Health Workforce Research Center on Long-Term Care

Research Report

Profile of the Licensed Practical Nurse/Licensed Vocational Nurse Workforce, 2008 and 2013

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Executive Summary

Licensed practical nurses (LPNs), referred to as licensed vocational nurses (LVNs) in some states, are the second-largest health care occupation that requires postsecondary education. More LPNs work in long-term care (LTC) than in any other sector. Demand for LPNs among long-term care providers is expected to increase substantially over the next several decades. Thus, there is a need to better understand recent trends in the LPN workforce and their implications for the future supply of LPNs available to provide long-term care.

This report updates previous studies of the LPN workforce by presenting the latest national data available on LPN employment patterns with emphasis on employment in long-term care. The report also describes trends in the demographic characteristics and educational attainment of LPNs.

Methods

Data from the 2008 and 2013 American Community Survey (ACS), Public Use Microdata Sample were analyzed.

Results

Employment Patterns

Between 2008 and 2013:

- The number of LPNs in the United States decreased by 6%
- The number of LPNs employed by LTC providers increased by 13% and the number employed by hospitals decreased by 20%
- Most of the growth in LPN employment in LTC was due to a 58% increase in the number of LPNs employed by home health agencies

Demographic Characteristics

Between 2008 and 2013:

- The age distribution of LPNs did not change significantly
- The LPN workforce remained predominantly female

- There was a small increase in the percentage of LPNs who were Hispanic or Latino and a small decrease in the percentage who were white
- The percentages of LPNs who were foreign-born or spoke a language other than English at home increased
- The percentage of African Americans in the LPN workforce was higher than in the general population, especially among LPNs working in long-term care
- The racial/ethnic diversity of the LPN workforce is likely to increase in the coming decades because non-White LPNs are younger, on average, than white LPNs and, thus, likely to remain in the labor force longer

Differences among Census Regions

In 2013:

- LPNs in the West region were more likely to work in hospitals and less likely to work in LTC settings than LPNs in the Northeast, Midwest, and South regions
- Within the LTC sector, LPNs in the South and West regions were more likely to be employed by home health agencies and less likely to be employed by skilled nursing facilities than LPNs in the Northeast and Midwest regions
- The LPN workforce in the South and West regions was younger than the LPN workforce in the Northeast and the Midwest regions
- The South and the West regions had the largest percentages of non-White LPNs; the South region had the largest percentage of African American LPNs, while the West region had the largest percentage of Hispanic or Latino LPNs
- The Northeast and the West regions had the largest percentages of LPNs who were foreign born or who spoke a language other than English at home

Differences between Metropolitan and Non-Metropolitan Areas

In 2013:

- LPNs in metropolitan areas were less likely to be employed in LTC settings than LPNs in non-metropolitan areas

- Within the LTC sector, LPNs in metropolitan areas were less likely to be employed by skilled nursing facilities than LPNs in non-metropolitan areas
- The percentage of male LPNs was greater in metropolitan areas than in non-metropolitan areas
- LPNs in metropolitan areas were more racially/ethnically diverse, more likely to be foreign-born, and more likely to speak a language other than English at home compared with LPNs in non-metropolitan areas

Recommendations

This analysis suggests that the total number of LPNs in the United States is decreasing and that employment patterns are changing. The number of LPNs employed by hospitals has decreased significantly while the number employed in long-term care settings has increased. Within the long-term care sector, LPN employment has grown most substantially in home health care settings.

The growth in demand for LPNs in long-term care settings relative to hospitals has important implications for LPN education. LPNs who work in long-term care settings have less direct supervision than their counterparts in hospitals and need to exercise more independent judgment regarding patient care. LPN education programs need to ensure that students obtain sufficient clinical training in long-term care settings and have the critical thinking and communications skills necessary to practice effectively in these settings.

The findings from this analysis also suggest that there are some important differences in LPN employment patterns between Census regions and between metropolitan and non-metropolitan areas. Further research is needed to assess the extent to which these differences are related to differences in state policies regarding healthcare staffing, reimbursement for healthcare services, or other characteristics of healthcare markets.

Profile of the Licensed Practical Nurse/Licensed Vocational Nurse Workforce, 2008 and 2013

Background

Licensed practical nurses (LPNs), referred to as licensed vocational nurses (LVNs) in California and Texas, are the second-largest healthcare occupation that requires postsecondary education. More LPNs work in long-term care (LTC) than in any other sector. The majority of LPNs are employed by skilled nursing facilities, but they are also employed by other long-term care providers, such as home health agencies and residential care facilities.

Growth in demand for long-term care services for the aging population of the United States is likely to increase demand for LPNs in the coming decades. The number of LPNs employed in long-term care is projected to increase by 70% (approximately 70,000 LPNs) between 2010 and 2030.[1] Thus, there is a need to better understand recent trends in the LPN workforce and their implications for the future supply of LPNs available to provide long-term care.

This report updates previous studies of the LPN workforce[2,3] by presenting the latest national data available on LPN employment patterns with emphasis on employment in long-term care. Employment patterns in 2008 are compared with employment patterns in 2013 to identify major trends in LPN employment over this time period. The report also describes trends in the demographic characteristics and educational attainment of the LPN workforce. Comparisons of the LPN workforce across Census regions and between metropolitan and non-metropolitan areas describe important geographic differences.

Methods

Data

We pooled data from the 1-year 2008 and 1-year 2013 American Community Survey (ACS), Public Use Microdata Sample (PUMS). The ACS is a national household survey administered by the U.S. Census Bureau and collects social, demographic, and economic information. Approximately 3.5 million households are in the sample, and each month approximately 295,000 are targeted for interviews; the sample covers approximately 95% of the U.S. population. The PUMS data are

untabulated records describing either people or housing units, representing individual survey responses. We used survey weights to produce estimates generalizable to the U.S. civilian population.

Census regions were identified using the state variable in the ACS dataset. The smallest geographic unit of analysis in the 1-year ACS PUMS data is the Public Use Microdata Area (PUMA). We used the 2013 Rural Urban Continuum Codes (RUCC) to geocode each PUMA in the 2013 ACS PUMS file as either metropolitan or non-metropolitan. A detailed explanation of our methodology appears in the Appendix.

Defining Sector and Occupation

The *long-term care* sector was defined as the aggregate of 6 Census industry codes, using the 4-digit codes (most disaggregated available) that align with the North American Industry Classification System. (See Appendix Table 2 for crosswalk). Three of these are typically identified as healthcare-related: *home health care services*, *skilled nursing facilities*, and *residential care facilities*. The other 3 industries are often, but not exclusively, involved in the delivery of LTC: *individual and family services* and *community food and housing, and emergency services* (both of which are considered part of the broader *social and community assistance* sector), and finally *private household services*.

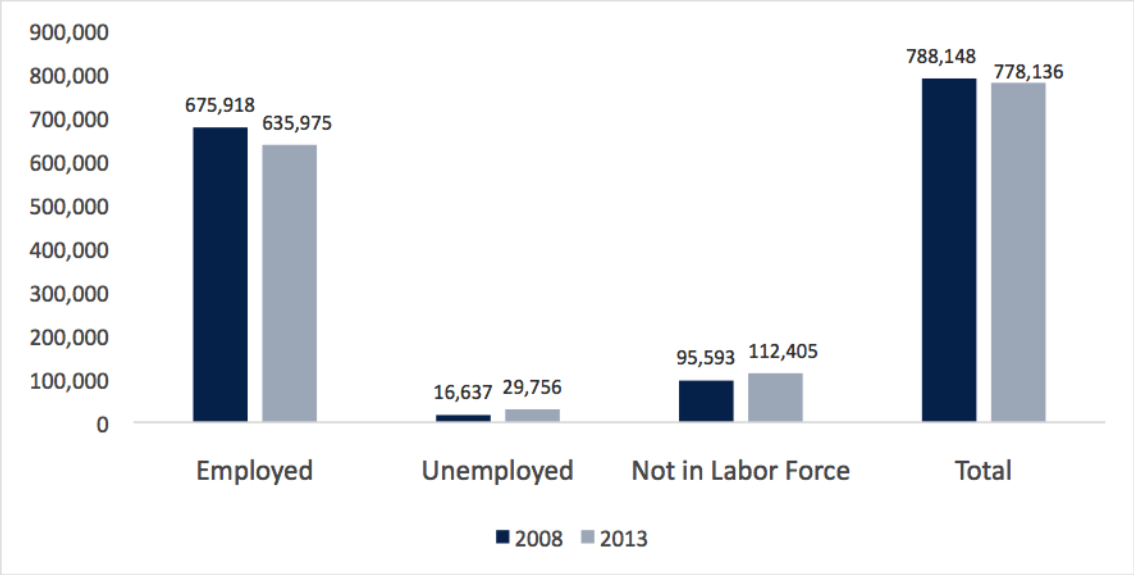
LPNs were identified using the unique Census occupation code.

Results

Employment Characteristics of Licensed Practical Nurses

The LPN workforce in the United States is decreasing in size. ACS estimates indicate that the number of employed LPNs in the United States declined from 675,918 LPNs in 2008 to 635,975 LPNs in 2013, a decrease of 6%. This decrease coincides with increases in the number of unemployed LPNs and the number of LPNs no longer in the labor force.

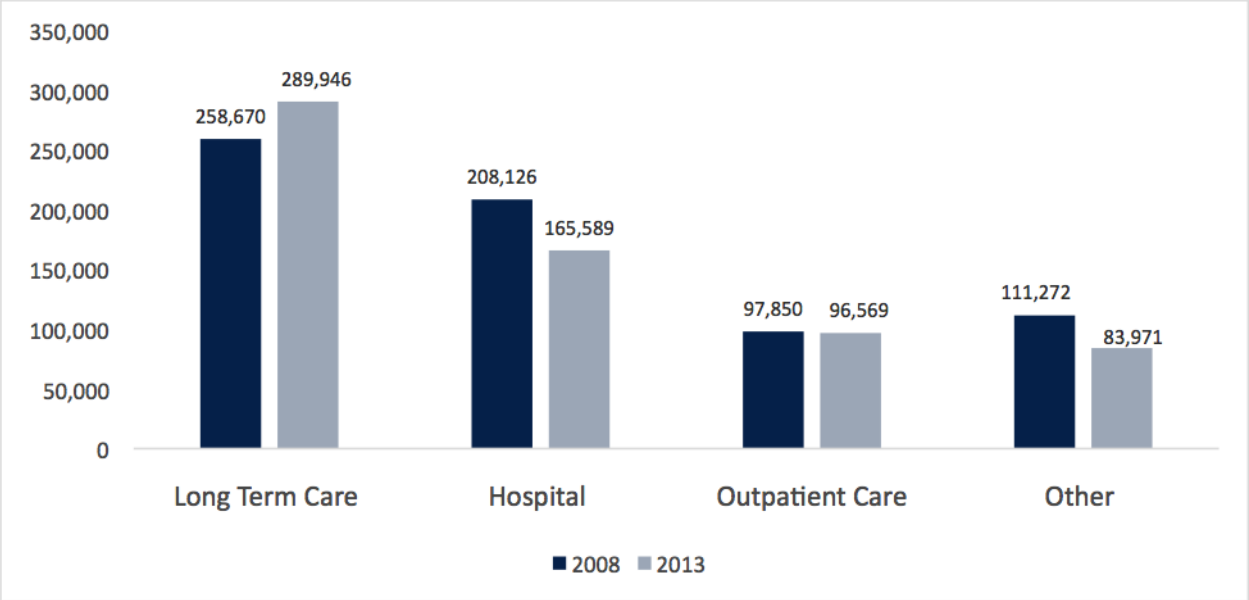
Figure 1. Employment Status of LPNs, United States, 2008 and 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Long-term care employs more LPNs than any other industry sector and is the only sector in which LPN employment grew between 2008 and 2013. The number of LPNs working in long-term care grew from 258,670 in 2008 to 289,946 in 2013, an increase of 13% (approximately 32,000 LPNs). In contrast, LPN employment in hospitals, outpatient care, and other sectors decreased between 2008 and 2013. The largest decrease occurred in hospitals, where the number of LPNs employed decreased by 20% (approximately 43,000 LPNs).

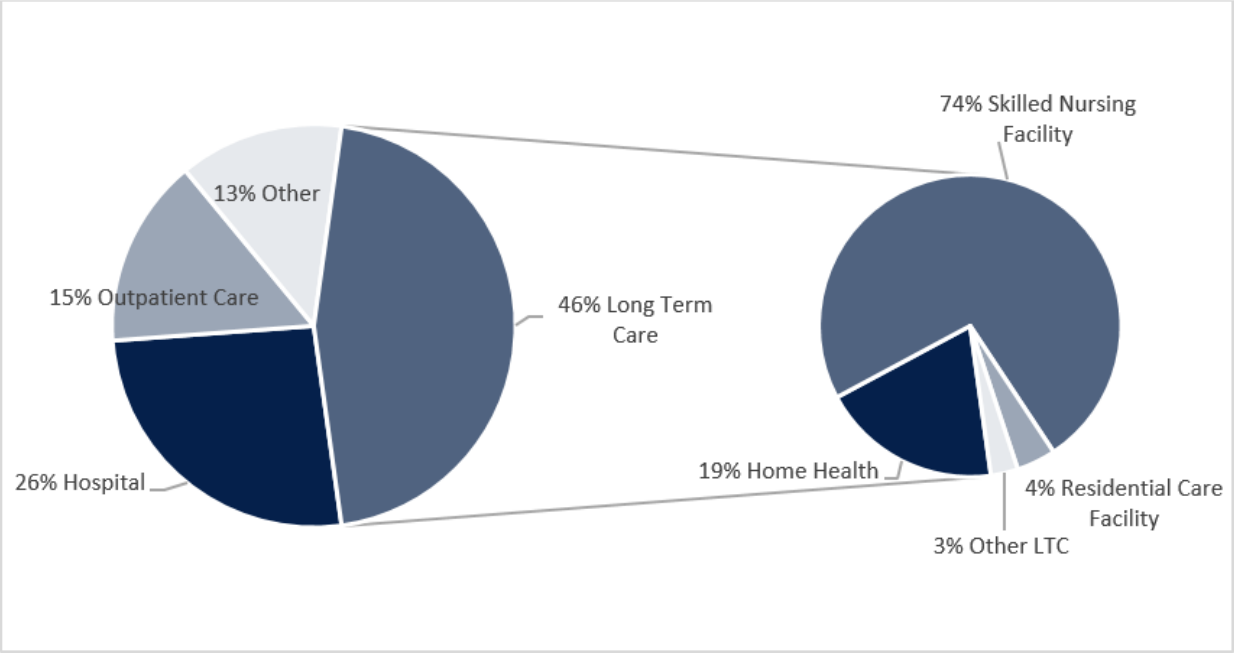
Figure 2. Employed LPNs by Industry, United States, 2008 and 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Skilled nursing facilities were the employment setting for 74% of LPNs employed in the long-term care sector in 2013. Home health agencies employed another 19% of LPNs working in long-term care. Residential care facilities and other settings employed very small percentages of LPNs working in long-term care (4% and 3%, respectively).

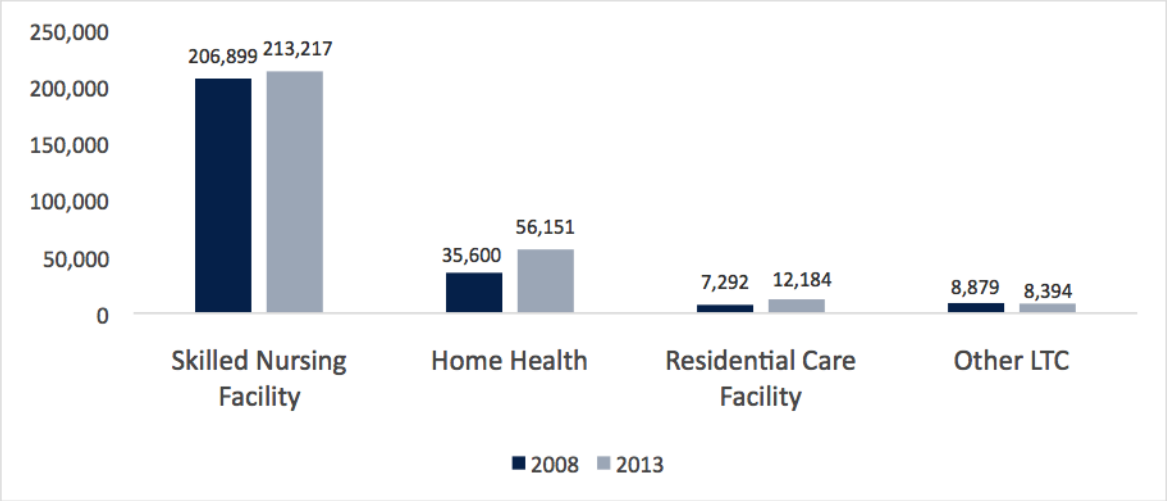
Figure 3. Employed LPNs by Employment Setting and LTC Employment Setting, United States, 2013



Note: Data are weighted to represent the U.S. population of LPNs.

The rate of growth in LPN employment between 2008 and 2013 varied across long-term care settings. Most of this growth occurred in home healthcare. The number of LPNs employed in a home healthcare setting grew 58% during this period, increasing from 35,600 to 56,151 LPNs. The rate of employment growth among residential care facilities was also high (67%), but the actual number of LPNs working in this setting was very small. In contrast, the number of LPNs employed in skilled nursing facilities grew by only 3%.

Figure 4. LPNs Employed in Long-term Care by Setting, United States, 2008 and 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Demographic Characteristics of Licensed Practical Nurses

Age

The age distribution of LPNs did not change significantly between 2008 and 2013. At both time points, approximately two-thirds of LPNs were age ≤50 years. The age distribution of employed LPNs is similar to that of the U.S. population.

Table 1. LPNs by Age Group, United States, 2008 and 2013

Age Range	2008	2013
≤35y	31%	30%
36y – 50y	37%	36%
51y – 65y	29%	30%
≥66y	3%	4%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are not statistically significant between 2008 and 2013; $p = 0.1872$.

As with most occupations, the labor force participation rate of LPNs decreases with age. In 2013, the vast majority of LPNs age ≤50 years were employed, with 88% of LPNs 35 years old and younger and 89% of LPNs between the ages of 36 and 50

years old being employed. Among LPNs between the ages of 51 and 65 years old, the employment rate was 78%, and among LPNs over the age of 65 the employment rate dropped to 39%. Most LPNs who were not employed were not actively seeking employment as evidenced by the low unemployment rate (3% to 4%) for all age groups. LPNs have higher labor force participation rates than the general population; 39% of LPNs age ≥66 years were employed versus 18% of the general population.

The age distribution of LPNs employed in long-term care was similar to the age distribution of LPNs employed in all sectors.

Table 2. LPNs by Employment Status within Age Group, United States, 2013

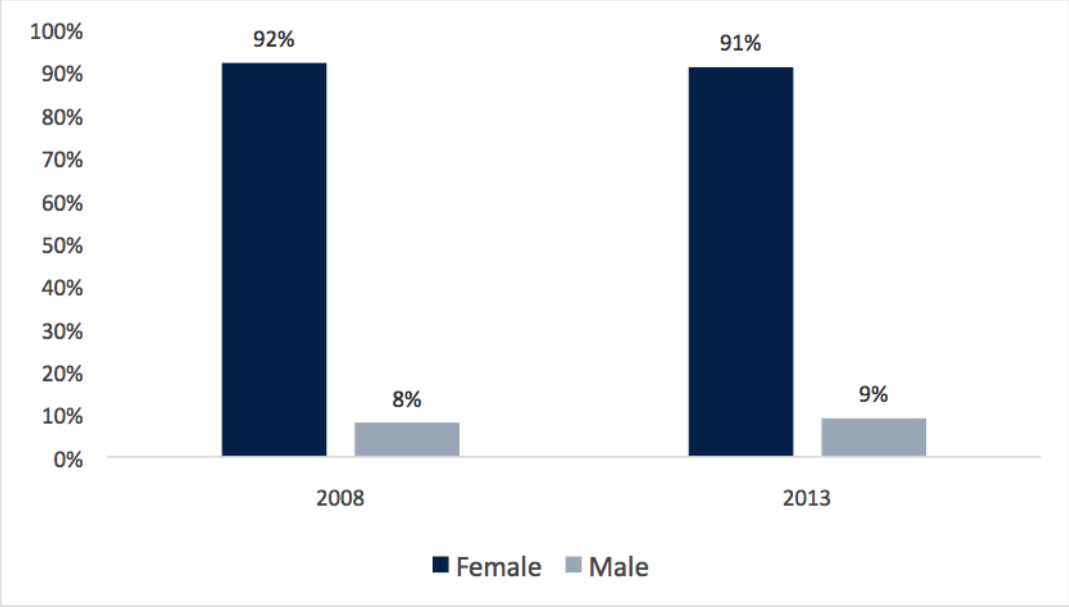
Age Range	≤35y	36y-50y	51y-65y	≥66y
Employed	88%	89%	78%	39%
Unemployed	4%	3%	4%	3%
Not In Labor Force	8%	8%	17%	58%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Gender

The LPN workforce is predominantly female. The percentage of male LPNs increased by only one percentage point between 2008 and 2013, from 8% to 9%. The gender distribution of LPNs employed in long-term care in both 2008 and 2013 was similar to that of LPNs employed in all sectors.

Figure 5. Employed LPNs by Gender, United States, 2008 and 2013

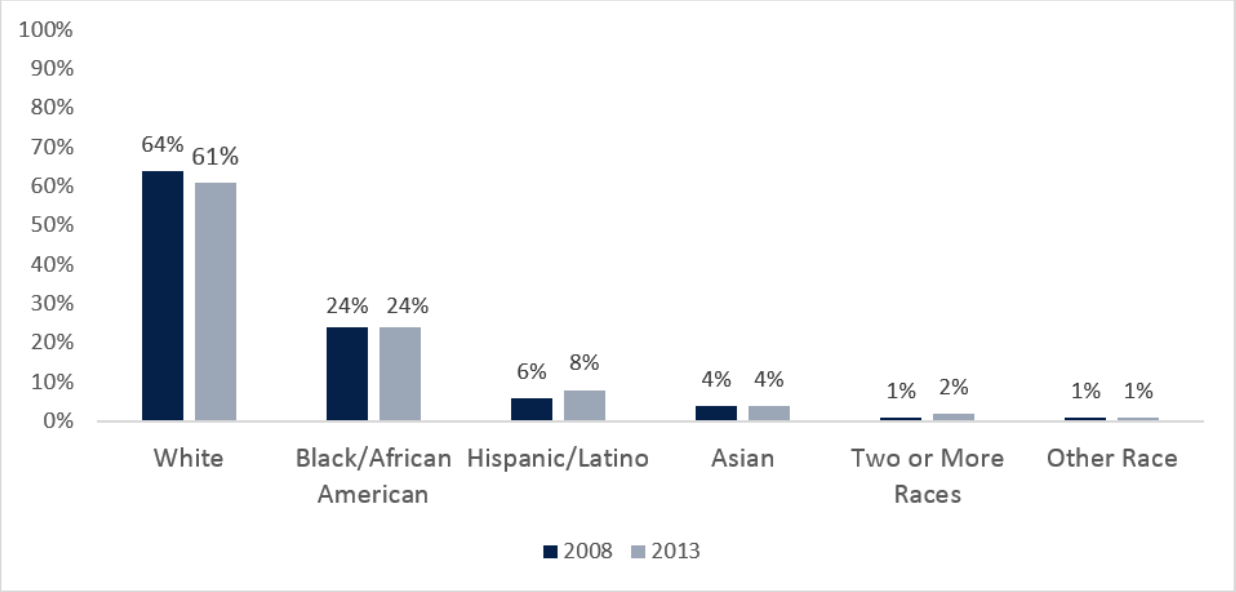


Note: Data are weighted to represent the U.S. population of LPNs.
Differences are not statistically significant between 2008 and 2013; p = 0.0727.

Race/Ethnicity

The LPN workforce was more racially/ethnically diverse than both the registered nurse (RN) workforce and the general population of the United States. Compared with the general population, African Americans were overrepresented among LPNs (24% vs. 12%) while Hispanics or Latinos were underrepresented (8% vs. 17%). White LPNs represented a majority of the workforce. However, their share of all LPNs decreased from 64% in 2008 to 61% in 2013. In contrast, the percentage of LPNs who were Hispanic or Latino increased slightly (from 6% to 8%), as did the percentage of LPNs who identify with two or more races.

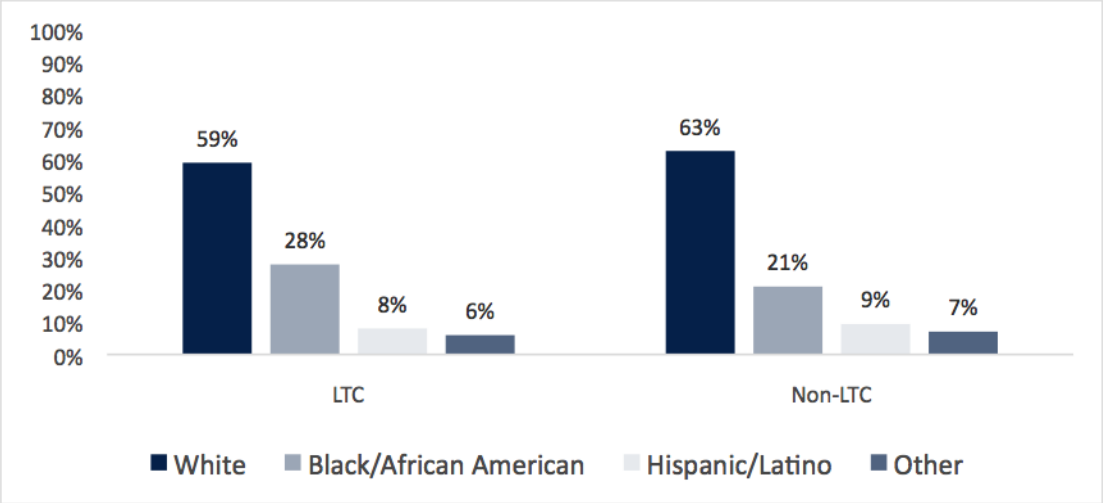
Figure 6. Employed LPNs by Race/Ethnicity, United States, 2008 and 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0004.

There were statistically significant differences in the racial and ethnic composition of LPNs working in long-term care compared with other sectors in 2013. Most notably, the percentage of African Americans was higher among LPNs employed in long-term care than among LPNs employed in other sectors (28% vs. 21%). In contrast, the percentage of whites was lower in long-term care than in other sectors (59% vs. 63%).

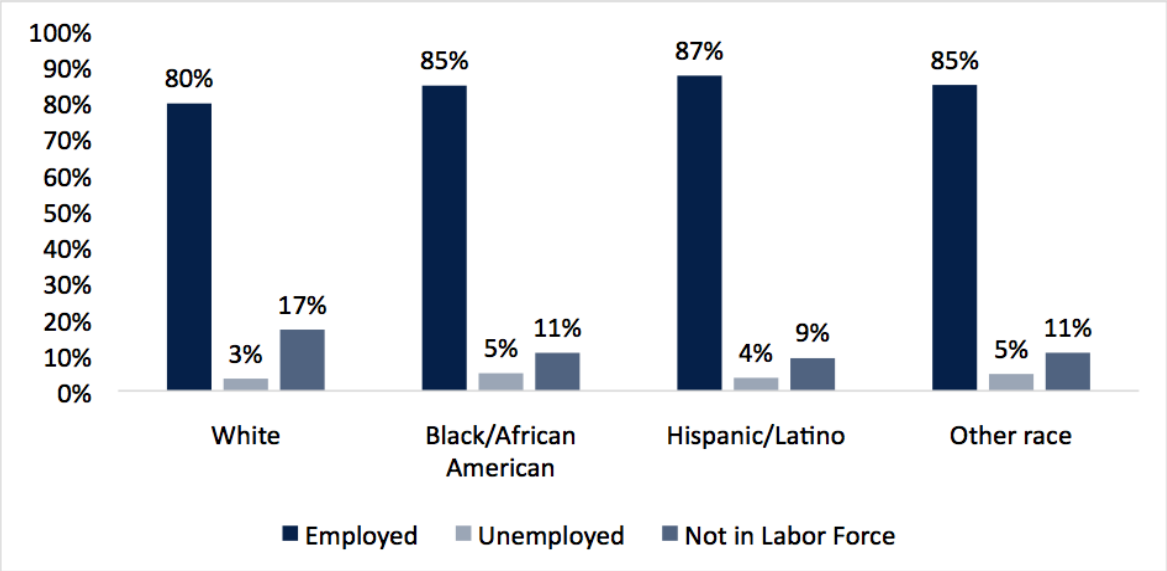
Figure 7. Employed LPNs by Race/Ethnicity and by Industry (LTC versus Non-LTC), United States, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Differences in labor force participation rates across racial and ethnic groups were also statistically significant. The 2013 employment rate for white LPNs was 80%, at least 5 percentage points lower than any other racial/ethnic group of LPNs.

Figure 8. Employment Status of LPNs by Race/Ethnicity, United States, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Differences in labor force participation among racial and ethnic groups were related to differences in the age distribution of LPNs. The percentage of white LPNs who were age ≥65 years (9%) was nearly double that of LPNs in other racial/ethnic groups. The share of white LPNs age ≤50 years was at least 15 percentage points lower than all other groups. Forty-five percent of employed Hispanic or Latino LPNs were age ≤35 years, making them the youngest racial/ethnic group in the LPN workforce.

Table 3. LPNs by Race/Ethnicity and Age Range, 2013, United States

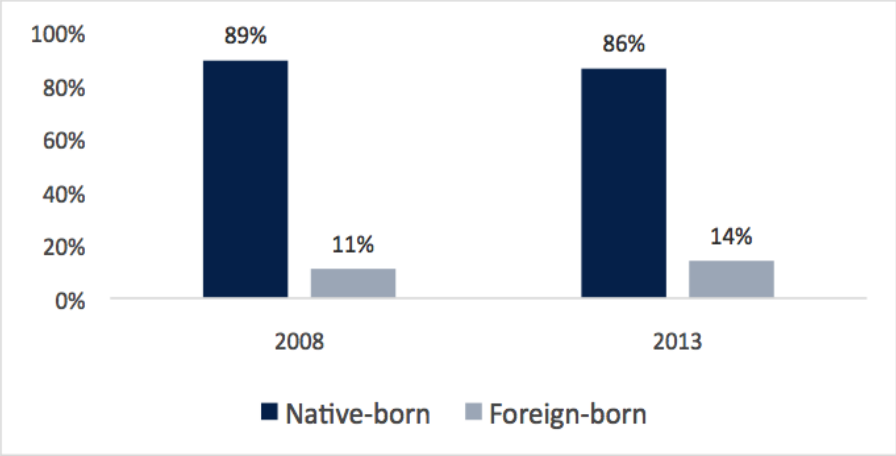
Age Range	White	Black or African American	Hispanic/Latino	Other
≤35y	24%	27%	45%	38%
36y – 50y	31%	40%	35%	33%
51y – 65y	36%	28%	16%	25%
≥66y	9%	5%	4%	5%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Nativity

Between 2008 and 2013, the percentage of employed LPNs who were foreign-born increased from 11% to 14%. This may be one reason for the small increase in the percentage of employed LPNs who were Hispanic or Latino.

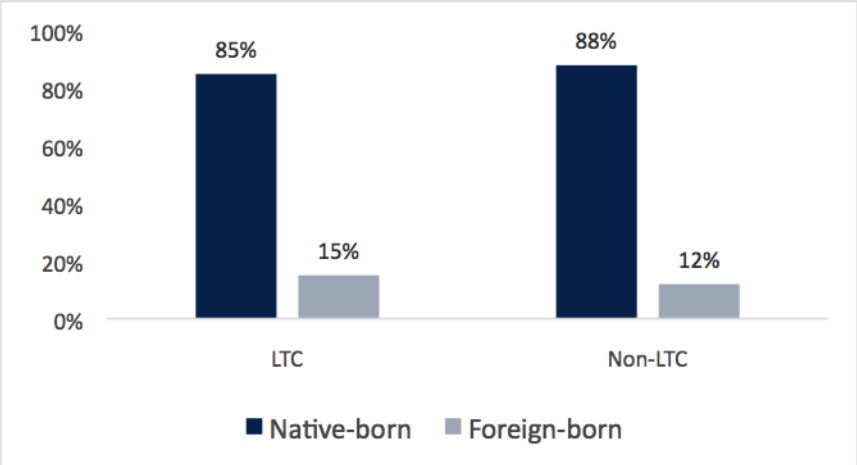
Figure 9. Employed LPNs by Nativity, United States, 2008 and 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0001.

There was a small but statistically significant difference in the percentage of foreign-born LPNs working in long-term care compared with other sectors. Fifteen percent of LPNs employed in long-term care were foreign-born versus 12% of LPNs employed in other sectors.

Figure 10. Employed LPNs by Nativity and by Industry (LTC versus Non-LTC), United States, 2013

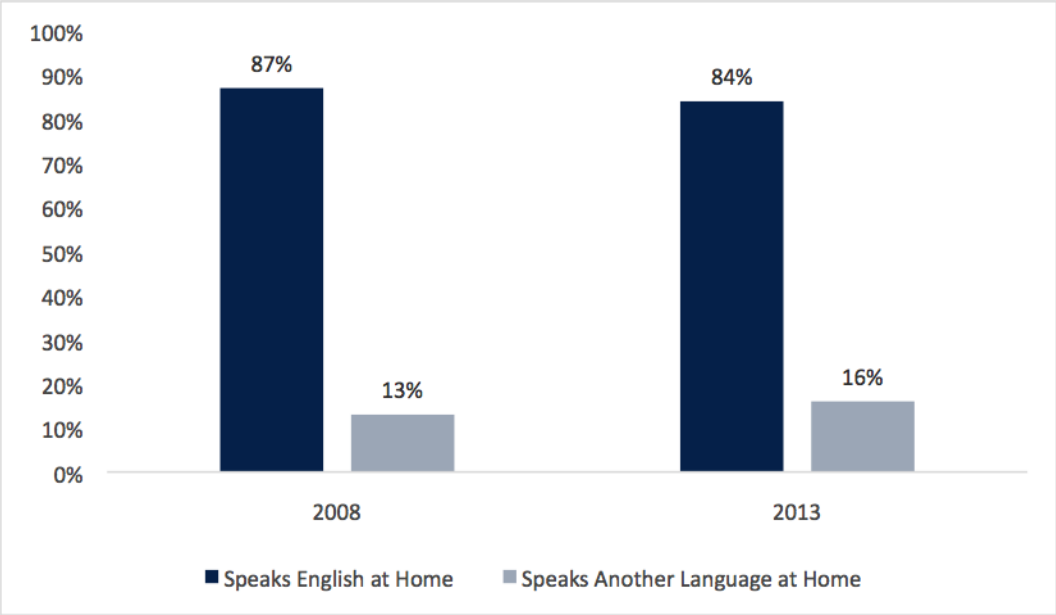


Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0119.

Speaking a Language Other than English

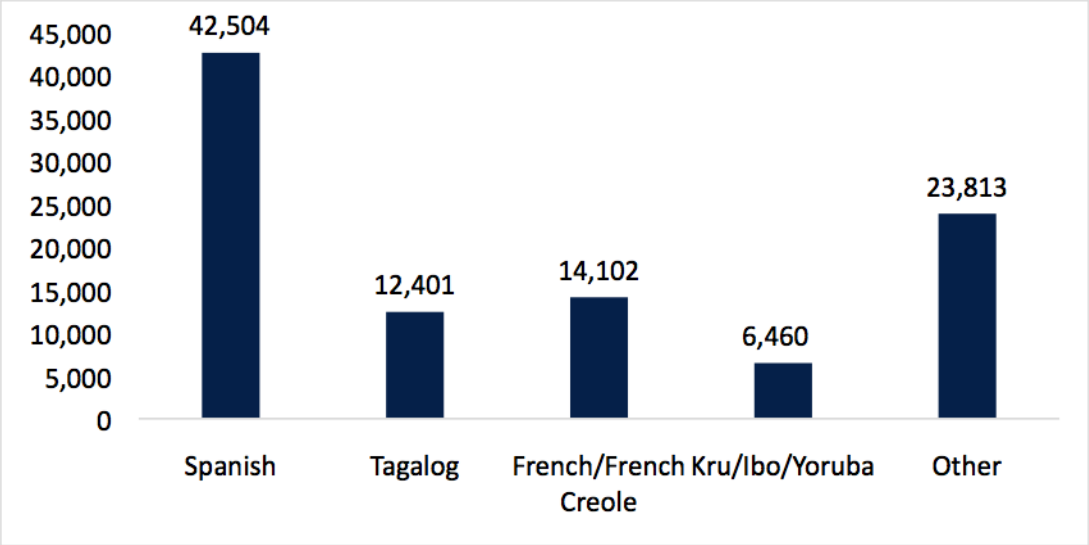
Consistent with the increase in foreign-born LPNs, the percentage of LPNs who speak a language other than English at home increased from 13% to 16% between 2008 and 2013. Spanish was by far the most common language other than English spoken at home. Other non-English languages spoken at home by employed LPNs included Tagalog, French/French Creole, and the African languages of Kru, Ibo, and Yoruba. The percentages of LPNs employed in long-term care who speak a language other than English at home were similar to that of LPNs working in other sectors.

Figure 11. Employed LPNs by Language Spoken at Home, United States, 2008 and 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0010.

Figure 12. Employed LPNs by Non-English Language Spoken at Home, United States, 2013



Note: Data are weighted to represent the U.S. population of LPNs.

Educational Attainment

The distribution of employed LPNs by educational attainment did not change substantially between 2008 and 2013. In both years, 1 or more years of college with no degree was the most frequently reported level of educational attainment (47% in 2008 and 48% in 2013). This is consistent with the fact that many LPN education programs offer students a certificate and not a degree.

Table 4. Employed LPNs by Educational Attainment, United States, 2008 and 2013

Educational Attainment	2008	2013
HS diploma or GED	19%	18%
<1 year college (no degree)	11%	10%
≥1 year college (no degree)	47%	48%
Associate's degree	18%	19%
Bachelor's or higher degree	6%	6%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are not statistically significant between 2008 and 2013; p = 0.0623.

There were statistically significant differences in the level of educational attainment reported by LPNs employed in long-term care compared with LPNs employed in other sectors. LPNs working in long-term care were more likely to report that their highest level of education was a high school diploma or GED (19% versus 16%) and less likely to report having any higher level of education.

Table 5. Employed LPNs by Educational Attainment and by Industry (LTC versus Non-LTC), United States, 2013

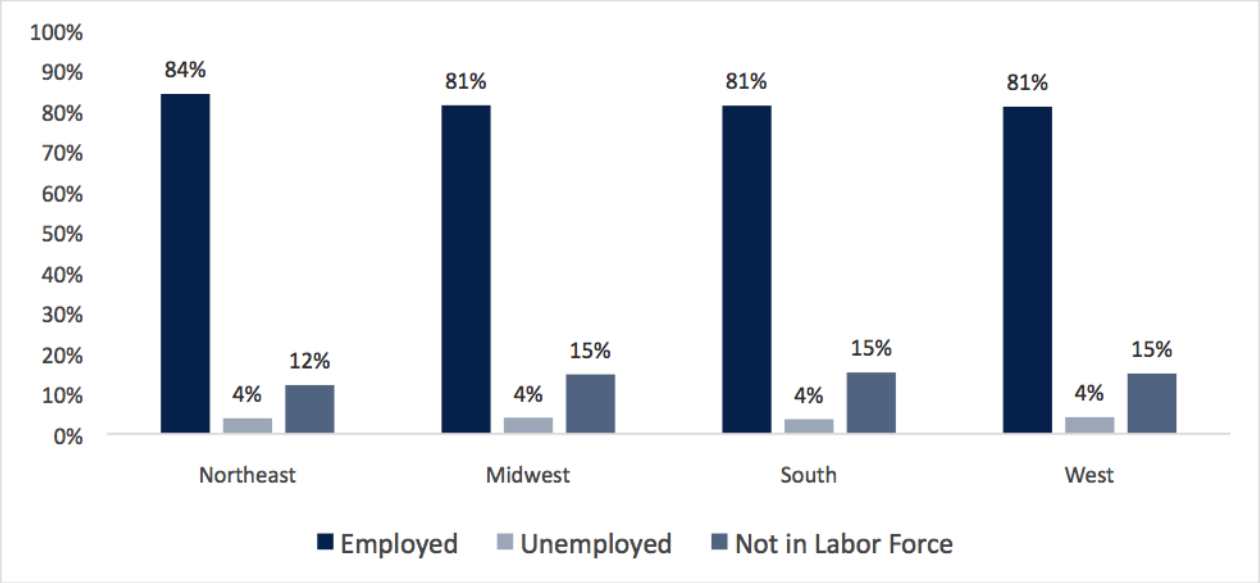
Educational Attainment	LTC	Non-LTC
HS diploma or GED	19%	16%
<1 year college (no degree)	9%	10%
≥1 year college (no degree)	46%	50%
Associate's degree	18%	20%
Bachelor's or higher degree	5%	6%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0288.

Characteristics of Licensed Practical Nurses by Census Region

In 2013, the employment status of LPNs was largely consistent across Census regions. The percentage of LPNs who were employed was 81% in the Midwest, South, and West regions and 84% in the Northeast region. The percentages of LPNs not in the labor force were also similar across regions, while the percentage of unemployed LPNs (4%) was identical across regions.

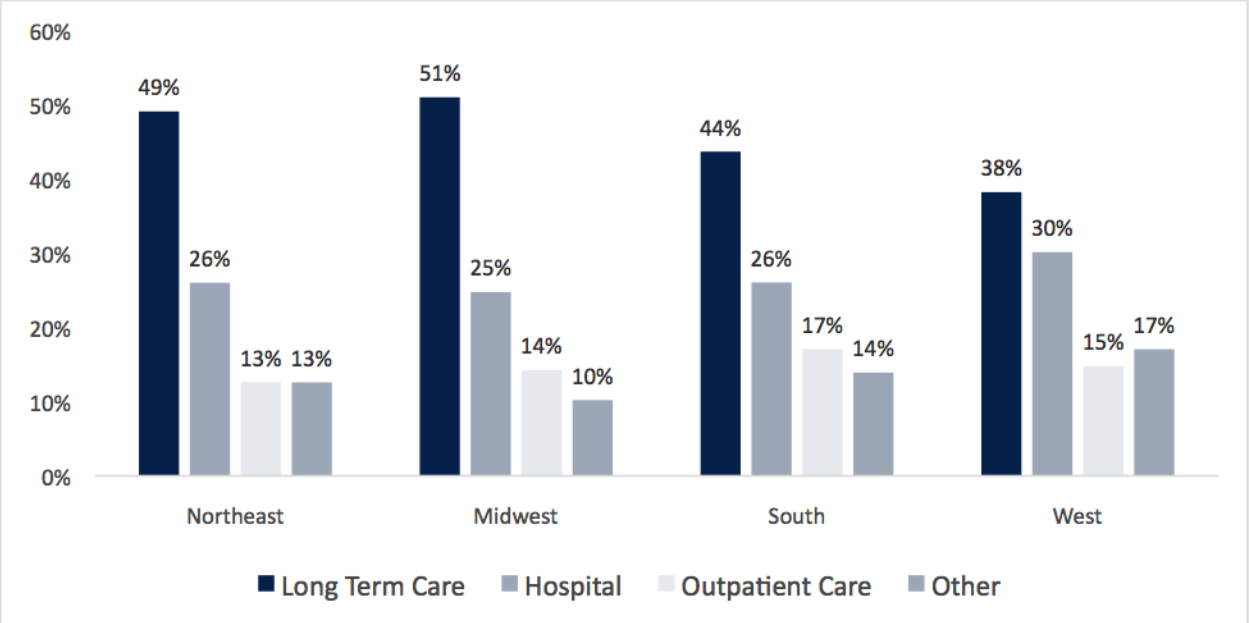
Figure 13. Employment Status of LPNs by Census Region, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are not statistically significant between 2008 and 2013; p = 0.4060.

Although employment status is similar across the nation, the distribution of employed LPNs across industry settings varied significantly. In all regions, LPNs were most likely to be working in long-term care, with the percentage ranging from 51% in the Midwest region to 38% in the West region. While states in the West region had the lowest percentage of LPNs employed in long-term care, they had the highest percentages of LPNs employed in hospital settings (30%) and in other settings (17%).

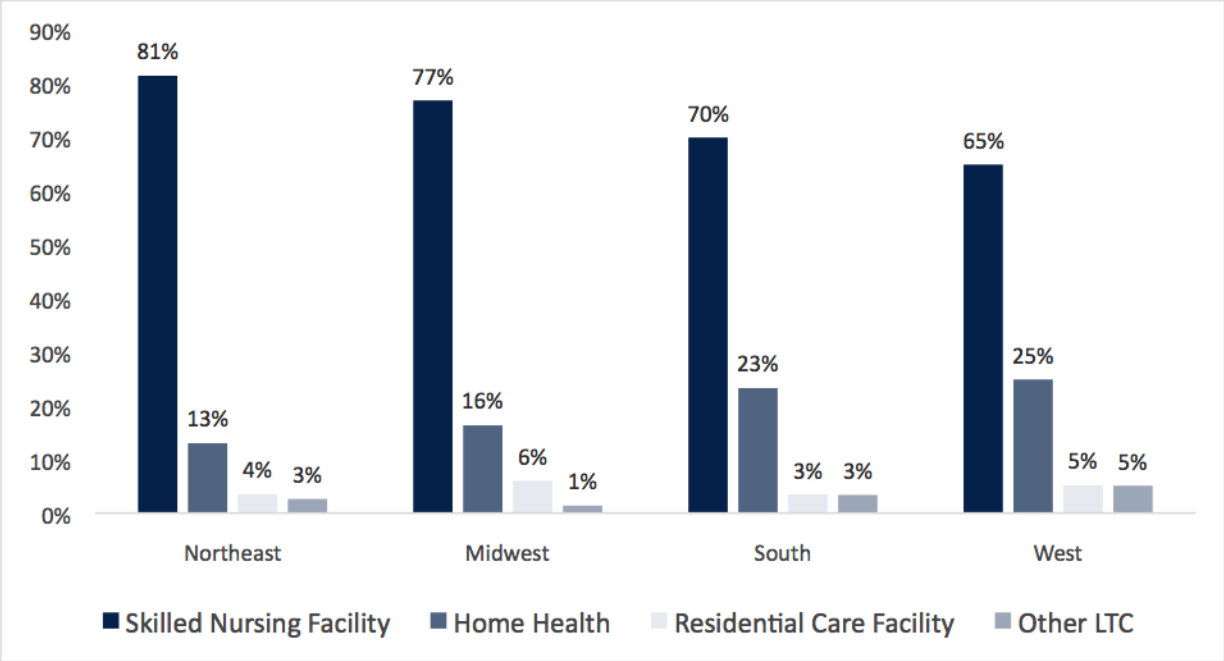
Figure 14. Employed LPNs by Industry and by Census Region, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Within the long-term care sector the percentage of LPNs employed in different types of long-term care settings also varied by Census region. Although a majority of LPNs in all regions were employed by skilled nursing facilities, the percentage ranged from 81% in the Northeast region to 65% in the West region. Similarly, the percentage of LPNs working in home healthcare ranged from 12% in the Northeast region to 25% in the West region.

Figure 15. LPNs Employed in Long-Term Care by Work Setting and by Census Region, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Some variation existed in the age distribution of employed LPNs across Census regions. The South and the West regions had the highest proportions of LPNs age ≤35 years, with 32% in both regions. The Northeast region had the lowest proportion of employed LPNs age ≤35 years (24%). The Midwest region had the largest percentage of employed LPNs age 51 to 65 years.

Table 6. Employed LPNs by Age Range and by Census Region, 2013

Age Range	Northeast	Midwest	South	West
≤35y	24%	28%	32%	32%
36y – 50y	41%	34%	37%	33%
51y – 65y	31%	34%	28%	31%
≥66y	3%	4%	3%	4%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p = 0.0004$.

The racial and ethnic composition of employed LPNs across Census regions overall matched that of the general population. The Midwest region had the highest proportion of White LPNs (79%), the South region had the highest proportion of African American LPNs (30%), and the West region had the highest proportion of Hispanic or Latino LPNs (19%).

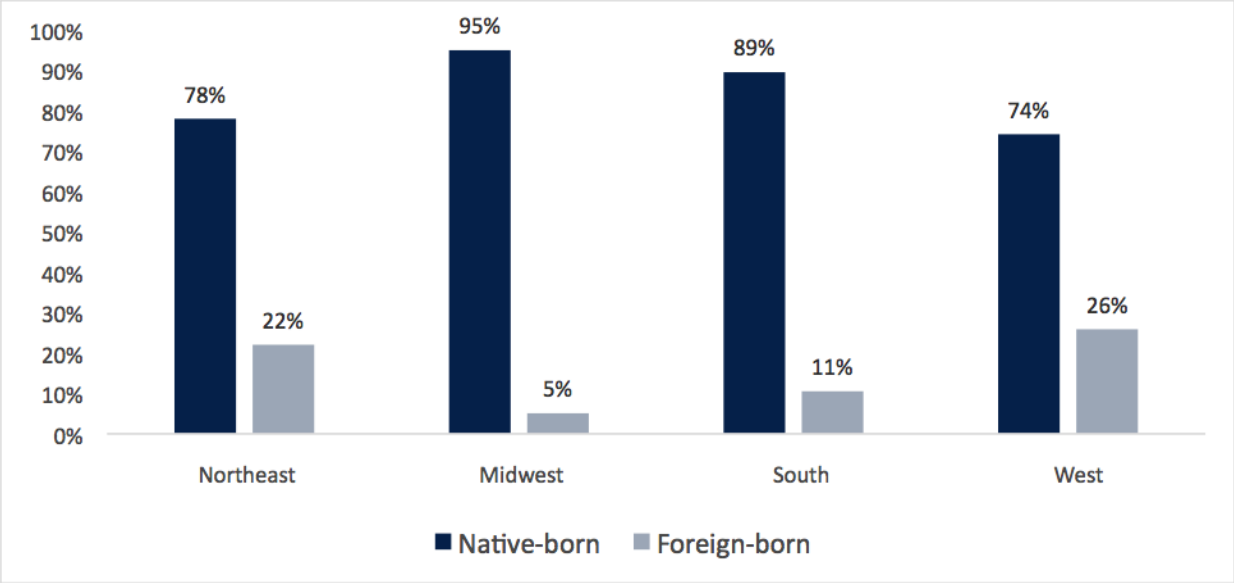
Table 7. Employed LPNs by Race/Ethnicity and by Census Region, 2013

Race/Ethnicity	Northeast	Midwest	South	West
White	60%	79%	56%	47%
Black or African American	29%	16%	30%	12%
Hispanic or Latino	6%	3%	9%	19%
Other race	5%	3%	4%	21%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

The percentage of employed LPNs who were foreign-born varied by Census region. The Northeast and the West region had the largest percentages of foreign-born LPNs (22% in the Northeast; 26% in the West). These differences are consistent with regional differences in the percentage of foreign-born persons in the general population.

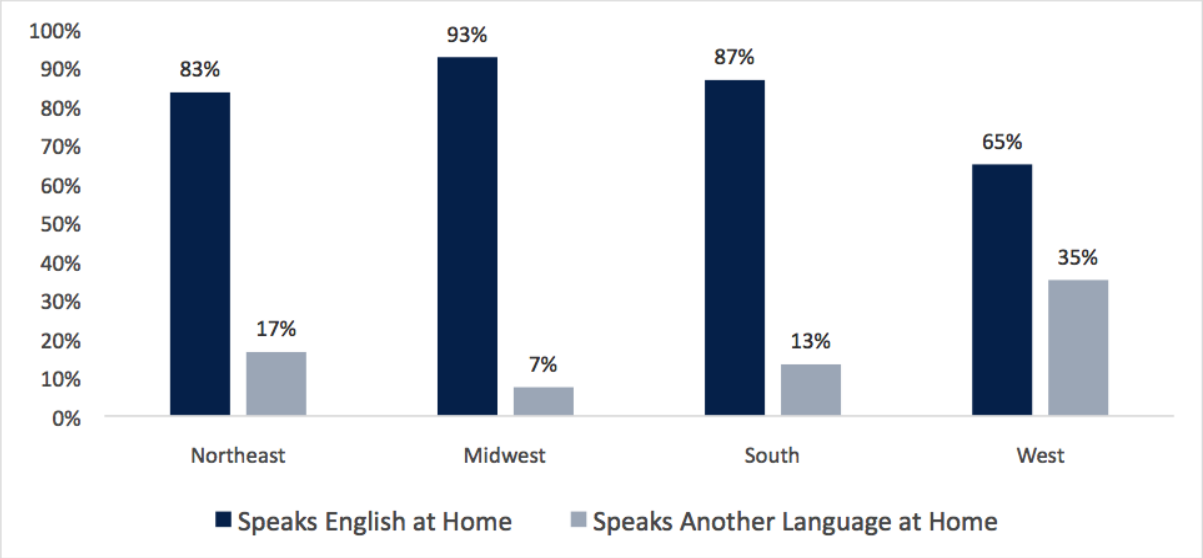
Figure 16. Employed LPNs by Nativity and by Census Region, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Similarly, the West region had a significantly higher proportion of LPNs who speak a language other than English at home. This is likely due to the West's higher proportions of Hispanic or Latino and other non-White LPNs and is consistent with differences in the general population across Census regions.

Figure 17. Employed LPNs by Language Spoken at Home and by Census Region, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Across all regions, employed LPNs were most likely to have attended 1 or more years of college without receiving a degree. In the Northeast region, employed LPNs were significantly more likely to have only a high school diploma or GED compared with LPNs in other regions. Employed LPNs in the West region were more likely than LPNs in other regions to have a Bachelor's degree or higher and employed LPNs in the Midwest region were more likely to have an Associate's degree than in other regions.

Table 8. Employed LPNs by Educational Attainment and by Census Region, 2013

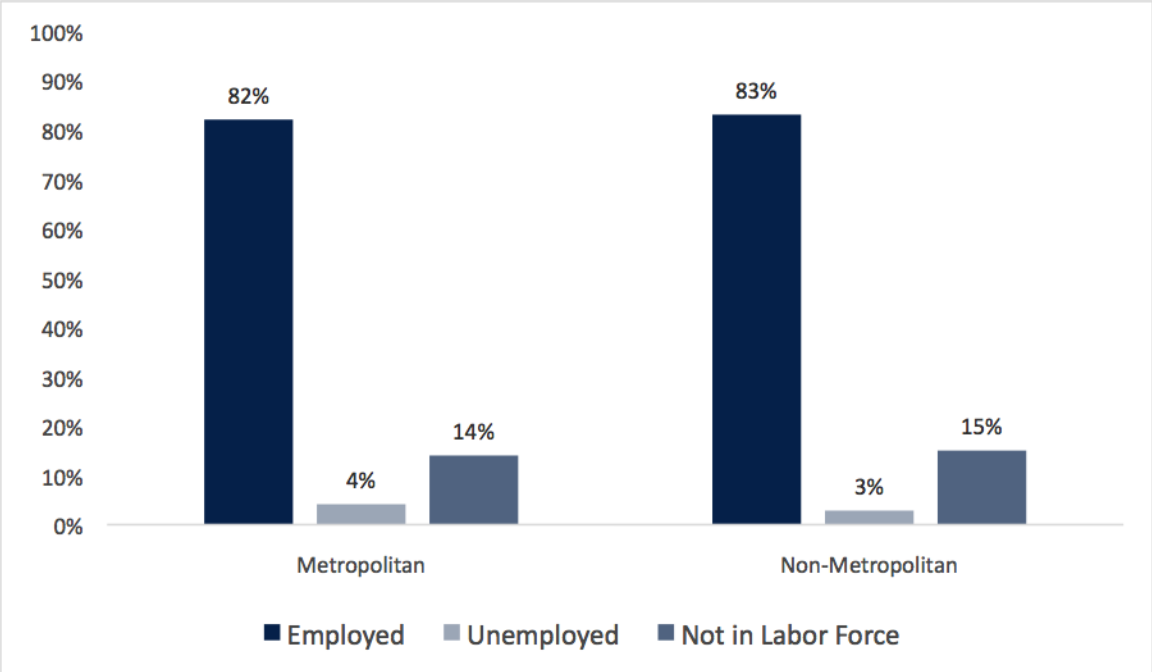
Educational Attainment	Northeast	Midwest	South	West
HS diploma or GED	25%	14%	17%	15%
<1 year college (no degree)	11%	9%	10%	8%
≥1 year college (no degree)	42%	47%	50%	50%
Associate's degree	16%	25%	18%	16%
Bachelor's or higher degree	5%	5%	5%	11%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Characteristics of Licensed Practical Nurses in Metropolitan vs. Non-Metropolitan Areas

Employment status did not differ substantially between LPNs in metropolitan and non-metropolitan areas. In 2013, 82% of LPNs in metropolitan areas and 83% of LPNs in non-metropolitan areas were employed.

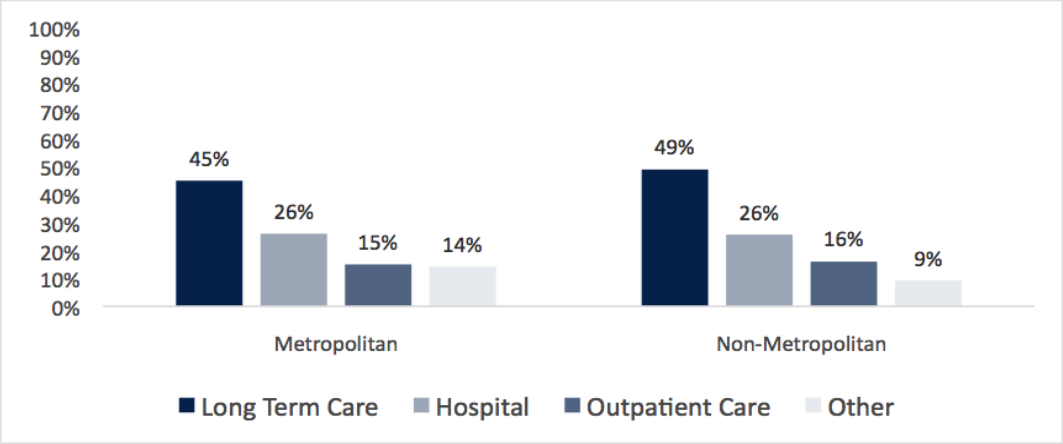
Figure 18. Employment Status of LPNs by Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are not statistically significant between 2008 and 2013; p = 0.0833.

LPNs in metropolitan and non-metropolitan areas were equally likely to be employed in hospitals (26%) but the percentages employed in long-term care and other settings differed significantly. In metropolitan areas 45% of LPNs were employed in long-term care versus 49% in non-metropolitan areas. The percentage employed in other settings was 14% in metropolitan areas versus 9% in non-metropolitan areas.

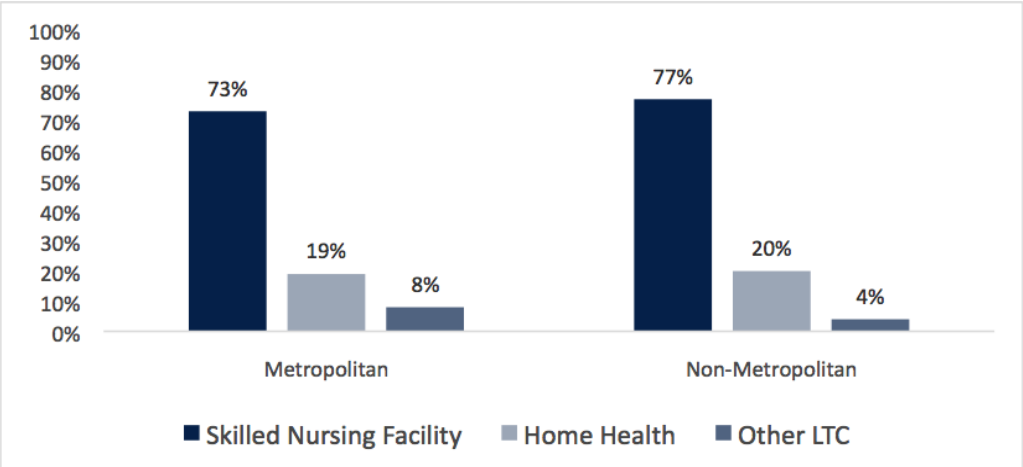
Figure 19. Employed LPNs by Industry and by Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0013

While the proportion of LPNs working in skilled nursing facilities was high across the nation, the proportion was higher in non-metropolitan areas compared with metropolitan areas (77% vs. 73%). The percentage of LPNs working in long-term care settings other than skilled nursing facilities and home health agencies was twice as high in metropolitan areas as in non-metropolitan areas (8% vs. 4%).

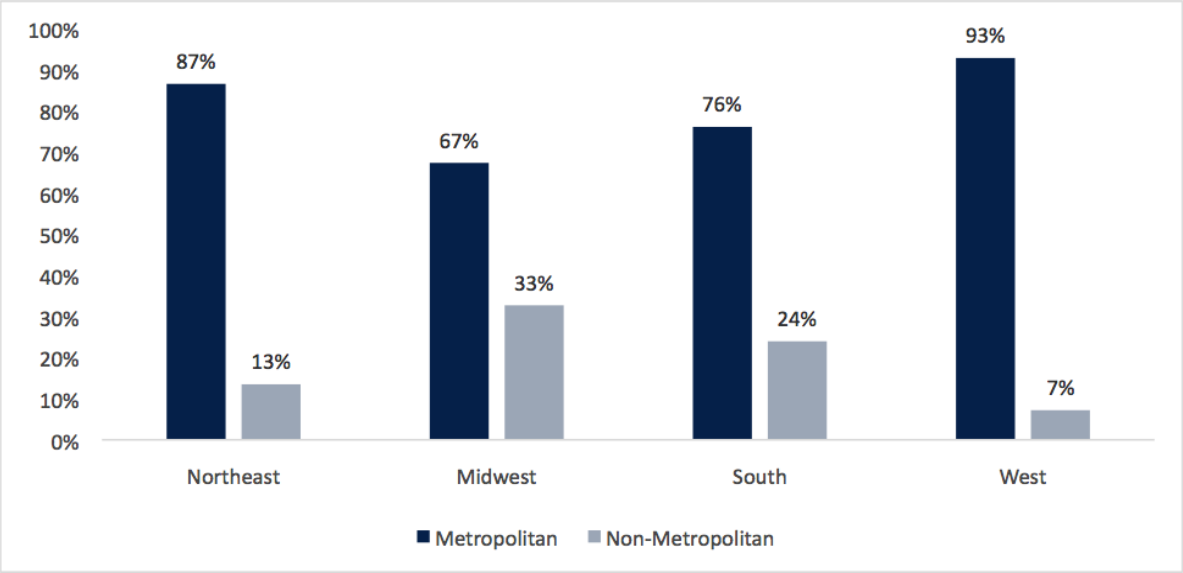
Figure 20. LPNs Employed in Long-Term Care by Setting and by Metropolitan vs. Non-Metropolitan Area, 2013



Note: In this figure, Residential Care Facilities are included in "Other."
Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at p = 0.0019.

The highest proportion of LPNs working in non-metropolitan areas was in the Midwest region, and the lowest proportion was in the West region. The regional differences in the percentages of employed LPNs in metropolitan versus non-metropolitan areas were consistent with the distribution of the general population.

Figure 21. Employed LPNs by Census Region and by Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

The age distribution of employed LPNs was similar in metropolitan and non-metropolitan areas.

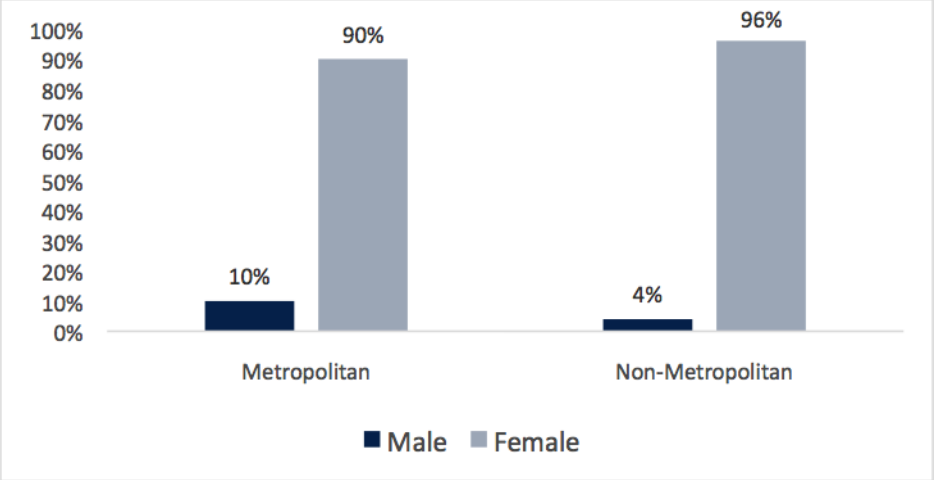
Table 9. Employed LPNs by Age Range and by Metropolitan vs. Non-Metropolitan Area, 2013

Age Range	Metropolitan	Non-Metropolitan
≤35y	30%	28%
36y – 50y	36%	36%
51y – 65y	30%	32%
≥66y	3%	4%

Note: Data are weighted to represent the U.S. population of LPNs. Differences are not statistically significant between 2008 and 2013; $p = 0.3963$.

While LPNs were predominantly female, in 2013 metropolitan areas had a higher proportion of male LPNs compared with non-metropolitan areas (10% vs. 4%).

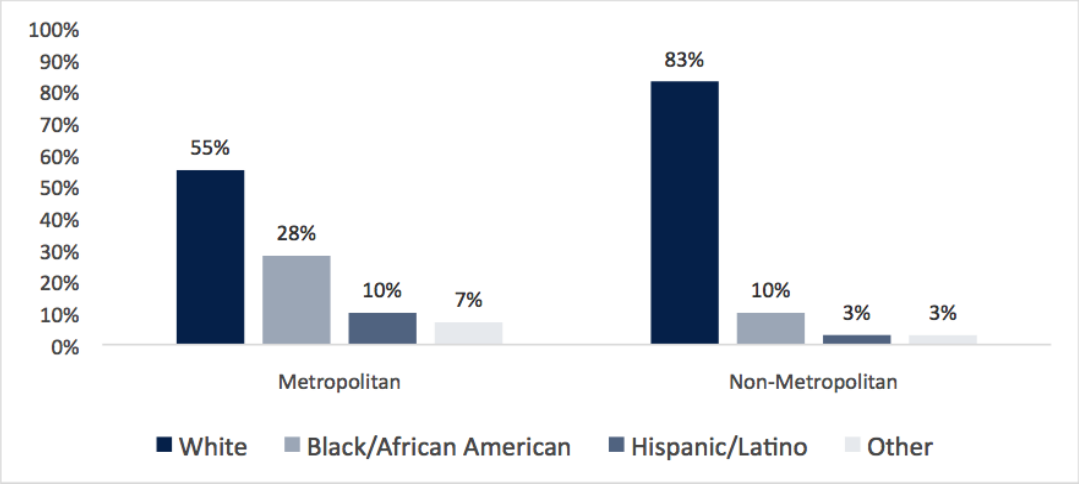
Figure 22. Employed LPNs by Gender and by Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Employed LPNs in metropolitan areas were also more racially and ethnically diverse compared with their counterparts in non-metropolitan areas. A much lower proportion of LPNs working in metropolitan areas were White (55% vs. 83%). Correspondingly, metropolitan areas had higher proportions of LPNs who were African American, Hispanic or Latino, or another non-White race.

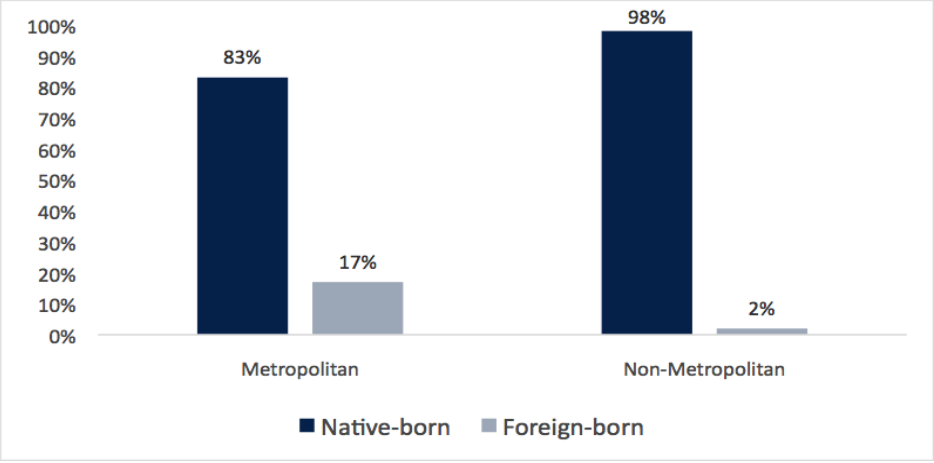
Figure 23. Employed LPNs by Race/Ethnicity and by Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

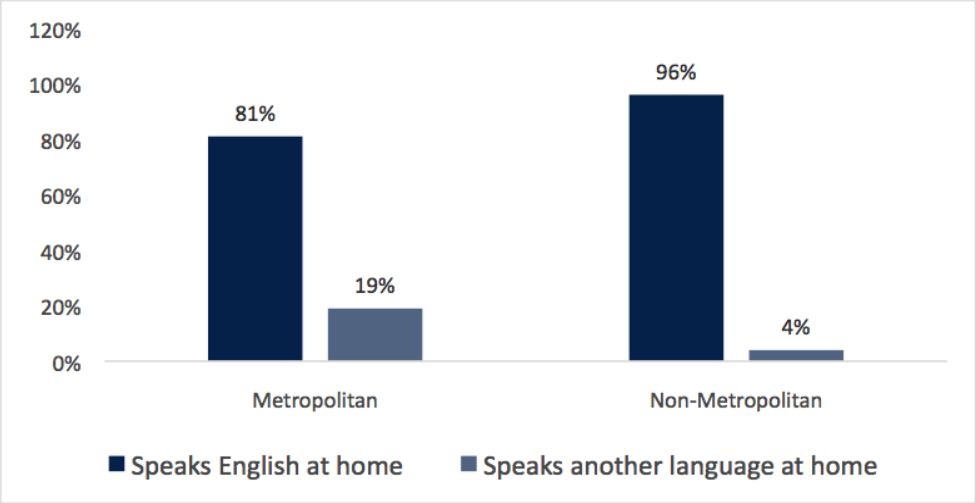
As the racial and ethnic diversity of LPNs in metropolitan areas would suggest, there was a significantly higher proportion of foreign-born LPNs residing in metropolitan areas compared with non-metropolitan areas. The percentage of LPNs speaking a language other than English at home was also higher in metropolitan areas.

Figure 24. Employed LPNs by Nativity and by Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Figure 25. Employed LPNs by Language Spoken at Home and Metropolitan vs. Non-Metropolitan Area, 2013



Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Significant differences existed in the educational attainment of LPNs by metropolitan status. This is largely due to a much higher proportion of LPNs in non-metropolitan areas having earned an Associate's degree (25% vs. 18%). This finding may be related to the high proportion of LPNs in non-metropolitan areas in the Midwest region, the region with the greatest percentage of the general population living in non-metropolitan areas. As shown in the section of the report on Census regions, LPNs in the Midwest region were more likely to have an Associate's degree than LPNs in other Census regions.

Table 10. Employed LPNs by Educational Attainment and Metropolitan vs. Non-Metropolitan, 2013

Educational Attainment	Metropolitan	Non-Metropolitan
HS diploma or GED	18%	17%
<1 year college (no degree)	10%	9%
≥1 year college (no degree)	48%	46%
Associate's degree	18%	25%
Bachelor's or higher degree	6%	4%

Note: Data are weighted to represent the U.S. population of LPNs.
Differences are statistically significant between 2008 and 2013 at $p < 0.0001$.

Conclusions

The LPN workforce has undergone several important changes in recent years. The number of LPNs has decreased and employment patterns have changed. The number of LPNs employed by hospitals has decreased and the number employed in long-term care settings has increased. Much of the increase in employment in long-term care settings is due to a large increase in employment in home health.

The decrease in the number of LPNs employed by hospitals suggests that hospitals' demand for LPNs is decreasing. This may be due to 2 factors. First, hospitals are striving to increase the education and skill level of their nursing staff and prefer to hire registered nurses (RNs).[4] Second, as the shortage of RNs has abated, hospitals may be finding it easier to recruit RNs.[5] Simultaneously, demand for LPNs in long-term care settings may be increasing due to the growth in the number of senior citizens, many of whom need long-term care.

The demographic characteristics of the LPN workforce are also changing, albeit not as dramatically as their employment patterns. The percentage of non-White LPNs in the workforce is increasing because non-White LPNs are younger than White LPNs and, thus, more likely to be in the labor force. The percentages of LPNs who are foreign-born or who speak a language other than English at home are increasing. These trends are consistent with the needs of the U.S. population which includes more immigrants and more persons whose first language is not English.

There are also some important differences in the LPN workforce across Census regions and between metropolitan and non-metropolitan areas. LPNs in the West region were less likely to work in long-term care settings than LPNs in other regions, and more likely to work in hospitals. Two possible explanations for this finding are the lower supply of RNs in this region and a California law that mandates minimum nurse staffing ratios in hospitals.[6] The low ratio of RNs to population in states in the West region may lead hospitals in this region to demand more LPNs relative to hospitals in other regions. In addition, estimates for the West region are dominated by California, a state that has established minimum nurse staffing ratios for hospitals. Hospitals in this region may demand more LPNs to comply with this requirement.

Variation in other characteristics of health care markets may also contribute to regional differences. Across the entire nation, LPNs in metropolitan areas were less likely to be employed in long-term care than LPNs in non-metropolitan areas. The

larger populations of metropolitan areas can sustain a wider range of different types of health care providers than non-metropolitan areas. Given that the West region contains the highest percentage of the population living in metropolitan areas, the finding that LPNs in the West region were less likely to work in long-term care may reflect the wider variety of employment opportunities available to LPNs in metropolitan areas. The large population in metropolitan areas in the West region may also account for the higher proportion of LPNs working in long-term care settings other than skilled nursing facilities or home health.

Another important difference across Census regions concerns employment within the long-term care sector. LPNs employed in long-term care in the South and West regions were less likely to be employed by skilled nursing facilities and more likely to be employed by home health agencies than LPNs in the Northeast and Midwest regions. Differences in state policy may account for this difference because Medicaid is the largest payer for long-term care services. The extent to which state Medicaid agencies' coverage and payment policies encourage use of home health services may affect the demand for LPNs in home health relative to skilled nursing facilities. If states in the South and West regions provide greater incentives for beneficiaries to receive care in their homes relative to institutional settings, demand for home health may be greater in these states than in states in the Northeast and Midwest regions.

Limitations

The analyses presented in this report have some important limitations. First, individual LPNs cannot be tracked over time because the ACS draws independent samples of Americans each year. The differences that occurred between 2008 and 2013 may be partially due to differences in the characteristics of LPNs included in the 2008 and 2013 samples. Second, the sample size for the ACS limits the precision of our estimates. We chose to analyze data from the 1-year files for 2008 and 2013 because we wanted to identify trends over time. The sample sizes for the 1-year files are too small to generate estimates below the Census region level. To generate estimates for individual states and the District of Columbia, we would have had to analyze data in a multi-year file. It is possible that the estimates for Census regions mask important variation in LPN employment and characteristics within those regions. Third, the ACS 1-year files do not contain a variable for identifying respondents living in metropolitan and non-metropolitan areas. Although we used an accepted method to geocode each Public Use Microdata Area (PUMA) as either a metropolitan area or a non-metropolitan area, some portion of the

population living in a given PUMA was misclassified, which may have affected our estimates of differences or similarities between LPNs in metropolitan and non-metropolitan areas.

Future Directions

The shift in LPN employment from hospital to long-term care settings raises important questions for LPN education. LPNs working in long-term care settings have less direct supervision than LPNs working in hospitals. They often need to make more independent judgments about when they need input from registered nurses or physicians to meet patients' needs. This is especially true of the growing number of LPNs employed by home health agencies. LPN education programs should review their curricula and revamp as needed to ensure that new graduates are prepared to work in long-term care settings. LPN education programs may want to increase clinical training opportunities in long-term care settings and enhance training in critical thinking skills and communication.

Our analysis uncovered some significant differences in LPN employment patterns across Census regions and between metropolitan and non-metropolitan areas. Some differences, such as the greater share of LPNs in metropolitan areas employed in "other" settings may reflect differences in the characteristics of different health care markets. In other cases, they may be associated with differences in state policy, such as the presence of minimum nurse staffing laws or the extent to which state Medicaid agencies allocate funding for home and community-based services relative to skilled nursing facilities. Scope of practice laws may also affect demand for LPNs across health care sectors. Differences in the supply of RNs and LPNs across states may also affect employment patterns. In states with a low supply of RNs, demand for LPNs in hospitals may be greater than in states with a robust supply of RNs. Unfortunately, this report cannot answer these questions because the sample size for each year was insufficient to generate state level estimates. Additional analyses of ACS datasets that pool response from multiple years are needed to determine what state policy variables and market characteristics influence demand for LPNs within and across healthcare sectors.

Acronyms Used in this Report

ACS = American Community Survey

LPN = licensed practical nurse

LTC = long-term care

LVN = licensed vocational nurse

PUMA = Public Use Microdata Area

PUMS = Public Use Microdata Sample

RUCC = Rural Urban Continuum Codes

References

1. Spetz, J., L. Trupin, T. Bates, and J.M. Coffman. 2015. Future Demand for Long-term Care Workers Will Be Influenced by Demographic and Utilization Changes. Health Affairs (Millwood), 34 (6): 936-945.

2. National Center for Health Workforce Analysis. The U.S. Nursing Workforce: Trends in Supply and Education. 2013. Rockville, MD: Health Resources and Services Administration.

3. Seago, J.A., J. Spetz, S. Chapman, W. Dyer, and K. Grumbach. 2004. Supply, Demand, and Use of Licensed Practical Nurses. Rockville, MD: Health Resources and Services Administration.

4. Seago, J.A., J. Spetz, S. Chapman, W. Dyer, and K. Grumbach. 2004. Supply, Demand, and Use of Licensed Practical Nurses. Rockville, MD: Health Resources and Services Administration.

5. Buerhaus, P.I., D.I. Auerbach, and D.O. Staiger. 2009. The Recent Surge in Nurse Employment: Causes And Implications Health Affairs (Millwood), 28 (4): w657-w668

6. 22 C.C.R., Sec. 70217. https://govt.westlaw.com/calregs/Document/I8612C410941F11E29091E6B951DDF6CE?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

Appendix A. Methods

Data

We pooled data from the 1-year 2008 and 1-year 2013 American Community Survey (ACS), Public Use Microdata Sample (PUMS). The ACS is a national household survey administered by the U.S. Census Bureau designed to collect social, demographic, and economic information. Approximately 3.5 million households are in the sample, and each month approximately 295,000 are targeted for interviews; the sample covers approximately 95% of the U.S. population. The PUMS data are untabulated records describing either people or housing units, representing individual survey responses. We used survey weights in order to generate estimates generalizable to the U.S. civilian population.

The smallest geographic unit of analysis in the 1-year ACS PUMS data is the Public Use Microdata Area (PUMA). We used the 2013 Rural Urban Continuum Codes (RUCC) to geocode each PUMA in the 2013 ACS PUMS file as either metropolitan or non-metropolitan. The RUCC is a classification scheme used to identify metropolitan counties using the size of their metro population, and non-metropolitan counties using the extent of their urbanization and their proximity to a metropolitan area. If 50% or more of the population in a given PUMA lived in a metropolitan area, the PUMA was coded as metropolitan; otherwise the PUMA was coded non-metropolitan.

Geocoding Public Use Microdata Areas (PUMA) using Rural Urban Continuum Codes (RUCC)

Analyses of rural-urban population differences using the 1-year ACS PUMS are complicated by the fact that the sub-state unit of geography in these data is the PUMA, which is a "statistical geographic area defined for the dissemination"[1] of PUMS data. Classifications of rural-urban geography are typically organized around Zip codes (Rural Urban Commuting Areas[2]), or counties (Urban Influence Codes[3] and Rural Urban Continuum Codes[4]). Because PUMAs may only partially correspond

[1] For more information on PUMAs, see https://www.census.gov/geo/reference/puma.html
[2] For more information on RUCAs, see http://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx
[3] For more information on UICs, see http://www.ers.usda.gov/data-products/urban-influence-codes.aspx
[4] For more information on RUCCs, see http://www.ers.usda.gov/data-products/rural-urban-continuum-codes/.aspx

with the boundaries of either Zip codes or counties, it is not possible to perfectly distinguish rural and urban geography using the 1-year ACS PUMS data (or any database that uses the PUMA as a geographic identifier).

The method outlined here is a partial solution to this problem. It is based on a working paper developed by the United States Department of Agriculture, Economic Research Service. It identifies the county or counties represented by each PUMA in the 1-year 2013 ACS PUMS file and categorizes the PUMA as either *metropolitan* or *non-metropolitan* based on the 2013 RUCC values assigned to the county or counties it represents.

The Rural Urban Continuum Codes contain 7 different values used to identify counties as either metropolitan or non-metropolitan based on commuting patterns and physical adjacency to other metropolitan areas. These are the 7 values:

Metropolitan
1 = counties in metro areas of 1 million population or more
2 = counties in metro areas of 250,000 to 1 million population
3 = counties in metro areas of fewer than 250,000 population
Non-metropolitan
4 = urban population of 20,000 or more, adjacent to a metro area
5 = urban population of 20,000 or more, not adjacent to a metro area
6 = urban population of 2,500 to 19,999, adjacent to a metro area
7 = urban population of 2,500 to 19,999, not adjacent to a metro area
8 = completely rural or less than 2,500 urban population, adjacent to a metro area
9 = completely rural or less than 2,500 urban population, not adjacent to a metro area

The first step in the process was to identify the county or counties represented by each PUMA in the 1-year 2013 ACS PUMS dataset, and how each contributes to the total population of the PUMA. For example, in PUMA X, County A contributes 20% of total population, County B another 50%, and County C the remaining 30%.[5] Next, each county in each PUMA was designated as either metropolitan or non-metropolitan according to its RUCC classification (outlined above). It's now possible to determine how the population in each PUMA is distributed according to the RUCC

[5] Share of population was determined using 2010 Census data.

classification: some PUMAs are purely metro, some are purely non-metro, while others are mixed.

Each PUMA was classified as metropolitan if 50% or more of its population came from metropolitan counties; otherwise the PUMA was designated non-metropolitan. Using this framework, metro/non-metro status is correctly assigned to 97% of the U.S. population; approximately 10 million people are misclassified. Among residents living in a PUMA that is classified as metropolitan, approximately 2% are residents of non-metropolitan counties. Approximately 11% of residents living in PUMAs that are classified as non-metropolitan are actually residents of metropolitan counties.

Defining Sector and Occupation

The Long-term Care sector was defined as the aggregate of 6 Census industry codes, using the 4-digit codes (most disaggregated available) that align with the North American Industry Classification System (see Appendix Table 2 for crosswalk). Three of these are typically identified as healthcare-related: *home health care services*, *skilled nursing facilities*, and *residential care facilities*. The other 3 industries are often, but not exclusively, involved in the delivery of long-term care: *individual and family services* and *community food and housing, and emergency services* (both of which are considered part of the broader *social and community assistance* sector), and finally *private household services*.

Licensed Practical and Licensed Vocational Nurses were identified using the unique Census occupation code. Much of our analysis focuses on LPNs who were employed at the time of the survey; in these instances, LPNs who were reported as either "unemployed" or "not in the labor force" at the time of the survey were excluded. Throughout our analysis, we excluded sample cases of LPNs whose educational attainment was reported as less than a high school diploma or GED equivalent (see Appendix Table 2 for sample counts).

Appendix Table 1. Census and NAICS crosswalk for selected Long-term Care sectors

Description	Census	NAICS
Home health care services	8170	6216
Skilled nursing facilities	8270	6231
Residential care facilities, without nursing	8290	6232, 6233, 6239
Individual and family services	8370	6241
Community food and housing, and emergency services	8380	6242
Private households	9290	8140

Appendix Table 2. American Community Survey, Public Use Microdata Sample counts by selected characteristics

Description	2008	2013
Total sample count	8,200	8,100
Less than HS/GED	116	169
Usable sample count	8,112	7,931
Employed	6,867	6,293
Unemployed	165	299
Not in labor force	1,080	1,339