentage of part-time faculty and the large number of nurse faculty who are not prepared at the doctoral level.

The estimated number of part-time baccalaureate faculty has grown 72.5 percent since 2002. The majority of baccalaureate and higher degree programs and almost half of associate degree programs reported hiring part-time faculty members as their primary strategy to compensate for unfilled, budgeted, full-time positions (National League for Nursing, 2006). While this approach allows for greater flexibility, often part-time faculty are not an integral part of the design, implementation, and evaluation of the overall program.

Data show that nurse faculty were less well-credentialed in 2006 than they were four years earlier. More than 56 percent of full-time baccalaureate and higher degree program faculty do not hold earned doctorates; fewer than 10 percent of full-time faculty in associate degree and diploma programs hold any credential higher than the master's degree (National League for Nursing, 2006). Only 350 to 400 nursing students receive doctoral degrees each year and the pool of doctorally-prepared candidates for full-time nursing professorships is very limited (National League for Nursing, 2005). Educators without doctoral degrees may lack credibility within a university setting and have limited opportunities to advance into leadership positions. Institutions with low numbers of doctorally prepared educators may be less likely to be awarded funds to support research or educational innovations.

The average age of doctorally prepared nursing faculty in baccalaureate and graduate nursing programs holding the rank of professor is 57.3. Among associate professors, the average age is 55; among assistant professors, the average age is 51. The average age at which nursing faculty members retire is 62.5 (American Association of University Professors, 2006).

The shortage of nurse educators, especially among doctorally prepared nursing faculty, will likely become a more pressing problem with the retirement of existing nursing faculty (Hinshaw, 2001). Education programs in NLN's 2006 survey indicated that almost two-thirds of all full-time nurse faculty members were 45 to 60 years old and likely to retire in the next five to 15 years. A mean of 1.4 full-time faculty members left their positions in 2006; nearly one quarter of these were due to retirement (National League for Nursing, 2006). Approximately 1,800 full-time faculty members leave their positions each year. By 2019, 75 percent of the current faculty population is expected to retire (National League for Nursing, 2005).

A number of factors may contribute to the nursing faculty shortage. For example, although student enrollments have once again increased in recent years, Yordy (2006) suggests that such fluctuations and the resulting uncertainty may deter nurses from pursuing a nurse faculty career since the need for faculty decreases when enrollment of nursing students declines. As noted in section 1.4, academic salaries that are not competitive with salaries for nurses in practice are another factor contributing to the shortage. In addition, there are increased opportunities within the nursing profession in alternative areas such as research and administration (Bednash, 2000; Hinshaw, 2001), further drawing qualified prospective teachers away from education. Another challenge is that Federal appropriations to universities are declining (Aiken, 2005). For example, support for Medicare GME funds declined by 34 percent between 1991 and 2001 (Aiken, 2005).

“Higher compensation in clinical and private-sector settings is luring current and potential nurse educators away from teaching. According to the 2003 National Salary Survey of Nurse Practitioners completed by *ADVANCE for Nurse Practitioners* magazine, nurse practitioners who own their own practice earned an average of \$94,313 a year. In contrast, the NLN Survey found that nurse professors earned an annual average salary of \$61,452 in 2002. The annual salary for assistant professors averaged \$44,656 while the average salary reported by staff nurse respondents to a survey conducted by *Nursing 2003* magazine was \$49,634.”

(National League for Nursing, 2005)

Addressing the Faculty Shortage

Further research and creative interventions are needed to identify strategies that will help in addressing the faculty shortage. There are some innovative ideas currently being explored. Recently, some hospitals have directly subsidized nursing faculty salaries, loaned out their nurses as faculty while paying them their clinical salary, and assisted nursing schools in finding faculty (May, Bazzoli, & Gerland, 2006). This approach may be worth replicating. Also, because the overwhelming majority of nurses with master's and doctoral degrees began their education in baccalaureate programs (Berlin et al., 2005), it has been suggested that efforts to overcome the faculty shortage should focus on boosting enrollment in four-year nursing programs.

The National Advisory Council on Nurse Education and Practice recommends and supports providing incentives to encourage practicing nurses to become clinical faculty. Hinshaw (2001) suggests implementing initiatives that support nurses who enter doctoral studies early in their careers. The AACN recommends establishing online resources for nurses considering teaching careers and creating partnerships to build student capacity and fill vacant faculty slots (American Association of Colleges of Nursing, 2006b). To complement such programs, policymakers should support nursing education models that increase faculty productivity (Yordy, 2006).

2.2. Future Challenges in RN Curriculum Development

The nursing education curricula must evolve in response to increasing complexities in the health care environment and the demand for sophisticated nursing professional skills to address these new challenges.

2.2.1. The Need for Critical Thinking and Analytical Skills

Effective critical thinking and analytical skills equip nurses to make judgments needed to maximize patient care outcomes. Nurses are often called upon to make clinical practice decisions that involve issues related to interpreting patient data, administering medications, or making diagnoses. Critical thinking has always been important in nursing. However, the need for these skills is increasing as the complexity of health care delivery increases.

“Critical thinking in nursing practice is a discipline-specific, reflective reasoning process that guides a nurse in generating, implementing, and evaluating approaches for dealing with client care and professional concerns.”

(National League for Nursing, 2001)

Critical thinking skills are considered an essential component of the nursing profession in today's increasingly complex health care environment. Ineffective critical thinking based on insufficient knowledge or expertise can lead to inappropriate responses, resulting in poor clinical nursing judgment (Ritter, 1998). In a review of 18 studies conducted between 1992 and 2003, Brunt (2005) described this skill set as “the process of purposeful thinking and reflective reasoning where

practitioners examine ideas, assumptions, principles, conclusions, beliefs, and actions in the context of nursing practice.” In a recent review of almost 200 studies on clinical judgment in nursing, Tanner (2006) concluded that clinical reasoning arises from an engaged, concerned position related to a particular patient and situation, and is informed by knowledge and rationale processes. Critical thinking skills influence what nurses notice and how they interpret findings, respond, and reflect on their responses.

Analytical thinking includes the ability to scrutinize facts in a detail-oriented fashion. An analytical thinker must be able to look beyond surface statements and identify hidden agendas. This involves gaining critical insights about personal biases. Curricular enhancements to support analytical thinking could incorporate analysis of text, reports, and policy documents to identify the central arguments of the text. Curricular enhancements can also include exercises to identify and comment on logical consistency of arguments and the way arguments are presented.

Traditional teaching strategies must be adjusted to facilitate the implementation of critical thinking and analytical skills in clinical practice. A more traditional approach to teaching involves pedagogical discourse that encourages a dependency on the expertise of the educator (Myrick & Yonge, 2004); however, the Committee on Quality of Health Care in America Institute of Medicine report (2001) emphasized the need to implement strategies beyond the traditional focus on fact memorization to attain a core of knowledge about basic mechanisms of disease that better prepare students for practice. Examples include: teaching evidence-based practice; teaching application of critical appraisal skills in patient settings including those in which the patients’ cultures may differ from their own; conducting literature searches; evaluating and understanding evidence; and training in multidisciplinary, multicultural teams to provide an appropriate mix of services.

Fesler-Birch (2005) emphasized the need for a learning environment that fosters autonomy, scholarship, and collaboration. The author cited barriers such as traditional education methods and nursing curricula, faculty expectations, limited resources, and competitive nursing markets. Components of skills instruction needed to impart critical thinking skills include concept analysis, problem-based learning, the Socratic method of teaching, contextually specific metacognition, and thinking instruction. Fesler-Birch (2005) stressed the need for more empirical data to scientifically explore the possible link between critical thinking skills and patient outcomes.

In 2000, the National League for Nursing created a standardized RN critical thinking test and developed questions that require a sound understanding of theory basic to the practice of nursing in clinical settings. These questions relate to the health of adults and children, women's health, and mental health. The test serves to evaluate the student's knowledge in nine content areas: research, legal/ethical understanding, therapeutic communication skills, health care systems, cultural and spiritual considerations, leadership and management, quality improvement, health promotion and illness management, and client education and empowerment (National League for Nursing, 2001).

The educational curriculum of baccalaureate nursing programs includes extra time and focus on developing a broad range of skills, including critical thinking and analytical skills, needed to address the emerging challenges in nursing. The American Organization of Nurse Executives (AONE), in collaboration with state and regional AONE chapter leaders, concluded that a BSN degree in nursing is the educational level that best prepares nurses to function as part of the complex patient care environment of the future.

2.2.2. Connecting Associate and Baccalaureate Degree RN Programs

Nationwide, there are significant numbers of articulation agreements between ADN and diploma programs and four-year institutions that help students seeking a baccalaureate-level education, allowing some of their course work to be transferable. The National Advisory Council on Nurse Education and Practice recommends giving funding preference to pre-baccalaureate (associate degree/diploma) education programs that demonstrate a plan to encourage baccalaureate preparation with partnerships between baccalaureate and pre-baccalaureate programs. Accelerated baccalaureate and master's degrees in nursing programs for non-nursing graduates provide a way for individuals with undergraduate degrees in other disciplines to build on prior learning experiences and to transition into the field of nursing.

There are various exemplar articulation programs that transition ADN nurses into BSN programs. For example, to simplify the nursing enrollment process, the Oregon Education Consortium (consisting of eight community colleges and four Oregon Health Sciences University (OHSU) nursing schools) is working towards standardizing nursing schools' admission requirements and curricula (Robert Wood Johnson Foundation, 2006b). Under this new system, students would take the same prerequisite courses to apply to all state nursing schools, and new admission standards would grant community college students in two-year nursing programs automatic admission into the bachelor's degree programs at OHSU's four nursing schools. Education officials also are working to update and standardize nursing curricula to better prepare RNs to meet health care needs and use emerging medical technologies (Robert Wood Johnson Foundation, 2006b).

2.2.3. Technology Options for Enhancing the Effectiveness of Nursing Education in the Future

Technology offers important options for enhancing the effectiveness of nursing education. For example, technologies such as simulation technology and interactive and Internet-based instruction improve both quality of education and access for students.

Simulation Technology

Undergraduate nursing programs are increasingly using simulation technology, involving interactive computerized models to simulate realistic practice settings and situations and help nursing students develop and apply critical thinking skills (Medley & Horne, 2005). Simulation laboratories are being used in some hospitals to provide nursing orientation, conduct competency checks, and enhance risk management training. Models used in this training modality range from equipment that teaches a single skill to very advanced equipment that presents clinical scenarios. Processes for instruction described by Medley and Horne (2005) include determining the content best taught through simulation, establishing learning objectives, replicating reality through the environment and equipment, using video equipment to record activities for debriefing, and conducting a debriefing conference. This process requires faculty to become skilled in teaching these models. Faculty collaboration through Web sites is being promoted to share information and research about this technique.

Interactive and Internet-Based Instruction

Many nurses who wish to return to school face obstacles, such as requiring different work shifts to accommodate an academic schedule and the need to travel significant distances to attend classes (Moore and Hart, 2004). Nursing programs are increasingly implementing Internet-based instruction to deliver course content which helps to reduce barriers for individual students.

Traditional education was a place-bound classroom experience, based on structured didactic learning using face-to-face instruction. Interactive and Internet-based instruction transform that model to one that facilitates access, interaction, and convenience for students through the use of distributed classrooms, electronic

“The integration of technology into the process of teaching and learning is enabling new methods and models of teaching.”

(DeBourgh, 2003)

universities, computer-mediated technology, and interactive video conferencing. With distance learning, students are physically separated from classroom resources, faculty, and other students. This physical distance is bridged by an artificial communication medium that delivers information and access to learning resources and communication networks. In a study of 43 RNs enrolled in a semester-long core course taught via interactive video conferencing and the Internet, DeBourgh (2003) found that students acclimated to the educational modality. The quality and effectiveness of the instructor and instruction, not the instructional modality, was the most important predictor of course satisfaction.

Halstead and Coudret (2000) urged educators to consider instructional design concerns, faculty-student interactions, time and technology management skills, and student outcome evaluations when implementing Internet-based instruction. While benefits of this type of instruction include increased flexibility, improved computer skills, decreased travel time, increased access to information, and independent learning, some of the disadvantages noted were technological difficulties, decreased contact with faculty and peers, increased time demands, the need for self-discipline, and the cost of the technology (like computer hardware and software) required to take the course (Halstead & Coudret, 2000).

Internet-based courses have increased in popularity in recent years. However, competing demands in terms of curricular content and lack of prepared nursing informatics faculty have undermined efforts to include computer and information literacy in nursing curricula. About half of the respondents to a national online survey of baccalaureate nursing education programs reported not having access to informatics education. There is a lack of clarity among nursing faculty about essential informatics content and how to effectively integrate this content into the nursing curriculum (McNeil, Elfrink, Pierce, Bickford, & Averill, 2005). The National Advisory Council on Nurse Education and Practice recommends increasing support for efforts to improve nursing education by funding programs, projects, and/or efforts that create shared regional clinical simulation centers, technology centers, and virtual skills labs to complement clinical rotation and provide access to evidence-based practices.

3. Nursing and the Work Environment: Improving Outcomes

3.1. Changing Roles in the Nursing Work Environment

Identifying approaches for enhancing the nursing work environment is a key step towards improving the quality of patient care institutions and the health care system in general. A better work environment may require changes such as increasing nurse-to-patient staffing ratios, making better use of technology, and developing more effective and efficient processes. Dysfunctional work environments and associated practices are a significant contributor to nurse stress and burnout.

“Poorly designed work spaces, inefficient patient care layout, too few process and technological solutions to reduce the nurses’ time spent ‘hunting and gathering’ have been slow to improve. Further, fragmented and duplicative documentation between paper and electronic records continue to contribute to human error. All of these factors detract from the professional nurse’s ability to deliver safe, efficient, effective, patient-centric care.”
(Hendrich, 2006)

In a 2002 survey, more than 60 percent of nurses agreed or strongly agreed that stress and/or burnout was an issue. In a 2004 survey, 55 percent of respondents expressed the same view (Buerhaus et al., 2005).

The National Advisory Council on Nurse Education and Practice supports initiatives to optimize the nursing work environment. It recommends evaluating and improving the nursing work environment and workflow processes to enhance nurse retention, safety, satisfaction, productivity, and patient

outcomes (for example, via “Enhancing Patient Care” grants that address the aging workforce, decrease job burnout, reduce latent errors, lessen burdensome paperwork, and facilitate technological solutions).

Assessing Outcomes

The growing demand for health care value (cost, quality, and access) by consumers, employers, and funders of health care services contributes to the need for specific nursing outcome measures in education and practice. Much of the research currently available on nursing outcomes is, in part, the result of an initiative of the American Nursing Association (ANA). Begun in 1994, this initiative funded analysis of existing large datasets to determine the relationship between nursing skill mix and nursing quality indicators in hospitals. This initiative led to the development of the National Database of Nursing Quality Indicators (Blakeney, 2005). Since the initial ANA efforts, the National Quality Forum has put forth a set of 15 national standardized performance measures to assess the extent to which nurses in acute care hospitals contribute to patient safety, health care quality, and a professional work environment. These 15 consensus standards are intended to be used by providers, purchasers, and consumers to assess the quality of hospital nursing care, and to identify areas for improving outcomes and processes of care (National Quality Forum, 2004). Research is underway to assess the usefulness of these standards in hospital practice, and to identify other nursing-sensitive measures that could be used to supplement these benchmarks.

Although the research base is growing in this area, nursing would benefit from continued research that addresses the work environment, processes of care, and the relationship of specific nursing interventions to patient outcomes. The evidence that clearly links patient outcomes with work environment, specific nursing practices, nurse skills/knowledge, and nursing-related institutional

factors is small, commensurate with the limited research in this area. One of the limitations is that the state of the science in evaluation for nursing-related outcomes requires more development.

Organizations such as the American Nurses Credentialing Center (ANCC) and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) have developed methodologies for evaluating the quality of patient care. The ANCC's Magnet Recognition Program® was developed to recognize health care organizations that provide nursing excellence. The program uses quantitative and qualitative methodologies to evaluate nursing services and medical care and provides a vehicle for disseminating successful nursing practices and strategies. Magnet status is awarded to hospitals that satisfy a set of criteria designed to measure the quality of their nursing services and patient care. Among the criteria are patient outcomes, nurse job satisfaction, staff nurse turnover rate, appropriate grievance resolution, nursing involvement in data collection, and decision-making in patient care delivery. Recognizing quality patient care, nursing excellence, and innovations in professional nursing practice, the Magnet Recognition Program provides consumers with a benchmark to measure the quality of care that they can expect to receive.

The objective of Magnet hospitals is to promote open communication among nurses and other members of the health care team, as well as staffing practices that lead to an appropriate personnel mix, to attain the best patient outcomes and work environment for staff. The Magnet designation is often touted by designated hospitals as they promote their nurse-friendly work environments as part of their efforts to attract prospective employees.

3.2. The Importance of Retention

As discussed in section 1.3., the supply of nurses is not keeping up with demand. Retention is important not only because of the growing shortage, but also because there are significant costs associated with nursing staff turnover. A survey of turnover in acute care facilities found that replacement costs for nurse positions are equal to or greater than two times a regular nurse's annual salary (Robert Wood Johnson

Foundation, 2006a). Given a national average salary for a medical-surgical nurse of \$46,832, the cost of replacing just one nurse is \$92,442. Recruiting costs include human resource expenses for advertising and interviewing, increased use of traveling nurses, overtime, temporary replacement costs for per diem nurses, lost productivity, training, and terminal payouts. If a hospital with 100 nurses experienced turnover at the national average of 21.3 percent in 2000, annual expenditures associated with the turnover of medical-surgical nurses would amount to over \$1.9 million (Robert Wood Johnson Foundation, 2006a).

“Another researcher attempted to calculate the nationwide costs of nurse turnover for 2002. Assuming a nurse turnover rate of approximately 20 percent and a total RN population of 1,300,323 working in U.S. hospitals at an average annual salary of \$47,579, this researcher estimated the total cost of turnover to the industry at a staggering \$12.3 billion.”

(The Business Case for Workforce Stability, VHA Research Series 2002, Volume 7, as cited in Robert Wood Johnson Foundation, 2006a, p.8)

Approaches for Improving Retention

The National Advisory Council on Nurse Education and Practice recommends implementing evidence-based RN retention models across the health care system. The objective of retention efforts is to retain experienced and qualified RNs in the health care system. Research shows that compelling benefits plans are more important for promoting retention than they are for promoting recruitment. This is especially true for older nurses who have a stronger preference for benefits and retirement plans. Benefits plans should be structured to appeal to different demographic groups. For example, child care may be a more relevant benefit for younger nurses while an elder-care subsidy would be an appropriate benefit for older nurses (Robert Wood Johnson Foundation, 2006a).

As discussed in section 1.3, evidence shows some recent improvement in overall job satisfaction which may improve future retention rates. Recent data suggest that nurses are becoming more satisfied with their careers than they have been in the recent past. In 2004, 33 percent of RNs employed in hospitals were “very satisfied” with their current jobs and with nursing as a career, up from 21 percent in 2002 (Buerhaus et al., 2005).

3.3. Improving the Nursing Work Environment

Operating quality health care institutions and an effective and responsive health care system requires complementary nursing work environments, clinical practices, and organizational

One study showed that 85 percent of nurse actions involve “work arounds.” Some of these have potentially simple solutions. An example of this is the large amount of time ED nurses spent looking for pillows for patients — hospitals tend to buy pillows based on number of beds, but one or two pillows are seldom sufficient to make a patient comfortable. Thus, nurses either have to hoard pillows or take time to search for them. What’s needed is secondary problem solving – someone to take the responsibility to take up the issue with materials management to request more pillows. The lack of pillows won’t harm a patient, but breaks in a nurse’s concentration and the need to leave a patient’s room might have negative consequences.

(Aiken, 2005)

structures. There is evidence that poorly defined processes in the work environment can lead to inefficiency, excessive errors, and the need for significant “work arounds.” Work arounds are short-term remedies that “patch” immediate problems so nurses can continue to concentrate on the patient care task. Nurses performing this sort of first-order problem solving do not alter the underlying conditions that gave rise to barriers to task completion in the first place, and so, while the immediate situation at hand may be resolved, the failure, or one just like it, is likely to recur. This means that although the behavior appears to provide a solution to a system failure, the solution is a temporary measure. Meanwhile, an opportunity for organizational learning is lost. Because first-order problem solving is time consuming and tiring, over time, it can lead to nurses feeling frustrated and worn out from swimming

upstream against an incessant tide of small, annoying problems (Tucker & Edmondson, 2002).

As Tucker and Edmondson (2002) noted,

...nursing units were designed to maximize individual unit efficiency. Nursing labor is expensive and in short supply. Understandably, hospitals can ill afford to have nurses routinely working with slack resources. This staffing model leads to an organizational design where workers do not have time to resolve underlying causes of problems that arise in daily activities. Instead, nurses are barely able to keep up with the required responsibilities and are in essence forced to quickly patch problems so they can complete their immediate responsibilities. Thus, in this situation it is possible for an individual worker to be working non-stop while the content of the work technically adds little value to the customer's experience because of the amount of rework and unnecessary steps.

Insufficient management of variability in patient demand puts stress on the health care system in general and on nursing in particular. Litvak and colleagues (2005) suggested techniques for minimizing unnecessary variability to reduce stress on nurses and improve patient outcomes. The authors recommend identifying forms of artificial variation and conducting pilot programs to test operational changes. As an example, operating room (OR) schedules can be a source of artificial variation on patient census that can strain nursing resources. Rearranging OR schedules to minimize peaks and valleys in patient census can alleviate one source of artificial variation that contributes to nurses' stress.

As part of its effort to address some of the practice-related issues associated with the work environment, HRSA provides grants for Enhancing Patient Care Delivery Systems. Practice priority areas for these grants include, among other areas: providing managed care, quality improvement, and other skills needed to practice in existing and emerging organized health care systems; enhancing patient care delivery systems by enhancing collaboration and communication among nurses and other health care professionals; and promoting nurse involvement in the organizational and clinical decision-making processes of a health care facility.

The Use of Technology

Information technology has the potential for improving nurses' job satisfaction, and therefore nurse retention, by assisting with many routine aspects of their jobs. According to a recent survey of Maryland nurses conducted by the Maryland Workplace Subcommittee of the Maryland Statewide Commission on the Crisis in Nursing (MSCCN), "too much time spent on non-direct care activities" was identified as one of nurses' top concerns (Maryland Statewide Commission on the Crisis in Nursing, 2005). Information technology can be used for applications such as nurse scheduling, medication administration, and online patient charts and records, providing nurses with more time

to focus on health care delivery and minimizing time spent on the administrative aspects of clinical practice. Such uses of technology can also improve efficiency and reduce errors. The Committee on Quality of Health Care in America Institute of Medicine's (2001) goal of cutting medical errors in half in five years has not occurred. Research suggests that a significant challenge in reducing errors is to place increased attention to "latent errors." Latent errors are factors not under the direct control of front-line workers – e.g., poor systems design or poor communication (Aiken, 2005).

The use of ergonomic technology can help reduce injuries. The rate of overexertion injuries among hospital nurses is almost twice that of other workers in private industry (United States Department of Labor, Bureau of Labor Statistics, 1997). Nursing aides, orderlies, and attendants – a subset of the occupational group nursing, psychiatric, and home health aides – consistently ranked among the detailed occupations reporting the most cases of workplace injuries and illnesses during 1995 through 2004. In 2004, for example, nursing aides, orderlies, and attendants reported the third highest number of injuries and illnesses. Only truck drivers, laborers, and material movers reported more cases of injuries and illnesses (Hoskins, 2006).

Lifting and transferring patients is a frequent cause of back and shoulder overexertion injuries for nurses. Ergonomic technology, such as assistive devices for lifting and transferring patients, can

“...the use of technology that reduces or streamlines work while improving access or response to patient care needs both enhances the role of the nursing profession and benefits patients. Clarian Health Partners in Indianapolis, Indiana, which has 156 licensed critical care beds, created a flexible and sophisticated monitoring capability on its medical-surgical units with a conversion to ‘patient-focused, ergonomic, comprehensive acuity-adjusted rooms’ that accommodate critical care demand and significantly reduce patient transfers to intensive care. Nurses participated as full partners in the design, which recently won a Vista Award for multidisciplinary design process. The savings of not transferring a patient multiple times based on acuity balances the cost of scheduling more qualified staff to meet patient needs. Patients stay put, nurses save time, everybody wins.”

(Kimball & O’Neil, 2002)

reduce injury and increase job satisfaction (Owen, 2000). For instance, some hospital beds can be lowered to 18 inches off the ground to reduce injuries in the event a patient were to fall out of bed. The beds also can be raised so that nurses can work with patients without bending over beds at awkward angles.

The Occupational Safety and Health Administration (OSHA) (2005) has created guidelines to help staff nurses, certified nursing assistants, nursing supervisors, physical therapists, physicians, and nursing home residents with their assessments of lifting and repositioning tasks. These care providers and their patients can collaboratively determine when to use assistive devices including gait/transfer belts and full body slings

and which devices may be most appropriate. The Occupational Safety and Health Administration (2005) recommends minimizing manual lifting of residents and eliminating this activity when feasible.

OSHA’s “Ergonomics: Guidelines for Nursing Homes,” also provides an overview of assistive ergonomic technologies available to the health care industry (Occupational Safety and Health Administration, 2005). For instance, powered sit-to-stand or standing assist devices can help patients transfer from a sitting to a standing position. Portable or ceiling-mounted sling lift devices

can lift or transfer residents who are totally dependent, are partial- or non-weight bearing, are very heavy, or have other physical limitations. Non-motorized devices like transfer boards can also reduce the need for nurse support when a patient is moving from one level surface to another. By incorporating ergonomic technologies, the number and severity of injuries resulting from physical demands – and associated costs – can be substantially reduced (United States General Accounting Office, 1997).

The James A. Haley Veterans Affairs Hospital in Florida is developing a prototype concept room that automates patient handling to serve as a leading laboratory for patient care facility designers. This computer-controlled room would have a built-in patient handling and transfer system to permit all daily care patient tasks while providing a safe environment for patients and caregivers (United States Department of Veterans Affairs, 2006).

Technology can play a significant role in addressing the challenges associated with the changing health care environment. Technology does not replace nurses, but there are ways to use

technology to enhance the nursing workforce by ensuring adequate skill mix and staffing, and helping to prepare new nurses. In addition, it can enable new capabilities and new ways of performing work that can improve efficiency, reduce errors, and improve quality of care.

For instance, Personal Digital Assistants (PDAs) are handheld computers that can allow nurses to be more effective and more organized. These mobile instruments can provide access to evidence-based medicine (EBM), medical reference material, and other clinical data resources at the point of care, thus increasing the extent to which evidence is incorporated into patient care decisions (Wilcox & La Tella, 2001). Software for PDAs allows for quick access to current drug databases and medical calculators. PDAs can help nurses to organize and track patient data, and document treatments and assessments as they are performed. Because PDAs can allow bedside data collection and charting, they may reduce trips to and from the nurse's station (Davenport, 2004). Wilcox and La Tella (2001) noted that wireless technologies have potential for the rapid exchange of clinical laboratory results and efficient electronic communication of patient information. Thus, these devices provide the potential for true continuity of care across the healthcare system. Grasso, Genest, Yung, and Arnold (2002) reported decreased incidence of errors in discharge medication lists that were generated by PDAs instead of being hand transcribed. In a four-month period before

“As a part of a recently completed study headed by Audrey Nelson, RN, PhD, FAAN, director of the Veterans Health Administration Patient Safety Center, spinal cord and nursing home units at Veterans Administration (VA) hospitals in Florida and Puerto Rico participated in a multisite trial. The study began with an individual assessment highlighting ergonomic opportunities in each area. Based on these recommendations, technology that resulted in a “no-lift” environment was purchased in these areas. ... a spinal cord unit in a VA hospital in San Diego, Calif., implemented a “no lift” policy. ... the policy was presented to and gained the support of the unit administrators. [The clinical nurse specialist and rehabilitation case manager] and unit staff then collaborated with a variety of vendors to select the product that would provide the technology necessary to create a more ergonomic unit. The technology installed used ceiling tracks and Hoyer-like devices that enabled nurses to move patients from the bed to the toilet or the chair without lifting. As a result, [the clinical nurse specialist and rehabilitation case manager] says no injuries have occurred in the past six months, indirectly saving \$100,000.”

(Yeager, 2003)

the use of PDAs was introduced, 20 of the 110 hand-transcribed lists (22 percent) contained errors. In the four-month period after the use of PDAs was implemented, seven of the 90 PDA-generated lists (eight percent) contained errors. The researchers concluded that use of a PDA may be helpful in providing safer patient care.

In 2004, President Bush announced a federal mandate of widespread adoption of Electronic Health Records (EHRs) for most Americans by 2014. The Health Information Management Systems Society's (HIMSS, as cited in National Institutes of Health (NIH) National Center for Research Resources, 2006) defines EHRs as follows:

The Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via interface – including evidence-based decision support, quality management, and outcomes reporting.

EHR use is credited with increased efficiencies and improved accuracy, timeliness, availability, and productivity. In environments with EHRs, clinicians, including nurses, spend less time updating static data, such as demographic and prior health history, because this information is already in the patients' records. Clinicians also have much greater access to improved organizational tools, and alert screens which identify medication allergies and other needed reminders (National Institutes of Health, National Center for Research Resources, 2006). EHRs make patient information more readily available to health care providers, so there is improved likelihood of preventing adverse drug interactions, and better communication about patients among different providers and across shifts.

EHRs may present some challenges to workflow processes, including increased documentation time (for example, slow system responses, system crashes, and multiple screens), decreased interdisciplinary communication, and impaired critical thinking through the overuse of checkboxes and other automated documentation. System crashes are especially problematic because clinicians, particularly at in-patient facilities, will not know what patient treatments are needed or if medications are due (National Institutes of Health, National Center for Research Resources, 2006).

Members of AONE participated in a national survey to determine the information that nurse administrators considered essential for new nurses. Results revealed the most critical skills were the effective use of email, operation of basic Windows applications, and database searches (McCannon & O'Neal, 2003). Knowledge of nursing-specific software such as bedside charting and computer-activated medication dispensers was considered to be most important for new RNs. The National

Advisory Council on Nurse Education and Practice recommends employing and integrating technology into the educational process and curriculum content.

Within nursing education, the curriculum and teaching methods must address emerging clinical practice realities. Students must be prepared to work in environments that are increasingly reliant upon information technology systems as applied to delivery of health care, research, and education. Schools of nursing must re-design curricula and use innovative teaching approaches, pursue options for adequate funding of innovative nursing education including public and private investments, expand teaching capacity via the use of technology, and link practice needs with educational preparation.

One example of such a public-private partnership is The Johns Hopkins University School of Nursing and Eclipsys, a provider of information solutions to hospitals and health systems across North America. In 2004, the two organizations formed a partnership to teach students, as part of the curricula, to interact easily with health care information technology and learn to use a wealth of evidence-based, best-practices clinical content, and knowledge management tools (Writsel, 2004).

Integrating information technology into nursing education and practice has the potential to improve health care quality, prevent medical errors, and reduce health care costs. This integration may also increase administrative efficiencies, decrease paperwork, and expand access to affordable care.

4. Conclusion

Delivery of health care services in the United States is becoming ever more challenging as the health care system grows more complex and the demand for services escalates. The nursing workforce plays a critical role in addressing these challenges. However, over the next decade and a half, projections indicate that the shortage of RNs will deepen and worsen to potentially insurmountable levels. In addition, nurses will require expanded and new critical thinking skills to meet the challenges of the increasingly complex health care environment.

Policymakers must focus on ways to rapidly educate large numbers of RNs in relatively short periods of time (for instance, through associate degree nursing programs). In addition, policymakers must also find ways to promote more in-depth education of RNs so that they achieve broad knowledge and critical thinking skills through longer education tracks (such as via baccalaureate RN programs). However, it is not enough to have just more nurses and better educated nurses. There must also be improvements in the work environment and associated practices to utilize resources effectively and efficiently.

Therefore, the National Advisory Council on Nurse Education and Practice has developed a set of recommendations that are put forward in this report. The recommendations described herein address the objectives by supporting policy initiatives that will:

- Prioritize funding for initiatives to increase the proportion of BSNs in the nursing workforce;
- Prepare RNs for future challenges through increased support for improving nursing education;
- Increase the diversity of nursing students and the cultural competence of RNs; and

- Support initiatives to optimize the nursing work environment.

These recommendations are presented in the next section of this report.

5. Recommendations

1. Prioritize funding for initiatives to increase the proportion of BSNs in the nursing workforce. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Prepare nursing faculty to meet the increased demand for BSN-level and higher degree graduates through expansion of PhD programs and provide incentives to encourage practicing nurses to become clinical faculty. Increase the number of MS-to-PhD programs in nursing.
- Give funding preference to pre-baccalaureate (associate degree/diploma) education programs that demonstrate a plan to foster baccalaureate preparation with partnerships between baccalaureate and pre-baccalaureate programs.
- Employ and integrate technology (e.g., distance learning and simulation) into the educational process and curriculum content.
- Facilitate partnerships between health care systems and nursing programs to matriculate existing nursing personnel into baccalaureate degree programs.

2. Prepare RNs for future challenges by increasing support for efforts to improve nursing education. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Create shared regional clinical simulation centers, technology centers, and virtual skills labs to complement clinical rotation and provide access to evidence-based practices.
- Prepare students and faculty to deal with surge demands (e.g., sudden increases in the need for nursing services), in order to more effectively address health crises such as natural or man-made disasters.
- Continue to examine the relationships between the level of nursing education of Registered Nurses in various practice settings and patient outcomes.
- Support partnerships between hospitals and academic nursing institutions to assist hospitals in achieving evidence-based status.
- Identify and disseminate evidence-based practice curriculum models.

3. Increase the diversity of nursing students and the cultural competence and sensitivity of RNs. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Prioritize funding for colleges and schools of nursing that identify and implement plans for recruiting, retaining, and graduating more diverse students, and for recruiting and retaining more diverse faculty.
- Apply evidence-based curricular models that prepare existing and future nurses to provide culturally competent care.
- Evaluate and disseminate best-practice models that increase nursing school graduation rates for those groups with lower completion rates.

4. Support initiatives to optimize the nursing work environment. Fund programs, demonstration projects, evaluations, and/or research efforts that:

- Support nursing outcomes research to identify effective nursing practices such as studies of patient-centered care delivery models, the impact of different nurse-to-patient ratios, and the use of nursing-sensitive performance measurement.
- Evaluate and improve the nursing work environment and workflow processes to enhance nurse retention, safety, satisfaction, productivity, and patient outcomes (e.g., via “Enhancing Patient Care” grants that address the aging workforce, decrease job burnout, reduce latent errors, lessen burdensome paperwork, and facilitate technological solutions).
- Improve non-mortality incident (e.g., falls, pressure ulcers) outcome measures and associated data collection in Federally mandated datasets (e.g., Center for Medicare and Medicaid Services data reporting requirements).
- Implement evidence-based RN retention models across the health care system.

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