



# How fast will the registered nurse workforce grow through 2030? Projections in nine regions of the country

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## ABSTRACT

**Background:** After an unprecedented increase in nursing school enrollment and graduates in the past 10 years, projected shortages of nurses have been erased at a national level. However, nursing markets are local, and an uneven distribution of health care providers of all types is a longstanding feature of health care in the United States.

**Purpose:** The purpose of this study was to understand how the outlook for future registered nurse (RN) supply varies regionally across the United States.

**Methods:** We apply our nursing supply model to the nine U.S. Census Divisions to produce separate supply forecasts for each region.

**Discussion:** We find dramatic differences in expected future growth of the nursing workforce across U.S. regions. These range from zero expected growth in the number of RNs per capita in New England and in the Pacific regions between 2015 and 2030 to 40% growth in the East South Central region (Mississippi, Alabama, Tennessee, Kentucky) and in the West South Central region (Texas, Oklahoma, Arkansas, Louisiana).

**Conclusion:** Assuming growth in the demand for RNs per population, some regions of the United States are expected to face shortfalls in their nursing workforce if recent trends do not change.

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## Introduction

After a decade-long unprecedented expansion in nursing school enrollments, the outlook for the nursing workforce has turned from one of dire shortages to near-balance and even a small surplus according to one forecast (Auerbach, Buerhaus, & Staiger, 2015; Spetz, 2015; U.S. Department of Health and Human Services,

Health Resources and Services Administration, Bureau of Health Professions, National Center for Health Workforce Analysis, 2014). However, these national-level assessments belie substantial differences at the subnational level. Researchers recently projected the future supply of full-time equivalent (FTE) registered nurses (RNs) through 2030 according to four regions of the country—Northeast, South, Midwest, and West (Buerhaus, Auerbach, Staiger, & Muench, 2013). The

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study found substantial differences in outlook in each region, with states in the Midwest and South having younger RN workforces and much higher expected supply growth relative to the region's population growth through 2030 (17.4% per capita and 10.8% per capita, respectively). In contrast, the size of the RN workforces in the West and Northeast regions was projected to decline relative to the growth of their overall population (–2.5% per capita and –6.0% per capita).

This article provides regional projections of the number of FTE RNs based on workforce data through 2014. Unlike the previous regional forecasts published in 2013, the projections reported here extend that analysis by further dividing the country into nine census divisions. These more detailed forecasts provide agencies and stakeholders with more actionable information at a local level. We find strikingly different patterns by region suggesting some areas of the United States may be facing large shortages over the next decade while others are poised to readily meet the growing demands of an aging population.

## Methods

### Data

The workforce projection model requires information on the age of RNs, their employment status, hours worked, and the age and size of the U.S. population. Data on the age and employment of RNs were obtained from the Current Population Survey (CPS) and the American Community Survey (ACS). The CPS is a household-based, nationally representative survey of over 100,000 individuals administered monthly by the Bureau of the Census. The CPS has asked detailed questions about employment (including occupation and hours worked) since 1973 and is used by the Department of Labor to estimate current trends in unemployment, employment, and earnings. When the monthly surveys are aggregated to a yearly basis, the CPS provides data on approximately 3,000 RNs per year.

The ACS, which began reporting data in 2001, is modeled after the long form of the decennial census. Although it contains fewer questions than the CPS, the ACS obtains much larger sample sizes—approximately 12,000 RNs from 2001 to 2004 and roughly 35,000 RNs per year thereafter (after the sampling frame was expanded). These larger sample sizes enable workforce trends in nursing to be analyzed with greater accuracy. Consequently, the projection model uses data from the ACS data rather than the CPS data beginning in 2001.

The data analyzed included all individuals between the ages of 23 and 69 years who reported being employed as an RN during the week of the survey between 1979 and 2014 ( $N = 70,201$  in the CPS,  $N = 366,927$  in the ACS). To be consistent with previous projections, RNs reporting working fewer than 30 hr in a typical

week were recorded as .5 FTEs. These data were used to estimate the number of FTE RNs of each single year of age who were working in each year of our data. To make estimates representative of the U.S. noninstitutionalized population, observations were weighted by sampling weights provided by the CPS and ACS. Additional data on the U.S. population by year, state, and age between 1979 and 2014 were obtained from the U.S. Bureau of the Census. Forecasts of the U.S. population through 2030 by age were obtained from projections prepared by the U.S. Bureau of the Census.

### Statistical Analysis

CPS and ACS data were used to estimate the number of FTE RNs by age and year. These estimates were subsequently used in a projection model that was run separately for each of nine regions within the United States (Figure 1). The model predicts the proportion of the population in a given birth cohort that will be working as RNs at each age as the product of a cohort effect (defined by birth year) and an age effect. Cohort effects refer to the propensity of individuals born in any given year to work as RNs and capture changes across birth cohorts in the perceived attractiveness of a nursing career relative to other occupations. Age effects refer to the relative propensity of RNs to be working at different ages and capture life-cycle patterns such as retirement and the tendency of female RNs to work less during childbearing years. Thus, the proportion of any particular cohort working as RNs at a given age is the product of the propensity of that cohort to choose nursing as a career and the propensity of RNs to be working at that age.

### Estimation

Analysis of variance was used to estimate the age and cohort effects for each U.S. region. The dependent variable in the model was the logarithm of the number of FTE RNs of every age between 23 and 69 years for every year between 1979 and 2014 (46 years of age times 36 years equals 1,656 total observations) divided by the regional U.S. population in that given year-age cell. The analysis of variance model estimated main effects for cohort (birth year) and age, and two interaction effects to capture instances where the life-cycle pattern of nursing careers changed: the shift toward older ages of first entry into the workforce by cohorts born after 1965 (Auerbach, Buerhaus, & Staiger, 2007) and the shift toward older ages of retirement starting roughly in the early 2000s (Auerbach, Buerhaus, & Staiger, 2014). All statistical analyses were performed using Stata, version 14.1.

### Projections

Estimates of age and cohort effects were used to project the numbers of FTE RNs through 2030. We assumed that age effects in future years will be the same as those

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