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**Changes in the Rural  
Registered Nurse Workforce  
from 1980 to 2004**

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**by**

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## ABOUT THE CENTER

The WWAMI Rural Health Research Center (RHRC) is one of eight centers supported by the Federal Office of Rural Health Policy (FORHP), a component of the Health Resources and Services Administration (HRSA) of the Public Health Service. The major focus of the WWAMI RHRC is to perform policy-oriented research on issues related to rural health care and the rural health professional workforce. Specific interests of the Center include the training and supply of rural health care providers and the content and outcomes of the care they provide; the availability and quality of care for rural women and children, including obstetric and perinatal care; and access to high-quality care for vulnerable and minority rural populations.

The WWAMI Rural Health Research Center is based in the Department of Family Medicine at the University of Washington School of Medicine, and has close working relationships with the WWAMI Center for Health Workforce Studies, state offices of rural health, and the other health science schools at the University, as well as with other major universities in the five WWAMI states: Washington, Wyoming, Alaska, Montana, and Idaho. The University of Washington has over 30 years of experience as part of a decentralized educational research and service consortium involving the WWAMI states, and the activities of the Rural Health Research Center are

particularly focused on the needs and challenges in these states. The WWAMI RHRC also works closely with the associated Area Health Education Centers.

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# Changes in the Rural Registered Nurse Workforce from 1980 to 2004

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## ABSTRACT

There are shortages of registered nurses (RNs) in most parts of the country. Rural strategies to address these shortages may differ from urban strategies, and knowledge of how the rural nurse workforce has changed over time is important for rural health policy and planning.

With data from 1980-2004 National Sample Surveys of Registered Nurses, and using Rural-Urban Commuting Area definitions, this study describes changes in rural and urban RN demographics, education, and employment characteristics over time.

Between 1980 and 2004, the number of rural RNs grew by 216%, more than for urban RNs. The percent of rural RNs who are male and the percent nonwhite or Hispanic increased since 1980, but the RN workforce continues to underrepresent all these groups. The percent of working rural RNs with BSN or higher degrees increased since 1980, but the percent remained less than for urban RNs, and the average age at which both rural and urban RNs completed their basic RN degree increased. In 2004, a greater percentage of rural and urban RNs were employed in nursing and worked full time compared with 1980, but the proportion of both who worked in hospitals declined. The number of RNs living in rural areas increased from 1980 to 2004, but a steeply growing proportion of rural RNs commuted to larger rural towns and urban areas for work. As a result, the number of working RNs per capita remained lower in rural areas than in urban areas. The salaries of RNs who live in rural areas remained lower than urban-residing RNs' salaries, regardless of where they worked. This salary gap increased over the time period.

Rural RNs continue to have less nursing education on average than urban RNs, a growing proportion commute to larger rural towns and urban areas for their work, and their average age has increased. As a result, rural health care administrators will continue to face challenges in maintaining adequate RN resources for their facilities.

## INTRODUCTION

Current and projected nationwide shortages of registered nurses (RNs) threaten access to and quality of care in most parts of the country. In rural areas health care is frequently challenged by uneven distribution of health care providers, including nurses. Strategies to address nursing shortages in rural areas may be different from those in urban areas, given the differences in the characteristics of the rural and urban RN workforce.

Compared with urban RNs, rural RNs in the United States in 2000 had less nursing education, were less likely to work in hospitals, were less likely to work part time, and the more rural they were, the more likely they were to commute to an urban or less rural area to work.<sup>1</sup> Knowledge of rural nurses' education, demographics and practice characteristics, and how these have changed over time, is important for rural health policy and planning. The purpose of the analyses reflected in this report are to examine the characteristics of rural RNs in 2004, see how they have changed since 1980, and to compare these trends to those of urban RNs.

## METHODS

### DATA SOURCES

This descriptive study used data from seven rounds of the National Sample Survey of Registered Nurses (NSSRN), a nationally representative survey of licensed registered nurses (RNs) conducted by the Health Resources and Services Administration (HRSA) every four years.<sup>2-8</sup> The first NSSRN was conducted in 1977, but data from that survey were not used for this study because of issues of noncomparability. Through a special use agreement with HRSA, these analyses utilized the version of the NSSRN data that included respondent ZIP codes, allowing us to carry out geographical analyses. Each survey drew a stratified, nested sample from the population of RNs with active licenses in the United States at the time of

the survey. This sampling technique accounts for RNs who are licensed in more than one state and allows for the oversampling of minorities. The resulting data sets provide appropriate weights to be applied in order to obtain an unduplicated count of RNs licensed in the United States in each of the survey years.

Table 1 shows the number of unweighted and weighted cases for every survey after the data were cleaned, but before selecting our study population.

**Table 1: National Sample Survey of Registered Nurses: Number of Respondents and Response Rates by Survey Year**

Year of Survey	Unweighted N	Weighted N	Final Survey Response Rate
1980	30,535	1,670,817	80.0%
1984	31,913	1,906,468	79.8%
1988	33,272	2,049,213	80.7%
1992	32,608	2,262,178	79.7%
1996	29,908	2,572,293	72.3%
2000	35,579	2,714,671	72.0%
2004	35,635	2,909,357	70.5%

Sources: Health Resources and Services Administration. Findings from the 1980, 1984, 1988, 1992, 1996, 2000, and 2004 National Sample Survey of Registered Nurses.

Data for the U.S. population came from Claritas, a proprietary database of population estimates based on the U.S. Census, for the years 1990, 2000, and 2004. Population numbers for 1988, 1992, and 1996 were estimated by applying ratios based on Claritas data for the closest year. Because of difficulties with assigning Claritas data to ZIP codes prior to 1990, population estimates for survey years 1980 and 1984 would have been less accurate and thus were not calculated.

## STUDY POPULATION

Our study population includes surveyed RNs aged 18-75 (inclusive). It excludes RNs who were in the military, worked or resided in a foreign country, worked or resided in one of the U.S. possessions or territories, or were missing data on their residence and/or work locations needed to determine the RNs' urban/rural classification. In all cases, exclusions were 3% of the sample or less. Most analyses were limited to RNs who were employed in nursing at the time they were surveyed.

## GEOGRAPHY

We used the Rural-Urban Commuting Area (RUCA)<sup>9,10</sup> taxonomy (Version 2.0) to determine the type of geographic location of the RNs in our study. This

taxonomy defines rural and urban using Census Bureau definitions and work commuting flows.<sup>9</sup> The RUCA codes can be collapsed into groupings to identify urban, large rural, small rural, and isolated small rural areas. For this study, we grouped RUCA codes as follows: Urban (RUCA codes: 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, 5.1, 7.1, 8.1, and 10.1); large rural (RUCA codes: 4.0, 4.2, 5.0, 5.2, 6.0, and 6.1); small rural (RUCA codes: 7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 8.4, 9.0, 9.1, and 9.2); and isolated small rural (RUCA codes: 10.0, 10.2, 10.3, 10.4, 10.5, and 10.6).

RNs were assigned to either urban, large rural, small rural, or isolated small rural area using current residence and current work ZIP codes available in the 1988 through 2004 NSSRN data files. The 1980 and 1984 NSSRN data sets lack ZIP codes, but contain county-level Federal Information Processing Standards (FIPS) codes. FIPS codes are issued by the National Institute of Standards and Technology (NIST) in order to standardize the identification of geographic entities across federal government agencies.<sup>11</sup> We attached 2003 Urban Influence Codes (UICs)<sup>12</sup> to each of those FIPS codes and used the UIC values to approximate a RUCA assignment. UICs classify counties according to their metropolitan or nonmetropolitan status, and thus can be used to identify urban and rural areas. In our study, we used UIC categories 1 and 2 to approximate the "urban" RUCA category; UIC categories 3, 5, and 8 approximated the "large rural" RUCA category; UIC categories 4, 6, 9, and 11 approximated the "small rural" RUCA category; and UIC categories 7, 10, and 12 approximated the "isolated small rural" RUCA category.

## RUCA ASSIGNMENT WITH MISSING GEOGRAPHIC DATA

In each NSSRN survey data file, a percentage of cases lacked some or all of the geographic data needed for RUCA assignment. Cases for which all geographic data were missing (0.4% or less of weighted cases per data set) were excluded from the study population. For cases with partial geographic data, we applied imputation rules that utilized the available data to estimate the corresponding RUCA area type according to three scenarios.

Scenario #1 involved the 1980, 1982, and 1984 RN data files, which contained county-level FIPS codes for current and previous employment, and for current and previous residence. No ZIP codes were available for those data sets, meaning that RUCA assignments were approximated using UIC values (see explanation above). For cases missing the FIPS code of current residence, we imputed to it the FIPS code of current job, if available, therefore assigning such cases to residence RUCA area types that are identical to their

work RUCA area types. Similarly, we imputed FIPS codes of current residence to missing FIPS codes of current employment whenever possible, thus assigning those cases to identical residence and work RUCA area types.

Scenario #2 involved the 1988 and 1992 data sets, in which both ZIP codes and FIPS codes are available for current and previous residence, and for current and previous employment. We dealt with missing ZIP code and corresponding RUCA values by substituting available FIPS codes and corresponding UIC-based RUCA approximations for current residence and current employment. For example, a case in which ZIP code data for current residence was missing (rendering ZIP code-based RUCA determination impossible) but a FIPS code residence was available, was assigned to the RUCA of residence using the UIC data corresponding to the existing FIPS code.

Scenario #3 involved the 1996, 2000, and 2004 NSSRN data sets. In these survey years, both ZIP code and FIPS code data were collected, but in addition to ZIP codes for current and previous residence, and for current and previous work location, the mailing ZIP codes for the surveys were also made available. Previous analyses showed a very high level of concordance between residence and mailing ZIP codes in our study population. Thus, we applied a two-step rule to handle cases with missing ZIP code of current residence data. First we checked to see if a valid mailing ZIP code existed for those cases. If so, we imputed the mailing ZIP code to the missing residence data and assigned those RNs to a RUCA area of residence determined by the mailing ZIP code. If the ZIP code of residence was missing, but a mailing ZIP code was not available, the applied the same rule as in scenario #2 above and, if possible, used the FIPS code of current residence and linked UIC value to approximate a residence RUCA assignment. Because

no alternative ZIP codes existed to aid in identifying employment location, we dealt with cases missing ZIP codes for current employment (and thus corresponding RUCA designation) by assigning their employment locations to RUCAs estimated by using FIPS codes for current employment, if available, and linked UICs.

In the final geographic assignment scenario, using RUCAs we were able to assign at least 99.0% of RNs in our study population, across all the survey years, to either urban or rural areas of current residence, and to urban or rural areas of current work.

## RESULTS

Our findings describe changes among rural and urban RNs between from 1980 through 2004. We begin by describing changes in RNs' demographic characteristics, followed by changes in education, and finally employment and practice characteristics. We describe differences, when they occur, among the three rural area types (large rural, small rural, and isolated small rural).

### DEMOGRAPHICS

The overall active RN population (including both working and not working RNs) has grown steadily between 1980 and 2004, and as Table 2 shows, such growth has taken place among RNs living in urban, as well as large rural, small rural, and isolated small rural areas. The table also shows a small increase in the percentage of RNs who reside in rural areas, from 15% of all RNs in 1980 to 18% in 2004. And while the proportion living in large rural and small rural areas stayed similar over time, the percent living in isolated small rural areas went up from 1% in 1980 to nearly 4% in 2004.

**Table 2: Number and Percent of RNs Residing in Urban and Rural Areas: 1980-2004**

Area Type	1980	1984	1988	1992	1996	2000	2004
Rural (overall)	240,068 (14.9%)	270,699 (14.7%)	312,732 (15.5%)	356,706 (16.0%)	445,272 (17.5%)	479,785 (17.9%)	519,527 (18.0%)
Urban	1,372,267 (85.1%)	1,568,658 (85.3%)	1,707,530 (84.5%)	1,868,329 (84.0%)	2,104,095 (82.5%)	2,197,207 (82.1%)	2,367,465 (82.0%)
Rural subgroups							
Large rural	147,986 (9.2%)	169,160 (9.2%)	176,120 (8.7%)	197,377 (8.9%)	242,577 (9.5%)	253,005 (9.5%)	267,662 (9.3%)
Small rural	75,440 (4.7%)	82,341 (4.5%)	83,762 (4.1%)	94,776 (4.3%)	117,572 (4.6%)	129,712 (4.8%)	143,595 (5.0%)
Isolated small rural	16,642 (1.0%)	19,197 (1.0%)	52,850 (2.6%)	64,553 (2.9%)	85,122 (3.3%)	97,068 (3.6%)	108,270 (3.8%)



Since 1980 the percentage employed in nursing has also increased in both urban and rural areas (Table 3), up to 85.1% in rural areas and 83.3% of RNs employed in nursing in urban areas in 2004. This trend was consistent in large rural, small rural and isolated small rural areas.

Both rural and urban RNs have been getting older since 1980. Figure 1 shows an apparent convergence in the mean age of rural and urban RNs employed in nursing, which was 45 years in 2004.

In 2004, approximately one fifth of both rural and urban RNs across the nation were over age 54 (19.6% of rural and 20.0% of urban RNs).

While both the rural and urban populations of working RNs have aged, they have also become more diverse between 1980 and 2004. As Table 2 shows, men are still vastly underrepresented in the profession, though their percentage has grown to 6.3% of all working RNs residing in urban areas, and to 5.6% of all working

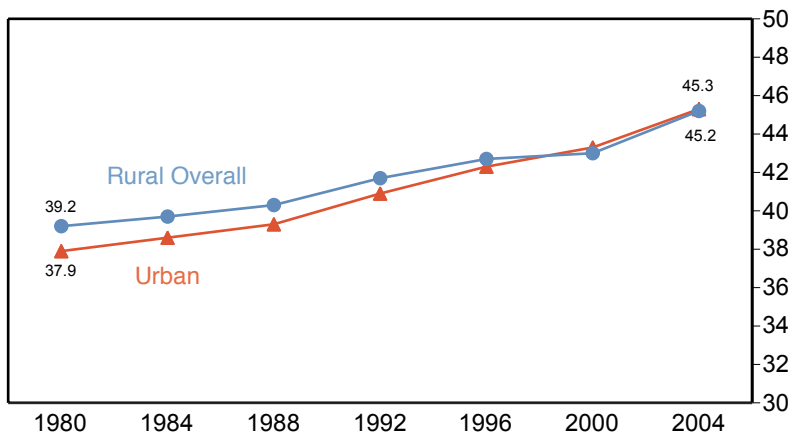
RNs residing in rural areas, up from 3.1% and 3.2% respectively in 1980.

According to the U.S. Census, in 2005 33% of the overall U.S. population was minority (nonwhite and/or Hispanic).<sup>13</sup> Since 1980 the percent of RNs who are nonwhite and/or Hispanic has grown in urban and rural areas, but the RN population continues not to be representative of the racial/ethnic composition of the general population. In 2004, only 6.5% of rural RNs and 13.5% of urban RNs were nonwhite and/or Hispanic (see Table 4).

**Table 3: Percent of RNs Employed in Nursing**

Area Type	1980	1984	1988	1992	1996	2000	2004
Rural (overall)	75.2%	77.6%	78.4%	81.8%	83.9%	83.2%	85.1%
Urban	77.1%	79.5%	80.7%	83.4%	82.7%	81.9%	83.3%
Rural subgroups							
Large rural	75.5%	77.3%	79.2%	82.5%	83.2%	83.0%	85.2%
Small rural	75.0%	79.0%	77.0%	81.6%	85.5%	83.9%	85.2%
Isolated small rural	73.4%	74.2%	77.9%	80.2%	83.6%	82.6%	84.6%

**Figure 1: Mean Age of Working RNs by Residence: 1980-2004**



Weighted number of rural and urban working RNs, respectively, for each survey year is 180,590 and 1,058,120 (1980); 210,046 and 1,247,625 (1984); 244,268 and 1,371,718 (1988); 291,197 and 1,554,685 (1992); 371,774 and 1,730,679 (1996); 396,441 and 1,782,334 (2000); 438,885 and 1,950,440 (2004).

**Table 4: Gender and Race/Ethnicity of Working RNs by Residence: 1980-2004**

Area Type	1980	1984	1988	1992	1996	2000	2004
Percent male							
Rural (overall)	3.2%	3.4%	3.9%	3.5%	4.9%	5.3%	5.6%
Urban	3.1%	3.3%	3.5%	4.4%	5.5%	6.0%	6.3%
Percent nonwhite and/or Hispanic							
Rural (overall)	4.4%	5.9%	4.1%	4.4%	4.8%	6.9%	6.5%
Urban	8.9%	10.1%	9.4%	11.2%	11.5%	15.1%	13.5%

Weighted number of rural and urban working RNs, respectively, for each survey year is 179,892 and 1,055,521 (1980); 210,046 and 1,247,625 (1984); 244,910 and 1,376,851 (1988); 291,776 and 1,556,666 (1992); 373,245 and 1,740,761 (1996); 399,032 and 1,798,427 (2000); 442,039 and 1,970,765 (2004).

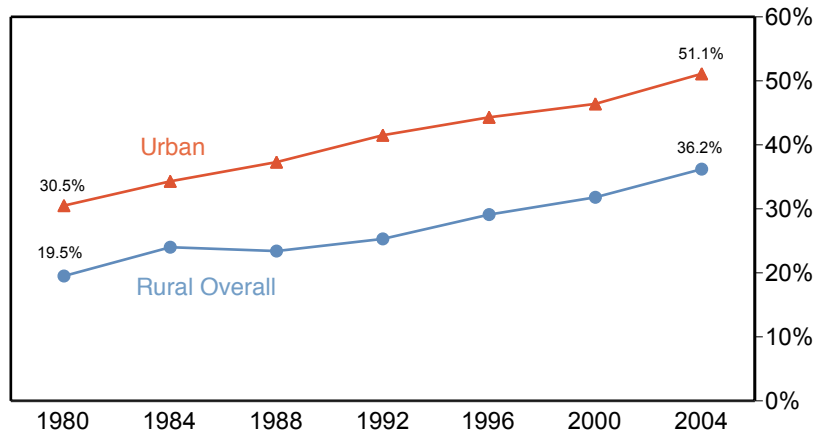
## EDUCATION

The following set of graphs sheds light on different aspects of RN<sup>7</sup> educational achievement and document some persistent differences between RNs living in urban and rural areas. In particular, the percentage of RNs who have nursing degrees at the bachelors of science in nursing (BSN) level or higher has increased in all areas since 1980, but a larger proportion of RNs living in urban areas continue to have BSN or higher nursing degrees than do RNs living in rural areas (Figure 2).

A similar trend occurs for RNs who have obtained either Master's or PhD degrees in nursing. The percentage of RNs with such advanced degrees grew from 1980 to 2004, but the curve is steeper for RNs living in rural areas (Figure 3). The proportion of RNs living in rural areas who have Master's or PhDs more than tripled since 1980, whereas it more than doubled in urban areas.

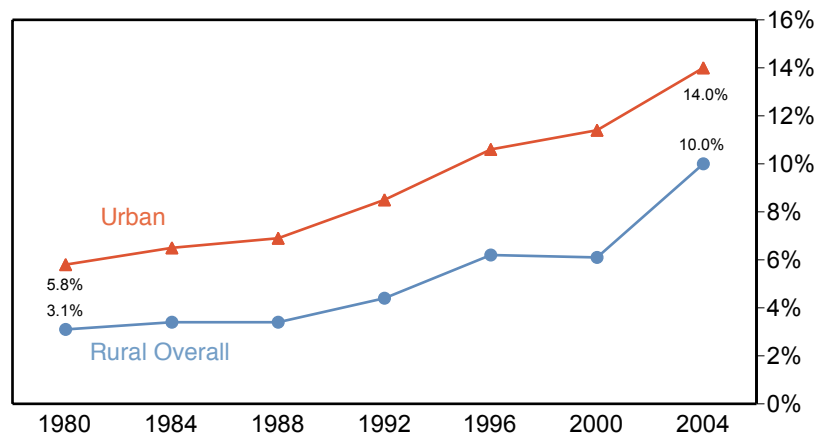
The average age at which both rural and urban RNs earned their initial RN degree or diploma has increased since 1980. In 1980 these ages were nearly the same (slightly older than 23 years), but by 2004 rural RNs' average age of first nursing degree was 28.0 years; four and a half years older than the average of 26.8 years for urban RNs (Figure 4).

**Figure 2: Percent of Working RNs with BSN Degree or Higher by Residence: 1980-2004**



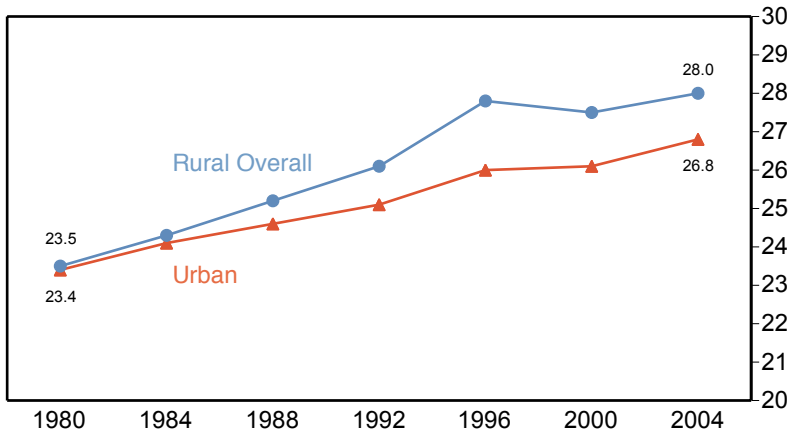
Weighted number of rural and urban working RNs, respectively, for each survey year is 180,100 and 1,052,536 (1980); 209,025 and 1,242,152 (1984); 244,625 and 1,372,133 (1988); 291,884 and 1,557,168 (1992); 373,313 and 1,740,556 (1996); 398,505 and 1,794,878 (2000); 435,937 and 1,940,490 (2004).

**Figure 3: Percent of RNs with Advanced Nursing Degrees\* by Residence: 1980-2004**



\* Master's or PhD degrees.  
Weighted number of rural and urban working RNs, respectively, for each survey year is 180,101 and 1,052,536 (1980); 209,024 and 1,242,152 (1984); 244,623 and 1,372,132 (1988); 291,883 and 1,557,167 (1992); 373,314 and 1,740,556 (1996); 398,505 and 1,794,879 (2000); 435,937 and 1,940,490 (2004).

**Figure 4: Mean Age at Basic RN Degree Completion by Residence: 1980-2004**

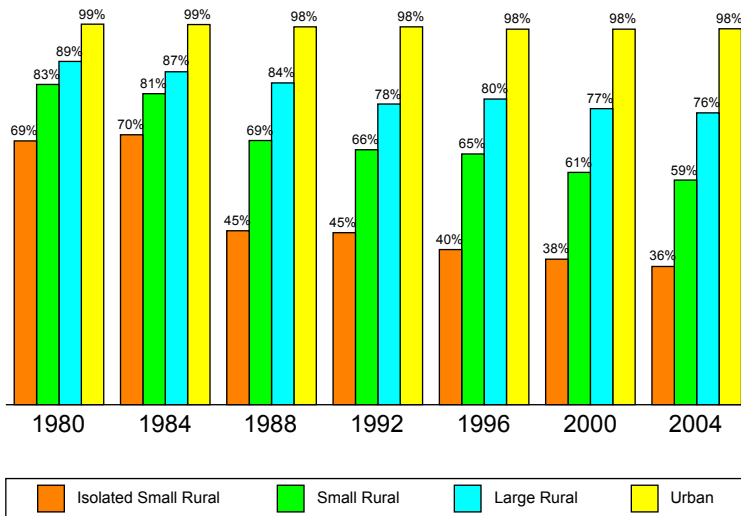


Weighted number of rural and urban working RNs, respectively, for each survey year is 179,004 and 1,048,250 (1980); 208,228 and 1,240,499 (1984); 243,795 and 1,366,540 (1988); 290,850 and 1,544,151 (1992); 371,478 and 1,728,680 (1996); 399,032 and 1,798,428 (2000); 432,564 and 1,923,018 (2004).

## EMPLOYMENT

The graph in Figure 5 shows that the percentage of RNs who work and reside in the same area type has dropped fairly consistently for all rural areas between 1980 and 2004. In 1980, 69% of RNs living in isolated small rural areas also worked in that same area type (86.1% for rural overall). By 2004 that number had dropped to 36% (62.9% for rural overall), indicating that nearly two-thirds of RNs who lived in isolated small rural areas commuted to small rural, large rural or urban areas to work. A closer look at that same RN population (Figure 6) offers more details on the work area types of RNs who reside in isolated small rural areas and the work destination areas of those who commuted outside of their residence areas.

**Figure 5: Working RNs Who Live and Work in the Same Area Type: 1980-2004**

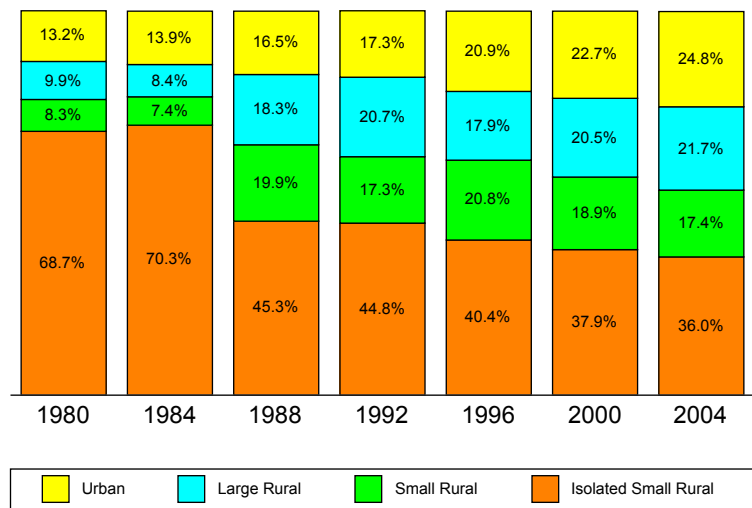


Weighted number of large rural, small rural, isolated small rural, and urban working RNs, respectively, for each survey year is 111,190, 56,304, 12,159, and 1,050,490 (1980); 130,713, 64,908, 14,242, and 1,246,449 (1984); 139,269, 64,514, 41,172, and 1,377,797 (1988); 162,794, 77,340, 51,790, and 1,557,594 (1992); 201,766, 100,526, 71,149, and 1,741,298 (1996); 207,937, 107,591, 79,418, and 1,782,209 (2000); 227,600, 121,558, 91,119, and 1,963,919 (2004).



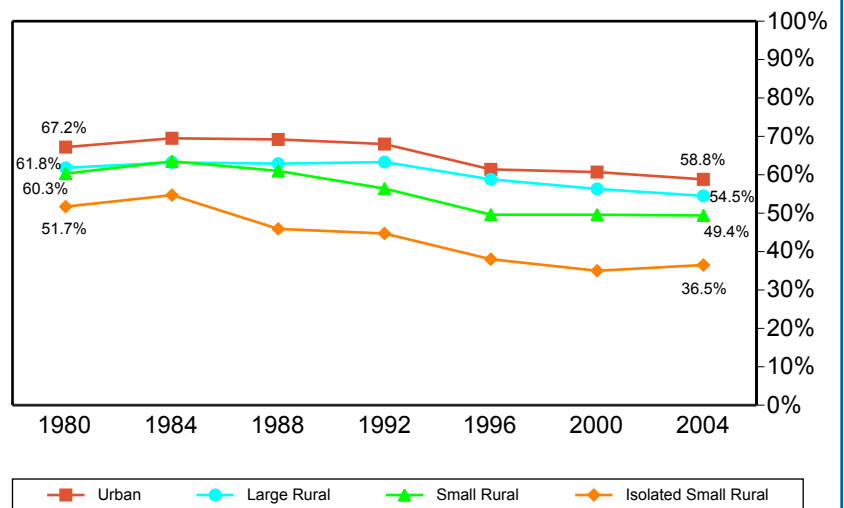
Because, as described above, many RNs who live in rural areas do not work in those same area types, the following analyses are based on the work location of the RNs. Figure 7 shows that the proportion of RNs working in hospitals has been declining since 1980 for rural as well as urban area types. However, the more rural the area, the larger is the drop in the percentage working in hospitals. That percentage is lowest for RNs who work in isolated small rural areas where only 37% were employed in hospitals in 2004.

**Figure 6: Work Area Type of RNs Who Live in Isolated Small Rural Areas: 1980-2004**



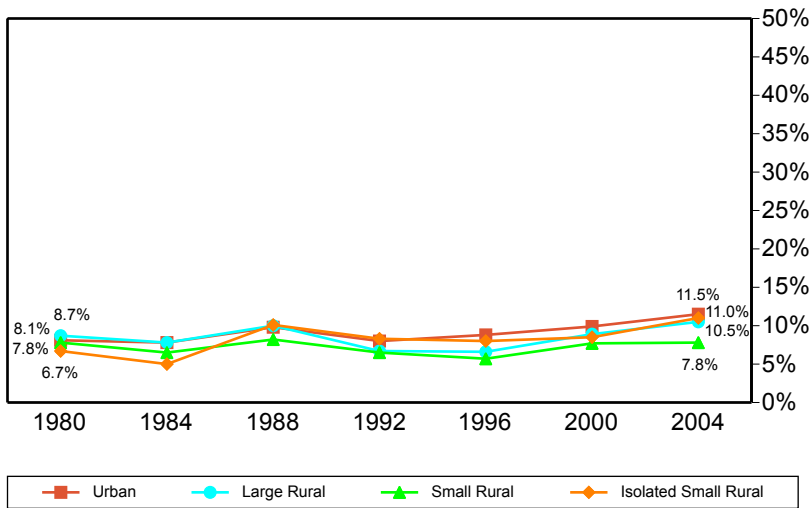
Weighted number of isolated small rural working RNs for each survey year is 12,158 (1980); 14,242 (1984); 41,172 (1988); 51,790 (1992); 71,149 (1996); 79,418 (2000); 91,119 (2004).

**Figure 7: RNs Working in Hospitals by Work Area Type: 1980-2004**



Weighted number of large rural, small rural, isolated small rural, and urban working RNs, respectively, for each survey year is 110,767, 52,321, 9,776, and 1,056,046 (1980); 126,870, 59,898, 12,485, and 1,257,605 (1984); 143,858, 63,291, 25,388, and 1,388,867 (1988); 161,474, 73,098, 30,078, and 1,580,434 (1992); 209,514, 98,191, 41,882, and 1,764,194 (1996); 213,218, 98,788, 42,852, and 1,813,453 (2000); 234,623, 102,871, 44,142, and 1,975,862 (2004).

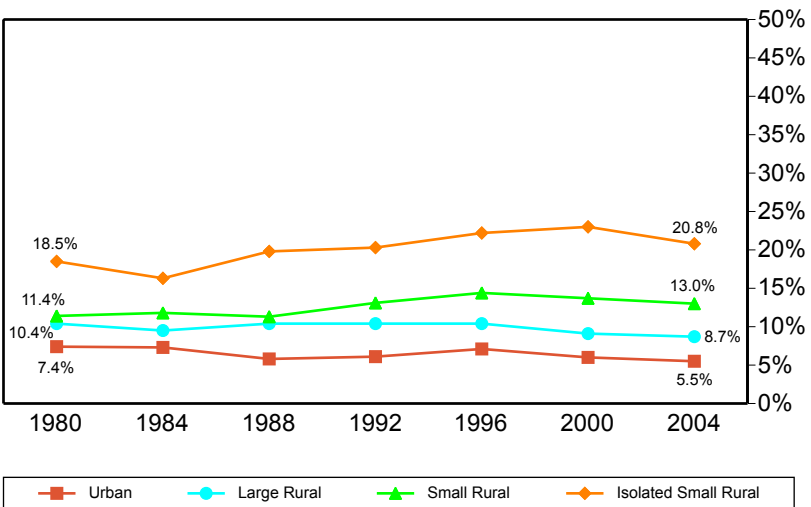
**Figure 8: RNs Working in Ambulatory Care by Work Area Type: 1980-2004**



Weighted number of large rural, small rural, isolated small rural, and urban working RNs, respectively, for each survey year is 110,767, 52,321, 9,776, and 1,056,046 (1980); 126,870, 59,898, 12,485, and 1,257,605 (1984); 143,858, 63,291, 25,388, and 1,388,867 (1988); 161,474, 73,098, 30,078, and 1,580,434 (1992); 209,514, 98,191, 41,882, and 1,764,194 (1996); 213,218, 98,788, 42,852, and 1,813,453 (2000); 234,623, 102,871, 44,142, and 1,975,862 (2004).

In contrast, the proportion of RNs working in ambulatory settings has remained essentially stable between 1980 and 2004 across all types of areas (Figure 8), as has the proportion employed in nursing homes (Figure 9). The percentage of RNs employed in nursing homes is highest in for those who work in isolated small rural areas.

**Figure 9: RNs Working in Nursing Homes by Work Area Type: 1980-2004**

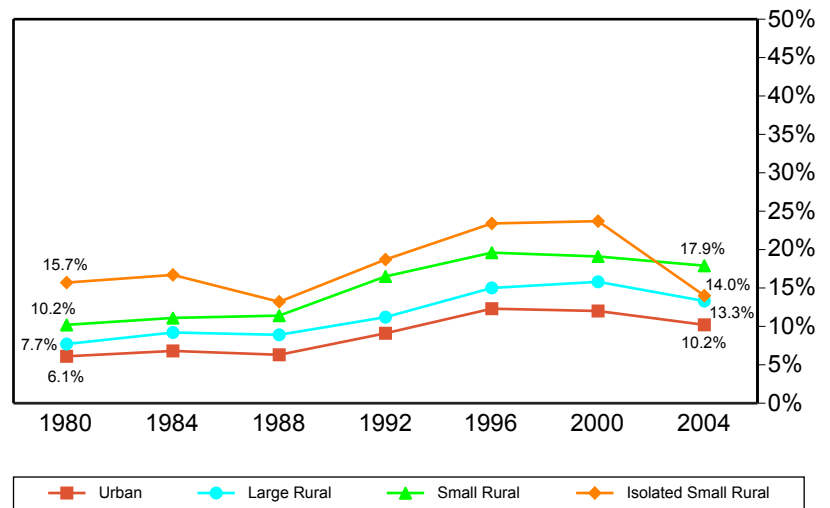


Weighted number of large rural, small rural, isolated small rural, and urban working RNs, respectively, for each survey year is 110,767, 52,321, 9,776, and 1,056,046 (1980); 126,870, 59,898, 12,485, and 1,257,605 (1984); 143,858, 63,291, 25,388, and 1,388,867 (1988); 161,474, 73,098, 30,078, and 1,580,434 (1992); 209,514, 98,191, 41,882, and 1,764,194 (1996); 213,218, 98,788, 42,852, and 1,813,453 (2000); 234,623, 102,871, 44,142, and 1,975,862 (2004).

Figure 10 shows the overall increase in employment of RNs in public/community health between 1980 and 2004 across urban and rural work area types, with the exception of a drop between 2000 and 2004 for RNs in isolated small rural areas.

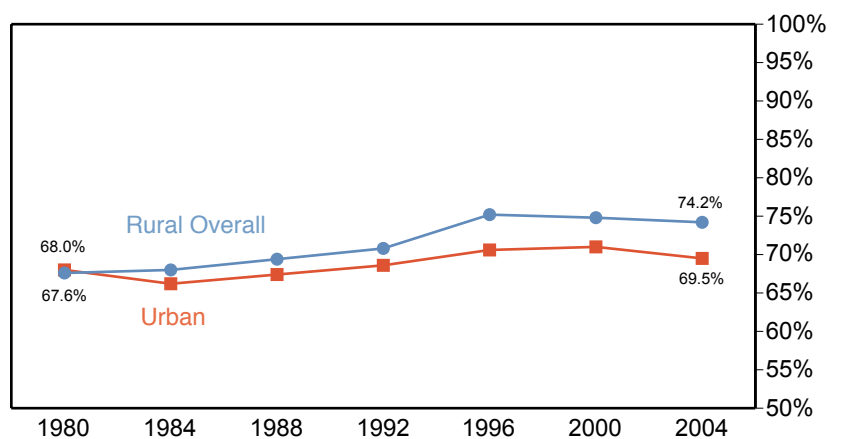
The graph in Figure 11 shows that the percentage of RNs working full-time has increased since 1980. Moreover, that percentage in 2004 was higher for RNs working in rural (74%) than in urban areas (70%).

**Figure 10: RNs Working in Public/Community Health by Work Area Type: 1980-2004**



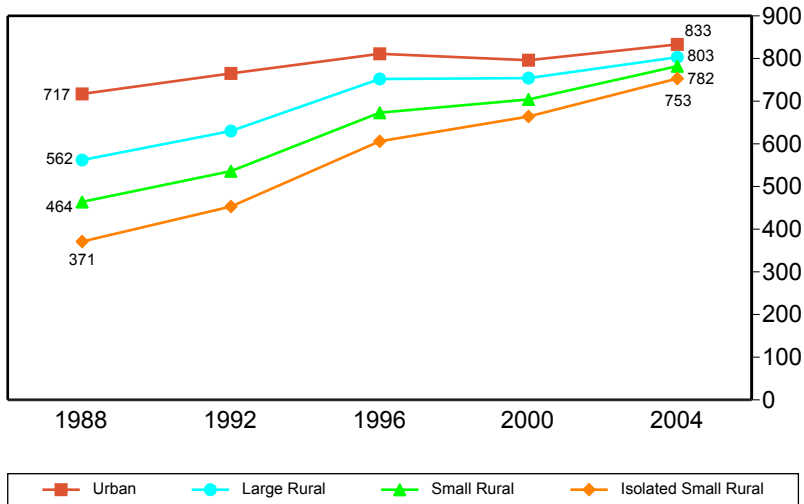
Weighted number of large rural, small rural, isolated small rural, and urban working RNs, respectively, for each survey year is 110,767, 52,321, 9,776, and 1,056,046 (1980); 126,870, 59,898, 12,485, and 1,257,605 (1984); 143,858, 63,291, 25,388, and 1,388,867 (1988); 161,474, 73,098, 30,078, and 1,580,434 (1992); 209,514, 98,191, 41,882, and 1,764,194 (1996); 213,218, 98,788, 42,852, and 1,813,453 (2000); 234,623, 102,871, 44,142, and 1,975,862 (2004).

**Figure 11: RNs Working Full Time\* by Work Area Type: 1980-2004**



\* In their primary employment position.  
 Weighted number of rural and urban working RNs, respectively, for each survey year is 172,302 and 1,051,416 (1980); 199,244 and 1,257,519 (1984); 232,424 and 1,389,359 (1988); 265,316 and 1,584,199 (1992); 349,647 and 1,765,093 (1996); 355,800 and 1,821,356 (2000); 386,576 and 2,018,203 (2004).

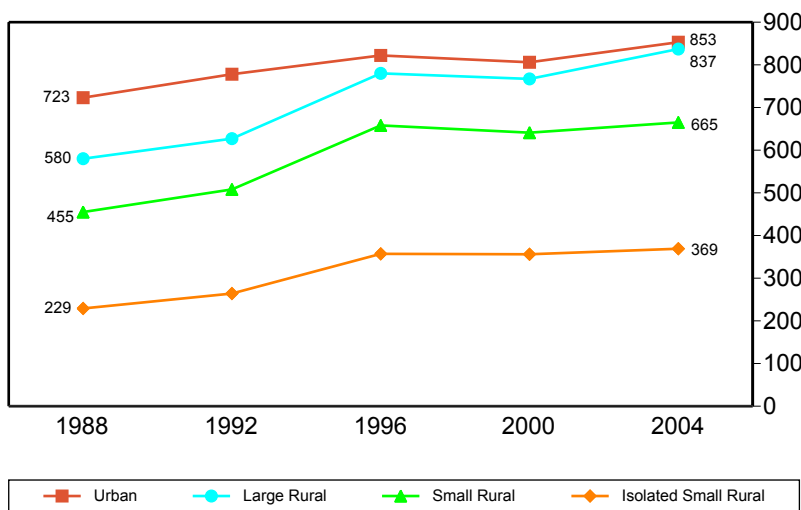
**Figure 12: RNs to 100,000 Population by RN Residence Area Type: 1980-2004**



To better understand the effect of rural RNs commuting out of their residence areas for work, we examined the proportion of RNs residing, and the proportion of RNs working, in the different area types compared with the overall number of people living in those areas. The graph in Figure 12 shows changes over time in the number of RNs living in rural and urban areas compared to the overall population (RNs per 100,000 population). We found that, for example, in 1988 areas of greater rurality had fewer RNs in residence per population. By 2004 the ratios had become similar: more RNs were living in rural areas relative to the population.

The story changes when we look at where RNs are working, as shown in Figure 13. In 2004 isolated small rural areas had only 369 RNs per 100,000 population, small rural areas had 665, and only large rural areas began to resemble urban areas with 837 RNs per 100,000 population. While these ratios of working RNs per 100,000 population have increased somewhat since 1980, especially in isolated small rural and in small rural areas, the numbers of RNs per population remain much lower than in urban and large rural areas.

**Figure 13: RNs to 100,000 Population by RN Work Area Type: 1980-2004**



The next graph (Figure 14) shows the change, between 1980 and 2004, of median full time salary by highest nursing degree across urban and rural RNs' work area types. RNs working full time in urban areas with a BSN or higher earn more than any other group, while RNs with associate degrees or diplomas in rural areas earn the least. However, RNs with BSNs or higher in rural areas make very similar salaries to those with ADN or diplomas in urban areas. The gap, measured as the percentage difference between highest and lowest salaries, is higher in 2004 (33%) than it was in 1980 (20%).

Another perspective on RN median full-time salaries is shown in analyses of changes overtime based on both RNs' work and residence area types. Figure 15 illustrates, for example, that in 1980 the difference in salaries between RNs living and working in rural areas compared to those living and working in urban areas was 15%. By 2004, the difference grew to 22%.

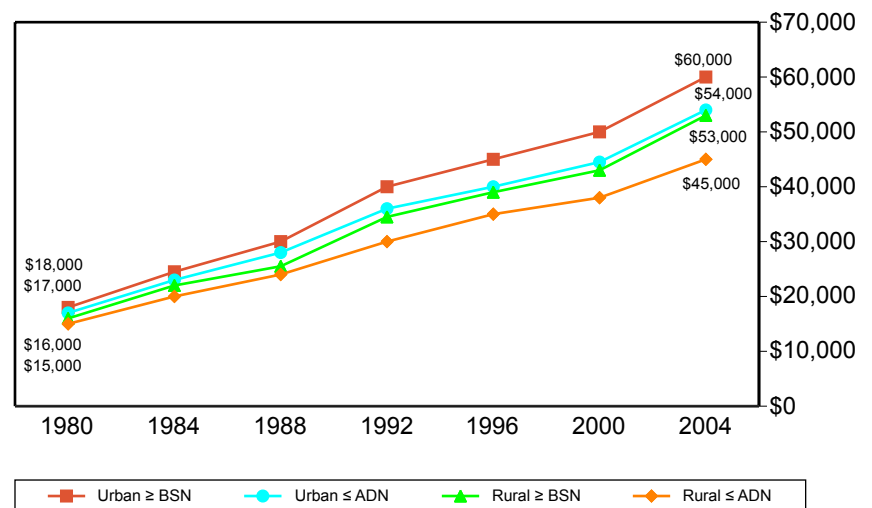
## STUDY LIMITATIONS

Limitations to this study may include the occasional errors and biases that can occur with sample surveys, including sampling design errors, nonresponse bias, and respondent recall error. The response rates to the NSSRN surveys are relatively high (between 70 and 81%) which should minimize nonresponse bias.

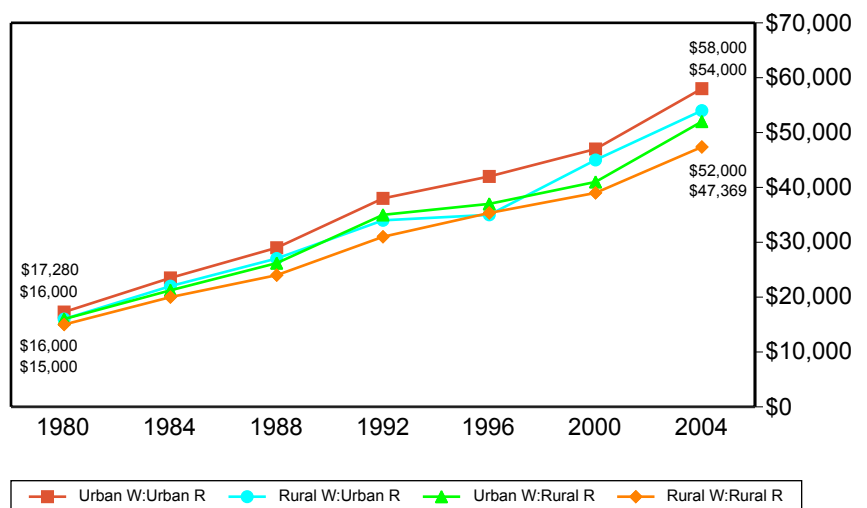
We were unable to produce estimates of the general population prior to 1988 using the RUCA geographic taxonomic system because of data limitations, and therefore were unable to examine work and residence RN-to-population ratios across the entire time period covered by our other analyses. The evidence from our other findings leads us to believe the trend lines would have continued to 1980.

We did not make rural/urban cost of living adjustments to salaries for our comparisons of RN salaries by residence and work location. Because RNs who commute from rural to less rural and urban areas are experiencing some of the higher costs associated with those more populated and less isolated areas, we felt that cost-of-living adjustments may not be entirely appropriate.

**Figure 14: Median Full-Time RN Salary by Highest Degree by Work Area Type: 1980-2004**



**Figure 15: Median Full-Time Salaries of RNs by Work:Residence Area Types: 1980-2004**



## CONCLUSIONS

U.S. workforce needs for registered nurses are complex and vary by time and place as well as by the demographic characteristics of local nurses. The National Sample Survey of Registered Nurses (NSSRN) represents the most comprehensive data set available for the study of temporal and spatial trends in nursing availability. Overall, these data provide evidence that in 2004 rural nurses were less likely than their urban counterparts to have either a bachelor's (51% urban vs. 37% large rural) or master's degree (14% urban vs. 10% rural overall). In addition, rural nurses entered the workforce later in life than urban nurses (28.0 years for rural vs. 26.8 years for urban). These findings have important implications for the leadership of both rural hospitals and community/public health agencies. Increasingly, health care credentialing organizations are requiring that hospitals meet specific thresholds for the education levels of nursing staff in order to receive "magnet" or other accreditation designations. In such cases, workforce demography and education patterns may work against rural hospitals, who often struggle with recruiting and/or retaining local nursing talent.

Overall, occupational commuting patterns among rural and urban nurses characterize an interesting trend in the NSSRN data sets and one that poses great challenge for rural health care administrators. Increasingly, nurses residing in all types of rural settings (isolated small, small, and large rural) are working outside of the communities in which they reside. With a 22% salary differential in 2004 between nurses living and working in urban versus rural areas (e.g., reside and work in urban area vs. reside and work in rural area), it is logical to assume that rural nurses are taking advantage of urban hospitals' retention programs. Many such programs provide nurses with schedule options (e.g., three 12-hour shifts/week) that allow them to maximize their income and minimize their time away from home and family. This trend may also reflect nurses' preference to work in urban versus rural hospitals; such hospitals may be more likely to perform procedures or care for patient groups that nurses find professionally stimulating. The realization that the nursing shortage in rural communities is strongly influenced by the *distribution*, rather than the *number* of available nurses deserves further reflection. Additional studies should address the dynamics of nurse commuting patterns regionally and nationally. However, the findings of this report can and should help begin to inform policy deliberations in rural communities, such as how to strengthen rural hospitals' retention programs.

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