The Balance of Care: Trends in the Wages and Employment of Immigrant Nurses in the U.S. between 1990 and 2000

Revised version

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1. Introduction

Recently, the transnational migration of nurses from developing countries to developed countries has received heightened attention from policymakers, health care practitioners, and the media. Globalization has made it easier for hospitals and nursing homes to advertise their jobs in developing countries. Health care professionals in countries such as India, the Philippines, and Nigeria can readily learn about job opportunities in developed countries. The easing of trade barriers and the low cost of transportation have made it easier to cross borders. For example, the North American Free Trade Agreement encouraged nurses from Mexico and Canada to work in the United States by easing visa restrictions (Brush and Berger 2002). Hospitals and nursing homes hire agencies to recruit nurses and doctors from developing countries such as the Philippines and India in order to fill vacancies that are difficult to fill with domestic health workers.

The economic and demographic forces that drive developed country hospitals and nursing homes to search for nurses in developing countries are expected to strengthen in the next twenty years. The main demographic force is the aging of the population in developed countries. For example, in the U.S, the first cohort of baby boomers will reach age 65 in 2010. As this large cohort ages, they will demand more health care. In addition, the nursing population is also aging. Many women of the "baby boom" generation decided to become nurses in the 1960s and the 1970s. These nurses will be retiring, cutting back on their hours, or switching from hospital settings to less stressful settings. With the increase in jobs open to women in the last 30 years, fewer young women are deciding to become nurses. In Europe, the population is aging rapidly as a

result of fertility rates that fell rapidly and remain very low. Therefore, the world is in a situation where developed countries are competing with each other to find new sources of nurses and much of that competition is occurring in developing countries.

Developed countries have been recruiting nurses from developing countries since the 1950s. What is new is the scale of recruiting, and the recruiting of nurses from countries that traditionally did not provide nurses to other countries, notably in sub-Saharan Africa. Recruiting nurses from developing countries to work in developed countries raises important ethical issues. Sub-Saharan countries are among the poorest in the world and now are facing the HIV/AIDS epidemic. These countries are experiencing nursing shortages themselves. In addition, much training of health care professionals is funded through African governments, so that African countries are incurring the costs of training health personnel who then move to developed countries to practice. On the other hand, professionals who work in developing countries remit large amounts of money back to their home countries. Some countries such as the Philippines encourage foreign labor migration as a development policy because of the volume of remittances.

In this paper, I present an overview of the issues involved in transnational migration in nursing. The implications of migration for the quality of care, nurses' wages, and the nursing shortage in the U.S. and other developed countries are considered. I discuss the impacts on health care systems and the economies of source developing countries and the ethical issues that arise. Then, the U.S. Census data from 1990 to 2000 are used to understand recent trends in the migration of registered nurses, licensed practical nurses, and nurses aides to the U.S. An understanding of this migration pattern and its economic causes is essential if a debate on health professional migration policies

in the U.S. is to be grounded in evidence and demographic research. Researchers and experts disagree substantially in their understanding of the role, importance, and impact of nurse migration on the nursing labor markets and on the provision of quality health care services in the U.S.

This paper answers questions about the changes in the number, location, wages, countries of origin, and other economic and demographic variables for foreign-born nurses and U.S. born nurses over the time period 1990 to 2000. Foreign-born nurses and nurses' aides increasingly come from developing countries and, specifically, from Africa. The characteristics of foreign-born nurses are compared with those of U.S.-born nurses to see whether foreign-born nurses provide lower quality service and are paid less than U.S.-born nurses. This study is the first analysis that uses the Census Public Use Micro Survey (PUMS) data files to address the issue of nurse migration. While the PUMS data do not provide information on where one attended school or received training, the PUMS data are rich in other important geographic, demographic, and economic details.

Additionally, while most of the literature published examines the situation of the registered nurses (RNs), the analyses consider RNs, licensed practical nurses, and nurses aides. All three nursing designations face increasing demand (though unique health care workforce issues within each nurse designation exist) and migration plays a significant role in each nurse category.

2. Nursing shortages

The worldwide nursing shortage

Many countries are reporting current nursing shortages and predicting that shortages will get worse in the future. In the UK, there were 22,000 unfilled nursing

positions in March 2000 (Trossman 2002). In response, the UK's department of health set and met a target of hiring 20,000 new nurses by 2004 and sought to add 35,000 by 2008 (Physicians for Human Rights, p. 52). A shortage of 7,000 nurses was predicted for the Netherlands by 2002 (Trossman 2002). Canada is projected to have a shortage of 78,000 nurses by 2011 and Australia, a shortage of 40,000 by 2010 (Aiken, Buchan, Sochalski, Nichols, and Powell 2004).

Shortages are occurring in the developing countries, also. Africa is especially hard hit. A recent Physicians for Human Rights Report (2004) reported that in Malawi, only 28 percent of nursing positions are filled in 2003 and that in South Africa 32,000 nursing positions were vacant in 2003. A hospital in Zambia has only a third of the 1,500 nurses required to function well (Trossman 2002). The Philippines, which is the country that supplies the largest number of nurses to the U.S. and the U.K., is facing a current small shortage of 6 percent of the nursing workforce, which is projected to increase to 29 percent by 2020 (Marchal and Kegels 2003).

The U.S. Nursing Shortage

In the U.S., the demand for nursing services is predicted to increase over the next several decades, and the shortage of nurses will most likely continue into the future. The shortage of nursing is often expressed by the percentage of hospital nursing positions that are vacant, with figures for hospitals in the period 1999-2001 ranging from 10 percent to more than 20 percent (Spetz and Given 2003, p. 199). Additionally, the Bureau of Health Professions of the U.S. Department of Health and Human Services (2002) has projected that this shortage will likely increase from a shortage of roughly 100,000 nurses in 2000 to a shortage of more than 800,000 in 2020 (see Figure 1).

The variables that explain the growing demand for nursing services in the U.S. include the growing population of elderly people utilizing both hospital and non-hospital based health services, and the growth of technologies and new medical procedures that require specialized nursing labor. As seen in Figure 2, the dependency ratio (defined as people aged 65 and older divided by the number of people in the 20 to 64 year old cohort) will likely increase from about 0.21 in 2000 to about 0.37 in 2030. Constraints working on the supply side of the nursing labor market include the relatively unattractive wages and conditions of nursing compared to other professions and fields in the U.S. and the aging of the current nursing workforce and retirements out of the nursing labor pool. (Buerhaus, Staiger, and Auerbach 2004) Another constraint appears in the form of limited capacity in nursing training programs. In 2003, nursing programs turned away 11,000 qualified applicants because there were not enough teachers, classrooms, and clinical sites for students (Aiken et al. 2004).

The workforce development responses of hospitals and health systems to the nursing shortage include increased wages, bonuses, recruitment and retention programs, and improvement of the work environment for nurses. To encourage people to train to become nurses, government, hospitals, and health systems have developed modified nursing education programs with features such as accelerated degrees, increased availability of scholarships and grants, and recruitment of men and minorities. Along with health care sector initiatives, the public sector has responded to the nurse shortage through nurse workforce commissions and education loan repayment programs, established in 24 states (Buerhaus, Staiger, and Auerbach, 2003).

In examining the growth of the nurse labor supply in response to these ongoing initiatives, Buerhaus, Staiger, and Auerbach (2003) found that the increase in nurse labor supply from 2001 to 2002 was almost all accounted for by additional effort by RNs over 50 years of age and by foreign-born RNs. The percentage of RNs under age 35 decreased from 50 percent in 1983 to 22 percent in 2002 (Buerhaus, Staiger, and Auerbach 2004). Figure 3 shows the decline in the number of young RNs and the increases in the number of RNs aged 50 and older and the number of foreign-born RNs from 1994 to 2002.

However, in 2003, there were some hopeful signs that the nursing shortage might be easing. Buerhaus, Staiger, and Auerbach (2004) updated their previous work and noted that "employment of young RNs exploded in 2003, raising the total employment growth of younger RNs by an estimated 66,000 since 2001 (p. 528)." Nursing schools reported increases in enrollments starting in 2001, and the increase in young RNs reflected the entrance into the workforce of the first graduates of two-year Associate's programs. Another non-traditional recruitment pool for nursing is men. The proportion of men in nursing increased from 5 percent in 1983 to 8.7 percent in 2003. Most of the men entering nurses were older, with 47 percent in their thirties and 39 percent older than age 50. Given high levels of unemployment and shrinking opportunities for men with less than a college education, men are choosing to be nurses because of the growing demand for nursing services and the relatively high wages and stable employment (Buerhaus, Staiger, and Auerbach 2004).

The current importance of foreign-born nurses in the U.S. is difficult to determine. Some studies refer to foreign-trained nurses and others to foreign-born nurses. The distinction is important—foreign-trained nurses were trained in their home

countries, perhaps at the cost of the home country government, and then moved to the U.S. The classification of foreign-born nurses includes nurses who migrated to the U.S., but then pursued their training in the U.S., which does not have the ethical implications that recruiting foreign-trained nurses does. Such nurses may have migrated to the U.S. on a family reunification visa, for example, and then trained to become nurses. Aiken et al. (p. 70, 2003) states that 4 percent, or 88,080 RNs out of a total of 2,202,000 RNs in the U.S., received their training abroad. In 2004, foreign-trained nurses only accounted for about 5 percent of the total U.S. nursing workforce, but their share in the percentage of newly-licensed RNs was increasing, reaching 14 percent in 2003 (Brush, Sochalski, and Berger 2004). The role of foreign-born nurses in the U.S. nursing workforce is much greater than the role of foreign-trained nurses. In 2003, the growth in the employment of foreign-born nurses continued, accounting for one-third of the total growth in RN employment from 2001 to 2003. Buerhaus, Staiger, and Auerbach conclude that "the trend toward increased reliance on foreign-born RNs has accelerated (p. 529)."

3. Impact of transnational migration of nurses on the U.S.

Foreign-trained nurses can be brought to the U.S. on permanent employment-based immigrant visas (EB-3) or on temporary nonimmigrant visas (H-1B and H-1C). The U.S. government allows for 140,000 EB-3 visas in 2005 for skilled workers with a minimum of two years of experience and for professionals with a baccalaureate degree. Requests for these visas must be filed by employers, and they are available for all skilled workers, not only nurses. In 2005, all of these visas were issued by July. An additional 50,000 special category permanent employment-based visas were earmarked for nurses for 2005 (Schaper 2005). It is not clear whether all 50,000 visas will be issued, because

of the strict requirements foreign nurses have to pass to work in the U.S. Employers who wish to bring in employees on EB-3 visas must demonstrate that there are no U.S. laborers who want to fill the positions.

U.S. immigration policy restricts the number of trained nurses that can be brought in on temporary visas. The U.S. government issued H-1A visas specifically for nurses until 1995. Thirty thousand nurses entered the U.S. on H-1A visas between 1989 and 1995. The visas were phased out because of resistance from the American Nursing Association. Currently, nurses can be brought to the U.S. under H-1C visas, which are limited. Only 500 H-1C visas are available each year, and the number is capped at 25 nurses for small states and 50 nurses for large states. Nurses can only be brought to work in hospitals located in regions that are designated to have a shortage of health professionals. These regions are primarily located in inner cities and some rural areas. The Department of Labor must certify that facilities that wish to import foreign nurses have taken steps to recruit and retain U.S. nurses and are not experiencing a labor dispute. Wages must be in line with existing salaries (Brush and Berger 2002). Nurses who have special expertise may be issued H-1B visas, which are intended for highly qualified professionals, including doctors and engineers. To qualify for an H-1B visa, the job must require a minimum of a Bachelor's degree. Nursing positions such as Clinical Nurse Specialist, Nurse Practitioner, and Certified Nurse-Midwife are considered to qualify for H-1B visa status. The number of H-1B visas issued is limited to 65,000 per year. Under NAFTA provisions, up to 5,500 nurses can enter the U.S. each year to work in U.S. hospitals (Brush and Berger 2002). This limit has since been lifted. However, nurses from Canada and Mexico must meet U.S. requirements for licensure and English

proficiency, which limits the number of Mexican nurses who have migrated under NAFTA (Aiken, et al. 2004). Legislation is periodically introduced in Congress to expand the number of H-1C visas available, but the legislation has not passed. The American Nursing Association strongly opposes such legislation.

Before applying for EB-3, H-1B or H-1C visas, foreign-trained nurses must meet strict requirements. The U.S. Commission on Graduates of Foreign Nursing Schools (CGFNS) is commissioned by the U.S. Congress to certify that foreign-trained nurses meet U.S. standards. Applicants who wish to secure a U.S. visa must have their training certified as meeting U.S. standards, including that their education was at the post-secondary level. Applicants must also pass an English proficiency test and an exam that is an excellent predictor of success on the National Council Licensure Examination, which is the exam all U.S. RNs must pass to get a nursing license (Aiken et al. 2002)

Because of the way that U.S. immigration statistics are reported, it is difficult to determine exactly how many nurses are entering the U.S. each year. Aiken et al. (2004) concludes that the number was fewer than 5,000 nurses in 2002 based on the number of nurses who took and passed the CGFNS exams.

The main issues raised with respect to increasing the number of foreign-trained nurses to the U.S. are the impacts on the quality of care received by patients and on wages for nurses and nurses' aides. The fact that foreign-born nurses must meet the CGFNS criteria ensures that nurses are technically competent. Foreign-born nurses tend to have higher levels of education than U.S.-born nurses. A study of nurses who were trained abroad and recruited to work in public hospitals in New York City found that 90 percent of the nurses brought in on temporary visas had a baccalaureate degree, compared

to slightly over one-third of the U.S.-born nurses (Pizer, Collard, James, and Bonaparte 1994). The Census data also show that foreign-born nurses have higher educational levels than U.S.-born nurses. Another issue raised by those opposed to increasing the number of foreign-trained nurses in the U.S. is that although such nurses might be technically competent, they might lack the ability to communicate effectively with patients in a way that is culturally appropriate (Brush, Sochalski, and Berger 2004). Little is known about how patients perceive the quality of care provided by foreign-born nurses.

Nursing organizations are opposed to increased immigration of foreign-trained nurses. The American Nursing Association (ANA) actively opposes legislation that would increase the number of H-1C visas issued. The ANA cites concerns about the quality of care and opportunities for recruiting agencies to act in an unethical manner (Trossman 2002). Nurses are also concerned that foreign-born nurses will lower their wages and reduce their bargaining position with hospitals. Foreign-born nurses are more willing to accept draining work conditions, such as overtime and night shifts, than U.S.-born nurses are.

Hospitals benefit from hiring foreign-trained nurses. Pizer et al. (1994) presents a study that looks at desirable outcomes from the point of view of the hospital. Foreign-trained nurses had higher levels of education, worked more often on evening and night shifts, and worked more overtime hours than U.S.-trained nurses. Foreign-trained nurses on 5-year visas were also less likely to quit their hospital jobs than U.S.-trained nurses. Because the nurses had temporary visas, to switch hospitals, they were required to contact the Immigration and Naturalization Service. The foreign-born nurses wanted to

minimize contact with the INS and as a consequence, were less mobile than U.S.-born nurses (Pizer et al. 1994). The Pizer study summarizes the findings with the following quote: "From the viewpoint of the recruiting hospital, this visa-related higher level of job attachment may be seen as a benefit of FNG (foreign-national graduate) recruitment." (p. 43).

Recruiting nurses from foreign countries is costly for hospitals. Private recruiting agencies have entered the market as a link between hospitals and developing country nurses. Hospitals currently pay agencies $5,000 to $10,000 per nurse, and the nurses contract to work 2 to 3 years for the hospital. Although this is a high cost relative to recruiting domestic nurses, hospitals perceive that foreign nurses are less likely to leave before their contract has expired. Also, agencies repay hospitals if a foreign-recruited nurse does not fulfill her contract, which lowers hospitals' risk (Brush, Sochalski, and Berger 2004). Pizer et al. (1994) concludes that a strategy of recruiting and employing foreign-trained nurses is more feasible for large hospital systems than for small rural hospitals because of the high costs involved in learning how to navigate U.S. immigration laws. An interesting topic for further research is the extent to which the private agencies are able to lower such costs for small rural hospitals.

In the case of nurses' aides, foreign-born nurses' aides may lower the wages of U.S.-born nurses' aides. Nurses' aide is a low-skilled job. With changes in U.S. welfare policy to encourage welfare recipients to obtain jobs, it is possible that many of those who have left welfare have become nurses' aides. A recent book by Jason DeParle (2004) describes the struggles of 3 women who are affected by the changes in U.S. welfare policy. One of those women becomes a nurses' aide. A strategy for U.S. welfare

policy would be to try to raise wages of low-skilled people in occupations such as nurses' aides. Increasing numbers of unskilled immigrants who enter the nurses' aides sector would conflict with such a policy. Very little is known about this important policy issue of the degree to which immigrant nurses' aides are lowering the wages of U.S.-born nurses' aides.

To place the U.S. experience in the international context, it is important to realize that the U.S. is not the biggest importer of nurses from foreign countries. The U.K. brought in 16,155 nurses in 2002 compared to less than 5,000 nurses brought in by the U.S. (Aiken et al. 2004). The U.S. has tougher visa requirements than the U.K. and other developed countries. Recently, nurses who have had difficulty getting visas to come to the U.S. have instead opted to go to the U.K. and the Middle East (Sullivan 2005). The U.K. has been heavily criticized for relying on recruiting nurses from African countries.

4. Impact of transnational migration of nurses on the sending countries

Recently, policymakers, nongovernmental organizations, and the media have given attention to the "brain drain" of nurses from developing countries to developed countries. The focus is on the negative effects of international recruiting on African countries, especially those countries afflicted by high levels of HIV/AIDS. African countries face increased demand for nurses as they struggle to provide antiretroviral treatment and care to HIV/AIDS patients (Eastwood, Conroy, Naicker, West, Tutt and Plange-Rhule 2005). The World Health Organization recommends that least developed countries maintain a minimum of 100 nurses per 100,000 population, and 17 sub-Saharan African Countries have 50 or fewer (Physicians for Human Rights 2004). In contrast, the U.S. has 782 and the U.K. 847 nurses per 100,000 population (Aiken et al. 2004).

Nigeria, a country that is growing in importance as a source country for the U.S., had 66 nurses per 100,000 population in 1992 (Physicans for Human Rights 2004). South Africa, an important source country for the U.K., has 472 RNs per 100,000 population. The Philippines, the largest individual source country for nurses, has 418 RNs per 100,000 population. India, a country that is mentioned as a future source of RNs, has 45 RNs per 100,000 population (Aiken et al. 2004). In 2000, more than double the number of new nursing graduates in Ghana left Ghana for other countries (Brush et al. 2004).

The quality of medical care in developing countries suffers when hospitals are understaffed. The rural areas are especially hard hit, as nurses move to cities to replace those nurses who have migrated abroad (Martineau, Decker, and Bundred 2002). The nurses who leave also tend to be the most capable and best educated, and the countries' health services lose their skills.

The wide disparities in wages create strong incentives for migration. In 2002, the median income for RNs in the U.S. was $48,090; in the Philippines, the annual salaries for RNs were $2,000 to $2,400 (Brush et al. 2004). This disparity has increased over time; Joyce and Hunt (1982) report that in 1982, Filipino nurses could make 10-12 times more working in the U.S. than in the Philippines. Developing countries do not have the resources to compete with job offers from developed countries. However, nurses in developing countries are not only responding to wage differentials when deciding to migrate. Nurses in developing countries are also motivated to migrate by poor working conditions. In Africa, nurses cite the high risk they face of getting infected with HIV because they do not have adequate medical supplies. Gloves are not always available.

(Physicians for Human Rights 2004). There are many factors that both pull nurses to developed countries and push them out of developing countries.

In countries where training is paid for by the government, additional costs of migration are borne by developing countries. In South Africa, training a nurse is estimated to cost $42,000. The U.K. recruited 5,259 nurses from South Africa between 1998 and 2002, resulting in a cost to the government of $220 million. In the Philippines, nursing education is private and paid for by nursing students, resulting in less cost to the government. Joyce and Hunt (1982) note that nurse training was free in the 1960s but after the possibility of migration opened up, students were willing to pay for their education and private schools opened up.

However, developing countries benefit from the emigration of nurses through the remittances that they send back to their families. In the Philippines, the government actively encourages overseas employment as a source of funds for development and has done so for many years (Aiken et al. 2004, Joyce and Hunt 1982). The nursing education system is set up to meet international requirements. Filipino migrants sent back almost $8 billion in remittances in 2002, representing 9 percent of Gross Domestic Product (Burgess and Haksar 2005). While it is impossible to say how much of these remittances came from nurses, they probably account for a significant share.

The role of remittances in development is controversial. Remittances are sent to private households, and therefore do not compensate for the loss of skilled health personnel (Physicians for Human Rights 2004). Whether encouraging remittance income is a sound development strategy depends on how households spend their income. If the income is spent on children's health and education, then development will result. If it is

spent on conspicuous consumption such as automobiles and elaborate houses, then the strategy has few benefits. Remittance income is flowing into national health ministries only indirectly, if at all,

Developing countries might also benefit if nurses return to their home countries with new knowledge and skills learned in the developed country. Little is known about return migration of nurses who work in developed countries, and this is an important topic for future research. Another question is how well the skills learned in developed country settings are applicable to developing country settings, such as in Sub-Saharan Africa (Physicians for Human Rights 2004; Martineau, Decker, and Bundred 2002).

5. Trends in foreign-born RNs, LPNs, and nurses' aides in the U.S.

Having discussed the global context of the transnational migration of nurses, including a discussion of ethical issues, this section presents original research examining the characteristics of foreign-born RNs, LPNs, and nurses' aides in the U.S. These analyses are a necessary first step to answer the following health policy questions: What is driving the immigration of foreign-born nurses? How large is the immigration of foreign-born nurses and is it likely to be a large enough flow to solve the "nursing crisis"? Is there evidence that immigrant nurses and nurses' aides significantly lower the wages of U.S. born nurses and nurses' aides?

Data

The U.S. Census data from 1990 and 2000 are used to examine trends in reliance of the U.S. health care system on foreign-born nurses, licensed practical nurses, and nurses' aides. Changes in the source countries of nurses and nurses' aides are discussed. U.S. regional differences in the percentage of nurses and nurses' aides who are foreign

born are presented. Finally, the characteristics of native-born and foreign-born nurses are compared.

The statistics refer to nurses who are currently employed, and in the case of statistics involving wages, nurses who were employed in the previous year. The Census questions about annual earnings, typical hours worked per week, and weeks worked per year all refer to the previous calendar year. To calculate wages, annual earnings are divided by the number of hours worked in the previous year. To calculate the total hours worked in the previous year, the typical hours worked per week are multiplied by the number of weeks worked in the previous year.

The foreign-born definition is the proxy used for immigration, because that is the definition provided in the Census, which reports individuals' places of birth. The data do not allow for a distinction between foreign-born nurses who were educated in their country of birth and those who were educated in the United States. However, this information is available in the *National Sample Survey of Registered Nurses*. The sample size of that data set is much smaller than the Census, with only 24,071 observations from employed R.N.s, of which 3.5 percent were educated outside of the United States (Jones and Gates 2004). This survey does not include information about a nurse's place of birth or about when she migrated. It does ask when and where the nurse was certified as a registered nurse. Another drawback of the survey is that it does not cover licensed practical nurses and nurses' aides. By focusing on the foreign-born nurses and nursing aides, the percentages I calculate are much higher than 3.5 percent because the nurses and nursing aides we define as foreign born may have completed their basic nursing education in the U.S.

The main advantages to using the 5 percent samples of the U.S. Census data to study immigrant nurses are large sample sizes, detailed data about country of origin, and data about when immigrants arrived in the United States. The 1990 Census included information about 193,472 employed nurses and nurses' aides, and the 2000 Census included information about 218,229 employed nurses and nurses' aides. The main drawbacks to using Census data to study nursing and nurses' aides labor markets are the lack of data on actual work experience, limited information about working conditions, and limited geographical control variables. Work experience, working conditions, and geographical location are likely to be very important in explaining why foreign-born nurses and nurses' aides obtain higher pay.

General trends in nursing

The total number of registered nurses increased by 21 percent from 1,811,350 in 1990 to 1,913,390 in 2000. A total of 176,492 nurses were foreign born in 1990, or about 10 percent of all registered nurses (Table 1). By 2000, the number of foreign-born nurses increased by 53 percent to 269,475, a total of 12 percent of the total number of registered nurses. These percentages are similar to the percentage of foreign-born people who lived in the U.S. in 1990 and 2000. According to the U.S. Census Bureau, 7.9 percent of the population was foreign born in 1990 and 11.1 percent of the U.S. population was foreign born in 2000.

There are fewer licensed practical nurses than registered nurses, although the number of L.P.N.s has been growing more rapidly than the number of R.N.s. The total number of L.P.N.s grew by 38 percent from 404,455 in 1990 to 559,188 in 2000. The number of foreign-born L.P.N.s grew more rapidly than the number of total L.P.N.s,

increasing by 88 percent between 1990 and 2000. By 2000, foreign-born L.P.N.s were 10 percent of the total number of L.P.N.s (Table 1).

Of the three health care professions analyzed here, the highest proportion of foreign-born workers is found in the nurses' aide profession. The number of aides declined by 3 percent from 1,658,334 in 1990 to 1,606,547 in 2000. However, the number of foreign-born aides grew by 40 percent, so that the percentage of aides who were foreign born increased from 13 percent in 1990 to 18 percent in 2000 (Table 1).

Changes in the source countries for nurses and nurses' aides

Between 1990 and 2000, the leading source countries for nurses and nurses' aides have become more likely to be developing countries. Tables 2-4 present the number of registered nurses, licensed nurses and nurses' aides from the top 10 source countries in 1990 and 2000.

The Philippines is by far the most important source country for foreign-born health care workers in the U.S. For registered nurses in 2000, there were almost 4 times more Filipino nurses than Canadian nurses, the second most important source country. The number of Filipino R.N.s increased by 55 percent between 1990 and 2000 (Table 2). Table 5 presents statistics for the most recent nursing immigrants to the United States, focusing on those who arrived between 1990 and 2000. The Philippines continues to be the most important source country for registered nurses, with 23,527 entering the U.S. between 1990 and 2000. The Philippines is also at the top of the list of source countries for L.P.N.s (Table 3), although the difference between the Philippines and the second-ranked country is not as great as for registered nurses. The number of L.P.N.s from the Philippines grew by 42 percent between 1990 and 2000. For nurses' aides (Table 4), the

Philippines was the second-ranked country in 1990 and the third-ranked country in 2000. More aides who entered the U.S. between 1990 and 2000 came from the Philippines than any other country, although almost as many aides came from Jamaica as the Philippines.

Developing countries are playing an increasingly important role in providing registered nurses to the U.S. health care system. Looking at Table 2, in 1990, Canada, Germany, the United Kingdom, and Ireland were all in the top 10 countries of origin of registered nurses. In 2000, Ireland was no longer in the top 10, and Germany dropped from 4 to 6. The number of R.N.s from India increased by 83 percent. Nigeria, Mexico, and Haiti joined the top 10. The number of R.N.s from Nigeria grew dramatically, by 343 percent between 1990 and 2000. The number of R.N.s from Mexico doubled and the number of R.N.s from Haiti increased by 125 percent during this same period. When we focus on registered nurses who entered the U.S. between 1990 and 2000 (Table 5), the list of the top 15 source countries is dominated by developing countries. Ten of 15 are developing countries, and 2 of 15 are Eastern European—Poland and the Former Soviet Union. The list includes large, poor countries such as Nigeria, India, and China.

A similar pattern is evident with developing countries playing an increasingly important role in supplying L.P.N.s. The list of the top 10 countries has remained fairly stable, with Nigeria being added to the list in 2000 (Table 3). Table 5 shows that among recent immigrants who work as L.P.N.s, the African countries are important source countries. The top 15 source countries for L.P.N.s include Nigeria, Africa (unspecified), Ghana, and Sierra Leone. The list is dominated by developing countries, with only Canada (No. 13) and Germany (No. 15) as important developed source countries for L.P.N.s.

The top source countries for nurses' aides are in Latin America and the Caribbean. Of the top 10 countries, 7 were in this region in both 1990 and 2000. Nigeria was not a top 10 country in 1990, but became one in 2000. Looking at recent arrivals to the U.S. who are working as nurses' aides (Table 5), we note that 8,713 aides came from countries that were part of the Soviet Union. This was the fourth-ranked group. Also remarkable is the presence of African countries such as Nigeria, Ghana, and Liberia on the list.

Next, the countries of origin of nurses and nurses' aides are aggregated into 10 world regions to look at how the distribution of nurses across regions of origin has changed between 1990 and 2000. Table 6 shows that the shares of foreign-born registered nurses from Eastern Europe, South Asia, East Asia, and Africa have increased over time. The percentages of foreign-born registered nurses from Latin America, Western Europe, and North America all decreased slightly. The increase for Africa is notable, going from 2.7 percent of foreign-born R.N.s in 1990 to 6.8 percent of foreign-born R.N.s in 2000.

The percentage of foreign-born licensed practical nurses from Latin America increased dramatically between 1990 and 2000, increasing from 36.9 percent of foreign-born L.P.N.s to 46.9 percent. The share from Africa also showed a large increase from 2.4 percent of the total number of foreign-born L.P.N.s in 1990 to 9.5 percent of foreign-born L.P.N.s in 2000. The share from Western Europe declined dramatically from 17.1 percent to 10.6 percent. The share from East Asia also declined, from 26.3 percent to 21.1 percent.

The majority of foreign-born nurses' aides come from Latin America and the Caribbean, and that majority increased between 1990 and 2000 from 56.8 percent to 60.2 percent of foreign-born aides. Also noteworthy is the increase in the share from Eastern Europe (including the states that were part of the Soviet Union) from 3.6 percent to 6.3 percent. A higher proportion of nurses' aides came from Africa in 2000 than in 1990, with the proportion increasing from 3.7 percent to 8.1 percent.

Comparing the source countries of registered nurses, licensed practical nurses, and nurses' aides highlights how different these labor markets are. The more highly skilled profession of registered nurse involves immigrants from regions of the world that are more geographically distant from the U.S. than the less skilled profession of nurses' aide. East Asia is the dominant source region for registered nurses, whereas Latin America is the dominant source region for nurses' aides.

Changes in the regional distribution of foreign-born nurses within the U.S.

The extent to which health service provision depends upon foreign-born nurses and nurses' aides varies widely by U.S. region, as shown in Table 7. The Middle Atlantic states and Pacific states have the highest proportion of foreign-born nurses and nurses' aides. By 2000, 25 percent of registered nurses were foreign born in the Pacific region and 19 percent of registered nurses were foreign born in the middle Atlantic region. By 2000, more than a third (36 percent) of nurses' aides were foreign born in the Middle Atlantic states.

All U.S. regions are increasing their proportions of foreign-born nurses and nurses' aides between 1990 and 2000. However, in the West North Central and East South Central regions, the proportions of foreign-born nurses and nurses' aides remain

very low. The proportion of foreign-born nurses and nurses' aides in rural PMSAs is also very low. This table has important implications for health service provision in underserved rural areas and regions of the U.S. located in the interior. These areas were not using foreign-born nurses and nurses' aides to increase their health care labor supply during the 1990s. The degree to which they might be able to do so is an important policy question. Foreign-born nurses and nurses' aides are concentrated in areas that already have high percentages of immigrants—the West Coast and the middle Atlantic region of New York, Pennsylvania, and New Jersey. Health policymakers in rural areas and areas that traditionally have not had a high degree of immigration will find themselves at a disadvantage in attracting foreign-born nurses and nurses' aides to their areas.

Comparing the characteristics and wages of foreign-born and native-born nurses and nurses' aides

In Table 8, we compare the average educational levels, age, hours worked and wages of native-born and foreign-born registered nurses, practical nurses, and nurses' aides. Wages are expressed in 1999 dollars. For each profession in each year, the foreign born earn higher wages than the native born. This differential has not changed between 1990 and 2000.

Real wages grew modestly for all groups between 1990 and 2000. For native-born R.N.s, average wages grew by 9 percent and by 10 percent for foreign-born R.N.s. For native-born L.P.N.s, wages grew more modestly, by 6 percent, compared to 8 percent for foreign-born L.P.N.s. For aides, wages grew by 8 percent for the native born and 6 percent for the foreign born between 1990 and 2000.

The foreign born work more hours on average than the native born and are also less likely to work part time, where part time is defined as working 35 hours or less during a typical week. For example, in 2000, foreign-born registered nurses worked 2 hours and 20 minutes more in a typical week than native-born registered nurses. Although information about actual work experience is not available in the Census data, these differences in hours worked and the proportions working part time suggest that the foreign born also have greater work experience than the native born because they have greater work force attachment.

Comparing native-born and foreign-born R.N.s, the foreign born are more highly educated than the native born. In 1990, 43 percent of native-born R.N.s had at least a Bachelor's degree, compared to 56 percent of foreign-born R.N.s. The average levels of schooling for registered nurses increased between 1990 and 2000. In 2000, 50 percent of native-born R.N.s had at least a Bachelor's degree, compared to 63 percent of foreign-born R.N.s.

The foreign-born registered nurses are more likely to be male than the native-born registered nurses. The proportion male has been increasing over time. Both native-born and foreign-born nurses are approximately the same age on average. Comparing 1990 and 2000, the average age of both native-born and foreign-born R.N.s increased, suggesting that the workforce is aging.

Foreign-born L.P.N.s are more concentrated at the low end of the educational distribution and at the high end of the educational distribution than native-born L.P.N.s. Only 8 percent of native-born L.P.N.s had less than a high school education, compared to 16 percent of foreign-born L.P.N.s. The percentages of L.P.N.s having less than high

school dropped dramatically by 2000, so that only 2 percent of native-born and 6 percent of foreign-born L.P.N.s did not have a high school degree. In 1990, only 10 percent of native born L.P.N.s had a Bachelor's degree or graduate degree, compared to 24 percent of foreign-born L.P.N.s. This might reflect overqualification of foreign-born L.P.N.s, who might not have been able to get jobs equal to their skill level when arriving in the U.S. However, by 2000, the proportion of L.P.N.s with a Bachelor's degree or higher had fallen to 7 percent for the native born and 12 percent for the foreign born. The majority of L.P.N.s have a high school degree, with 76 percent of the native born and 69 percent of the foreign born holding that degree. This might reflect standardization of training for L.P.N.s and better functioning labor markets for the foreign born because more highly educated foreign-born women have found other jobs more conducive to their educational levels.

Foreign-born L.P.N.s are more likely to be male than native-born L.P.N.s. There is little difference in age across the two groups. The average age of L.P.N.s increased slightly between 1990 and 2000.

Foreign-born nurses' aides are also more likely to be at the low end of the educational distribution and at the high end of the education distribution than native-born aides. In 1990, 25 percent of the native-born aides had less than a high school education, compared to 35 percent of the foreign-born aides. These percentages were similar in 2000, when 22 percent of the native born and 33 percent of the foreign-born aides had less than high school education. At the other end of the distribution, in 1990 6 percent of the native born had at least a Bachelor's degree compared to 11 percent of the foreign

born, and in 2000, 5 percent of the native born had at least a Bachelor's compared to 11 percent of the foreign born.

Foreign-born nurses' aides tend to be younger than native-born aides. This difference was almost 3 years in 2000. Native-born and foreign-born aides are about equally likely to be men, accounting for 12 to 13 percent of aides.

The observable differences between the native-born and the foreign-born nurses and nurses' aides suggest that the foreign born tend to be more highly educated and more devoted to the labor market than the native born. Therefore, we might expect to find that the foreign born earn a wage premium compared to the native born. The finding suggests that hiring foreign-trained nurses is not necessarily going to be an inexpensive way to solve the nursing shortage problem.

6. Policy implications and conclusions

One solution to the nursing shortage in the U.S. that is noncontroversial is to encourage more U.S. residents to become nurses. This policy is advocated by the American Nursing Association (Trossman 2002), Physicians for Human Rights (2004), the World Health Organization (Stilwell, Diallo, Zurn, Vujicic, Admans, and Dal Poz 2004) and the editorial board of the Lancet (2005), for example. The recent increase in the number of young nurses is a positive sign (Buerhaus, Staiger, and Auerbach 2004). An important supply constraint at this point in the U.S. is the availability of spaces for qualified students who would like to become nurses. Because most of the new entrants into nursing want to enroll in Associate's degree programs, expansion of nursing programs at the community college level would help ease this constraint. The recent U.S. experience suggests that market-based solutions are working. Wages have increased, and

people are responding by studying nursing. Nurses are responding by working more hours.

Retention of nurses is an important issue for resolving the nursing shortage in the U.S. In recent surveys, the leading reasons nurses give for job turnover relate to workplace issues. Those issues include mandatory overtime, nurse-to-patient ratios, workload, and patient safety. These reasons rank higher with nurses than low pay (Valentino 2002).

The findings from our analysis of the U.S. Census data and from Buerhaus, Staiger, and Auerbach (2004) imply that foreign-born nurses are increasing their share in RN, LPN, and nurses' aide employment. The foreign-born category includes people who migrated to the U.S. for reasons besides employment as nurses, who later became nurses and nurses' aides. Immigrant communities may be places to find people who are available for careers in health care. Outreach to these communities might include public service announcements in native languages, assistance with financial aid, special courses available within the communities at convenient times, and English language classes.

Given that the large incentives for health professionals to migrate from developing countries to developed countries are likely to persist and grow stronger in the future, another strategy is to not ban such flows, but to manage them through international agreements. For example, developed countries might agree to only recruit nurses from developing countries who have written agreements with them. Codes of conduct are emerging, with the National Health Service (NHS) in the U.K. as the most prominent example. The NHS code does not allow recruitment from 154 developing countries, unless the developing country explicitly agrees to allow recruitment

(Physicians for Human Rights 2004). However, this voluntary code is not binding for hospitals and health care providers in the private sector. There is some evidence that nurses are coming into the U.K. to work for private providers and then getting jobs for the NHS (Eastwood et al. 2005).

For the U.S., putting into place such codes would be relatively easy, given tight controls over nurse certification and visas. The main source countries for nurses are located at a large geographic distance from the U.S., with the exception of Mexico. The U.S. could easily put forth a policy of issuing no employment-based visas for nurses from sub-Saharan African countries or other countries that are experiencing severe nursing shortages. However, this would not prevent recruitment by other developed countries.

Developed countries could place more emphasis on temporary migration than permanent migration of nurses. This course is recommended by the International Labour Office (Lowell and Findlay 2001). Currently, the U.S. has a much higher number of employment-based permanent visas available for foreign-trained nurses than temporary visas. With temporary migration, more nurses in developing countries could be given the opportunity to work abroad, gain valuable skills, and send remittances back to their families. The source countries would benefit from the skills that the nurses gained abroad (Martineau, Decker, and Bundred 2002). Physicians for Human Rights (2004) recommended a new, special class of visa for foreign health professionals. This visa would be designed to provide a foreign health professional with skills valuable in her own country. The visa could be issued very quickly relative to a permanent visa. The availability of such visas might greatly increase the appeal of becoming a nurse because it

would allow a nurse to travel frequently and "see the world." (Physicians for Human Rights 2004, p. 59).

Developed countries could agree not to issue visas to nurses until they worked a given number of years in their home country's health system. Developing countries might have public service requirements for their graduates. Nigeria and South Africa require doctors to complete one year of public service before they graduate from medical school. In South Africa, the public service requirement was extended to nurses in 2005 (Physicians for Human Rights 2004).

Developed countries might cooperate with developing countries with strong health systems that seek to export workers as a development strategy. The government of China has encouraged the government of the U.K. to import some of its health professionals because China currently has a surplus and values the remittances. The government of India is also encouraging the U.K. to accept its health professionals (Martineau et al. 2002). However, India has a very low number of nurses per 100,000 population. For a developing country, encouraging outmigration of nurses will encourage more people to train to become nurses. By investing in nursing training in developing countries through developed country aid programs, a win-win situation could result. Large, trained cohorts of nurses could be rotated into and out of developed countries.

Developing countries experiencing a brain drain of nurses might learn from the experience of the Philippines. Because of the opportunity to work abroad, nurse training became privatized. Public education systems in other countries that train nurses and doctors might want to move towards privatization. When a nurse or doctor migrates, the

benefits are private. Remittances flow back to family members. If the benefits are private, the costs of training should be privatized also. It is important to consider that in developing countries, young people who make it far enough through educational systems to enroll in doctoral and nursing programs come primarily from the elite. They may be able to afford tuition. Governments can then pay back tuition to those who agree to work in underserved areas for a period of time. Before implementing such changes, it would be very important to look at the financial situation of students' families. Scholarship programs could be instituted to help the children of poor families who want to study nursing and medicine.

The current shortage of nurses is not limited to the U.S. alone. The shortage of nurses is a global problem that will require local, bilateral, and global solutions. Locally, developed countries should accept responsibility for facilitating the entry of young people into nursing and improving retention of older nurses. Bilaterally, developed and developing countries might negotiate agreements about the number of visas issued and investment of aid into the health sectors of developing countries. Globally, organizations like the International Labour Office and the World Health Organization should put together data on nurse migration and help to negotiate and enforce agreements between countries.

Finally, there is much important research that remains to be done to inform transnational migration policy. One question is to what extent immigration of nurses and nurses' aides lowers the wages of U.S.-born and trained nurses and nurses' aides. This is especially important for nurses' aides. With the recent welfare reforms in the U.S., and the influx of low-skilled workers into the labor force, we need to know whether former

welfare recipients are harmed by influxes of low-skilled immigrant workers. Another important research question is whether foreign-trained nurses who enter the U.S. on work visas return to their home countries, and if so, whether they are able to improve the health care systems of their home countries. These research questions are crucial to developing sound recommendations for U.S. immigration policy.

Table 1 Changes in the number of and percentages of native- and foreign-born registered nurses, licensed practical nurses, and nurses' aides, 1990 and 2000.

	1990		2000	
	Native born	**Foreign born**	**Native born**	**Foreign born**
Number of R.N.s	1,634,858	176,492	1,913,390	269,475
Percentages	90.26	9.74	87.65	12.35
Number of L.P.N.s	375,728	28,727	505,106	54,082
Percentages	92.90	7.10	90.33	9.67
Number of nurses aides	1,448,259	210,075	1,311,879	294,668
Percentages	87.33	12.67	81.66	18.34

Table 2 Top 10 source countries for foreign-born, employed U.S. registered nurses, 1990 and 2000.

1990		2000	
Country	**Number of R.N.s**	**Country**	**Number of R.N.s**
Philippines	50,162	Philippines	78,000
Canada	14,336	Canada	19,922
Jamaica	10,875	Jamaica	15,449
Germany	8,262	India	12,951
United Kingdom excluding N. Ireland	7,386	United Kingdom, excluding N. Ireland	10,774
India	7,068	Germany	9,907
Korea	5,502	Korea	8,082
Puerto Rico	4,590	Nigeria	7,842
Abroad, not specified	4,821	Mexico	7,225
Ireland (Includes N. Ireland)	4,117	Haiti	6,717
Percentage of total foreign born nurses accounted for by top 10 source countries	66 %		66%

Table 3 Top 10 source countries for employed U.S. licensed practical nurses, 1990 and 2000.

1990		2000	
Country	**Number of L.P.N.s**	**Country**	**Number of L.P.N.s**
Philippines	5,419	Philippines	7,678
Mexico	1,997	Jamaica	6,410
Germany	1,805	Mexico	3,924
Jamaica	1,801	Haiti	3,409
Canada	1,436	Germany	2,608
Abroad, Not specified	1,271	Puerto Rico	1,711
Puerto Rico	1,157	Canada	1,633
Haiti	1,140	United Kingdom excluding Northern Ireland	1,488
United Kingdom excluding Northern Ireland	1,122	India	1,487
India	993	Nigeria	1,386
Percentage of total foreign born LPNs accounted for by top 10 source countries	63 %		59 %

Table 4 Top 10 source countries for employed U.S. nurses' aides, 1990 and 2000.

1990		2000	
Country	**Number of Aides**	**Country**	**Number of Aides**
Jamaica	23,194	Mexico	35,799
Philippines	19,693	Jamaica	35,691
Mexico	18,506	Philippines	26,582
Haiti	14,010	Haiti	23,921
Puerto Rico	12,405	Dominican Republic	12,472
Abroad, not specified	8,452	Puerto Rico	12,315
Germany	7,249	Guyana	9,060
Dominican Republic	6,405	Trinidad and Tobago	7,861
Trinidad and Tobago	6,030	Germany	6,389
Guyana	5,127	Nigeria	6,366
Percentage of total foreign born LPNs accounted for by top 10 source countries	58 %		60 %

Table 5. Top 15 source countries for employed U.S. registered nurses, licensed practical nurses, and nurses' aides who arrived in the U.S. between 1990 and 2000.

Country	Number of R.N.s	Country	Number of L.P.N.s	Country	Number of Aides
Philippines	23,527	Philippines	2,417	Philippines	11,623
Canada	8,691	Jamaica	1,604	Jamaica	10,454
India	3,845	Nigeria	671	Former Soviet Union	8,713
Nigeria	3,479	Mexico	639	Mexico	8,573
Former Soviet Union	2,654	Haiti	592	Haiti	6,304
Jamaica	2,302	Former Soviet Union	473	Nigeria	4,267
U.K. (excl. N. Ireland)	1,765	India	412	Dominican Republic	3,652
Korea	1,722	Africa*	337	Guyana	3,284
China	1,644	Ghana	323	Ghana	3,055
Mexico	1,225	Puerto Rico	314	Trinidad & Tobago	2,236
Vietnam	1,037	Sierra Leone	285	India	2,032
Haiti	882	China	278	Liberia	2,022
Germany	866	Canada	277	Poland	1,966
Trinidad & Tobago	838	Poland	234	Puerto Rico	1,714
Poland	817	Germany	210	Africa*	1,609
Total from all countries	70,665	Total from all countries	13,209	Total from all countries	98,603

* Respondent answered "Africa" on the Census form; specific country not specified

Table 6. Distribution of foreign-born employed registered nurses, licensed practical nurses, and nursing aides in the U.S. by region of origin, 1990 and 2000.

	Registered Nurses		Licensed Practical Nurses		Nurses' Aides	
	1990	**2000**	**1990**	**2000**	**1990**	**2000**
North America	8.31	7.49	5.23	3.13	2.17	1.20
Latin America	24.89	23.72	36.93	46.92	56.82	60.18
Western Europe	14.99	11.69	17.05	10.58	10.57	6.01
Eastern Europe	2.44	3.38	2.26	3.31	3.58	6.28
South Asia	4.31	5.00	3.83	3.32	2.89	1.88
East Asia	37.80	39.15	26.31	21.11	14.49	14.42
Mideast	1.44	1.53	0.82	1.08	1.02	0.72
Africa	2.72	6.79	2.38	9.51	3.68	8.12
Oceania	0.67	0.61	0.72	0.66	0.67	0.76
Other	2.44	0.64	4.48	0.37	4.10	0.43

Other includes individuals whose response did not fit in the categories above, including answers such as "Europe—unspecified"

Table 7. Percentages of employed registered nurses, licensed practical nurses, and nurses' aides in the U.S. who are foreign born by U.S. region, 1990 and 2000.

	Registered Nurses		Licensed Practical Nurses		Nurses' Aides	
Region	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**
New England	6.75	8.96	7.42	10.61	16.12	23.35
Middle Atlantic	14.86	18.97	12.99	17.33	26.18	36.48
E. North Central	5.91	7.37	3.19	3.39	4.60	5.80
W. North Central	2.24	3.10	2.31	2.57	3.20	4.95
South Atlantic	8.76	12.52	5.16	10.92	9.63	15.66
E. South Central	2.61	3.13	1.27	1.78	1.30	2.19
W. South Central	8.64	11.91	4.48	4.26	5.42	10.93
Mountain	4.90	7.61	3.77	5.42	6.32	10.01
Pacific	20.11	25.07	22.01	27.72	26.54	36.26
Rural PMSA	2.67	3.40	1.75	1.85	2.27	3.47

New England includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont. Middle Atlantic includes New Jersey, New York, and Pennsylvania. East North Central includes Illinois, Indiana, Michigan, Ohio, and Wisconsin. West North Central includes Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. South Atlantic includes Delaware, DC, Florida, Georgia, Maryland, North Carolina, South Carolina, and Virginia. East South Central includes Alabama, Kentucky, Mississippi, and Tennessee. West South Central includes Arkansas, Louisiana, Oklahoma, and Texas. Mountain includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. Pacific includes Alaska, California, Hawaii, Oregon, and Washington.

Table 8 . Characteristics of native born and foreign born registered nurses, licensed practical nurses, and nurses' aides, 1990 and 2000.

	1990		2000	
	Native born	**Foreign born**	**Native born**	**Foreign born**
R.N.s				
Education				
Less than H.S.	0.01	0.01	0.00	0.01
High School	0.17	0.14	0.12	0.10
Associate's Deg.	0.39	0.30	0.37	0.26
B. A.	0.31	0.42	0.37	0.50
Graduate Deg.	0.12	0.14	0.13	0.13
Age	39.92	40.77	43.00	42.60
Gender =male	0.05	0.07	0.07	0.10
Hours worked	36.21	38.75	36.85	39.18
Work part time	30.51	19.40	27.58	16.73
Wages*	20.31	23.38	22.22	25.73
L.P.N.s				
Education				
Less than H.S.	0.08	0.16	0.02	0.06
High School	0.52	0.37	0.76	0.69
Associate's Deg.	0.30	0.22	0.14	0.13
B. A.	0.04	0.17	0.02	0.09
Graduate Deg.	0.06	0.07	0.05	0.03
Age	40.34	40.46	42.18	41.49
Gender=male	0.06	0.11	0.07	0.12
Hours worked	36.70	38.20	37.55	38.85
Work part time	28.12	22.23	23.97	18.60
Wages*	14.17	16.57	14.96	17.91
Aides				
Education				
Less than H.S.	0.25	0.35	0.22	0.33
High School	0.63	0.47	0.68	0.50
Associate's Deg.	0.06	0.07	0.05	0.06
B. A.	0.04	0.07	0.04	0.08
Graduate Deg.	0.02	0.04	0.01	0.03
Age	38.53	40.98	38.62	42.51
Gender=male	0.12	0.13	0.12	0.13
Hours worked	36.16	38.05	36.37	37.92
Work part time	30.33	23.07	29.36	25.10
Wages*	10.61	12.80	11.41	13.55

* Wages are deflated so that they are in terms of the 1999 wage. The Census questions about income and hours refer to the year previous to the census. Wages that were calculated to be below the minimum wage are set to the minimum wage, $3.35 an hour in 1989 and $5.15 an hour in 1999. Wages calculated to be above $100 in 1989 are set to $100 and wages above $134 in 1999 are set to $134.

Figure 1 Supply and Demand Projections for Registered Nurses, 2000--2020

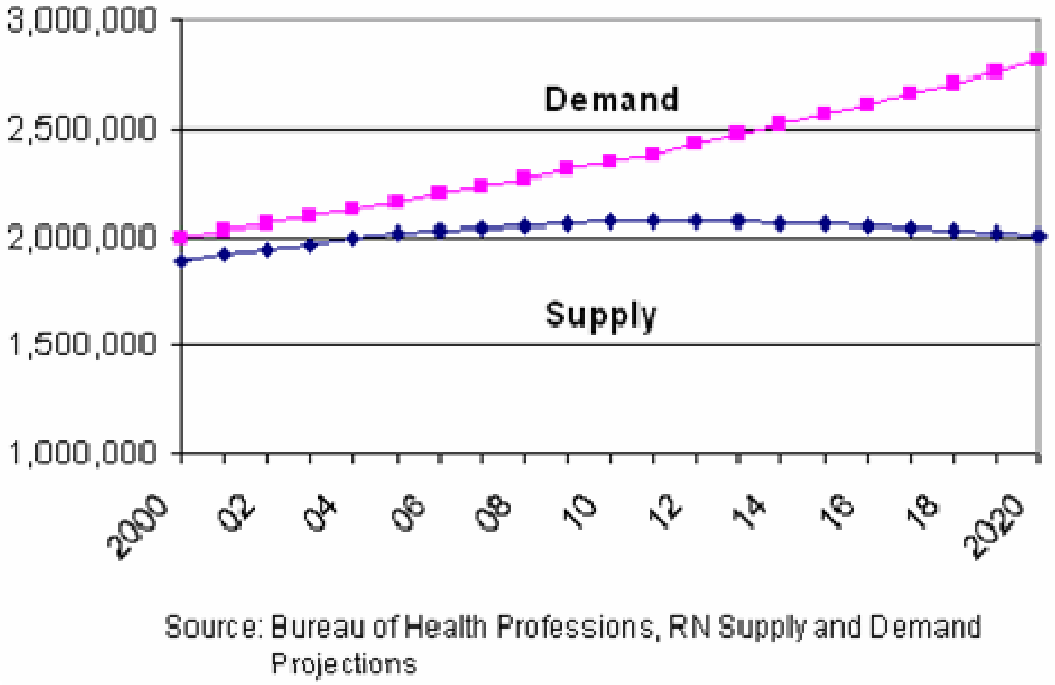
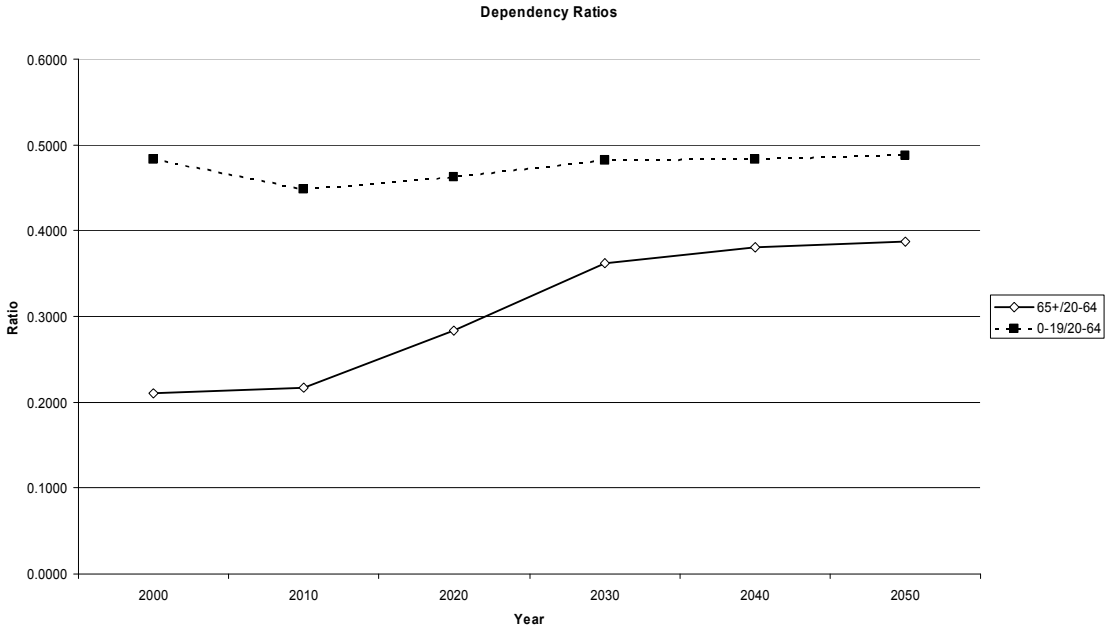
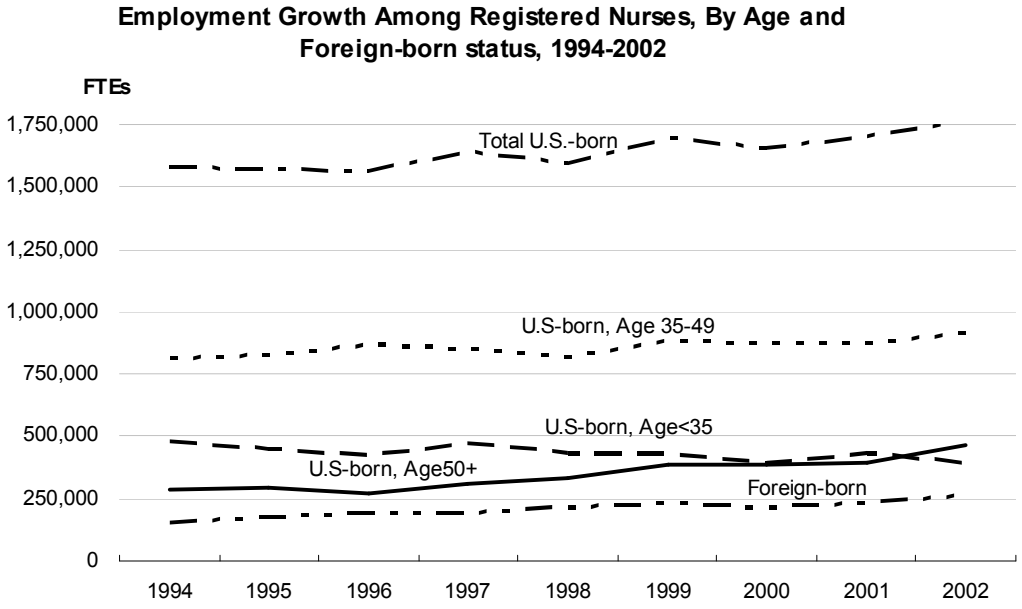


Figure 2 Dependency Ratios Based Upon U.S. Census Projections, 2000 – 2050



Source: U.S. Census Bureau, 2004, "U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin," http://www.census.gov/ipc/www/usinterimproj/ accessed on May 17, 2004.

Figure 3. Employment Trends for U.S. Nurses by U.S.-born age group and by Foreign-born



SOURCE: U.S.Bureau of the Census, Current Population Survey, Outgoing Rotation Group Annual Merged Files, 1994-2002.
NOTE: FTE is full-time equivalent

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