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## Urban-rural Differences in Visits to Office-based Physicians by Adults With Hypertension: United States, 2014–2016

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### Abstract

**Objective**—This report describes urban-rural differences in office-based physician visits made by adults aged 18 and over with documented hypertension by age, sex, and race and ethnicity during 2014–2016.

**Methods**—Data are from the 2014–2016 National Ambulatory Medical Care Survey (NAMCS), a nationally representative survey of visits to nonfederal, office-based physicians. The study population includes all office-based physician visits made by nonpregnant adults aged 18 and over with complete data on patient residence. Patient residence is based on the county of patient residence. The primary outcome is the percentage of visits with diagnosed hypertension, as defined by documentation of hypertension in their medical record. Variation in visits with documented hypertension was assessed by patient residence, sex, age, and race and ethnicity.

**Results**—During 2014–2016, the percentage of visits by adults aged 18 and over with diagnosed hypertension who lived in large metro suburban areas (34.2%) was lower than visits by adults who lived in small-medium metro areas (37.9%) and rural areas (40.1%). The percentage of visits by men with hypertension (41.0%) was higher than women (33.5%) overall and in large metro suburban areas (38.7% for men and 31.0% for women), small-medium metro areas (43.5% for men and 33.8% for women), and rural areas (44.9% for men and 36.5% for women). The percentage of visits by adults with hypertension increased with age, from 10.3% for adults aged 18–44 to 58.6% for adults aged 75 and over. This same pattern was observed in all patient residence areas. The percentage of visits by non-Hispanic black adults with hypertension (47.3%) was higher than for non-Hispanic white adults (35.7%) and for Hispanic adults (34.6%). This same pattern was observed in large metro urban and large metro suburban areas.

**Keywords:** race and ethnicity • high blood pressure • National Ambulatory Medical Care Survey

### Introduction

In 2016, the leading cause of death in the United States was heart disease, causing 635,260 deaths nationwide (1). Hypertension is a modifiable risk factor for heart disease (2). Hypertension guidelines have changed since 2016, and under new guidelines, 45.4% of U.S. persons have hypertension (3). Under previous guidelines, hypertension was prevalent in 34% of adult visits to office-based physicians (4). Compared with urban areas, adults who live in rural areas have higher rates of hypertension and are less likely to maintain normal body weight and meet aerobic activity recommendations, and are more likely to die of heart disease (5,6). Adults who live in rural areas are also more likely to live less active lifestyles and have less access to health care, making them more susceptible to diseases in comparison to adults living in urban areas (7). This report describes urban-rural differences in office-based physician visits made by adults aged 18 and over with documented hypertension by sex, age, and race and ethnicity.



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## Methods

### Data source

All estimates are from the 2014–2016 National Ambulatory Medical Care Survey (NAMCS) (8–10), a nationally representative survey of visits to nonfederal, office-based physicians. The survey is conducted annually by the National Center for Health Statistics (NCHS). NAMCS uses a stratified two-stage sample, with physicians selected in the first stage and visits in the second stage. The survey data are weighted to produce national annual estimates of office visits. The response rates for the 2014, 2015, and 2016 surveys were 39.0%, 29.6%, and 32.7%, respectively.

For this analysis, the study population includes all visits by nonpregnant adults aged 18 and over with complete data on patient residence ( $n = 66,985$ ). Visits by nonpregnant adults with missing data on patient residence (5.3% of unweighted visits [5.4% weighted]) were excluded.

### Selected measures

#### Diagnosed hypertension

The primary outcome is the percentage of visits with diagnosed hypertension, as defined by documentation of a diagnosis of hypertension in the patient's medical record. Since 2005, NAMCS has asked, "Regardless of the diagnosis for the current visit, does the patient now have (mark all that apply): hypertension, arthritis, asthma, cancer, cerebrovascular disease, chronic obstructive pulmonary disease, chronic renal failure, congestive heart failure, depression, diabetes, hyperlipidemia, ischemic heart disease, obesity, and osteoporosis?" The item has since changed to include additional chronic conditions.

This report includes the visits that included a diagnosis of hypertension, as defined by this question. Blood pressure values for the visit were not used to define hypertension. Given the time period included in this analysis, diagnosed hypertension was captured under previous guidelines (pre-2017) that

classify hypertension as having blood pressure greater than or equal to 140/90 mm Hg.

#### Residence

Patient residence is based on the county of patient residence. Areas were defined according to the 2013 NCHS Urban-Rural Classification Scheme (11). Visits by adults with missing urban-rural data (5.4%) were excluded from the analysis.

### Definitions of patient residences

*Large metro urban area*—Large central metro areas in metropolitan statistical areas (MSAs) of 1 million or more population that contain the MSA's largest principal city, are contained within the MSA's largest principal city, or contain at least 250,000 residents of any principal city.

*Large metro suburban area*—Large fringe metro areas in MSAs of 1 million or more population that do not qualify as large central metro. They are usually considered to be "suburbs" of large cities and are referred to in this report as "large metro suburban."

*Small-medium metro area*—Medium metro and small-medium metro were combined into one category and are referred to as "small-medium metro" in this report. Medium metro areas are areas in MSAs with a population of 250,000–999,999. Small-medium metro areas are areas in MSAs with a population of less than 250,000.

*Rural area*—Nonmetropolitan areas, not in MSAs, include areas in Office of Management and Budget-defined micropolitan statistical areas and noncore areas and are referred to as "rural" in this report. Micropolitan statistical areas are nonmetropolitan areas of populations of 10,000–49,999. Noncore areas are nonmetropolitan areas that do not qualify as micropolitan areas.

#### Race and ethnicity

Race and Hispanic ethnicity were collected separately and converted into a single combined variable that includes non-Hispanic white, non-Hispanic black,

Hispanic, and non-Hispanic other. NAMCS race and ethnicity data were missing for 17% of office-based visits in 2014–2016. Race and ethnicity data were imputed on the data file using a model-based, single, sequential regression imputation method (8). Missing race values were imputed to be white, black, or other. Hispanic ethnicity was imputed to be Hispanic or non-Hispanic. Non-Hispanic other race represents 33.3% of weighted visits. These visits are included in the total but are not reported separately. Non-Hispanic other race and ethnicity includes Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and two or more races.

All pairwise differences in the percentage of visits by adults with hypertension by urban-rural and subgroup categories were evaluated using two-tailed  $t$  tests ( $p < 0.05$ ). Data analyses were performed using the statistical packages SAS version 9.4 (SAS Institute, Cary, N.C.) and SUDAAN version 9.0 (RTI International, Research Triangle Park, N.C.). All proportion estimates presented meet NCHS guidelines for presentation of proportions (12).

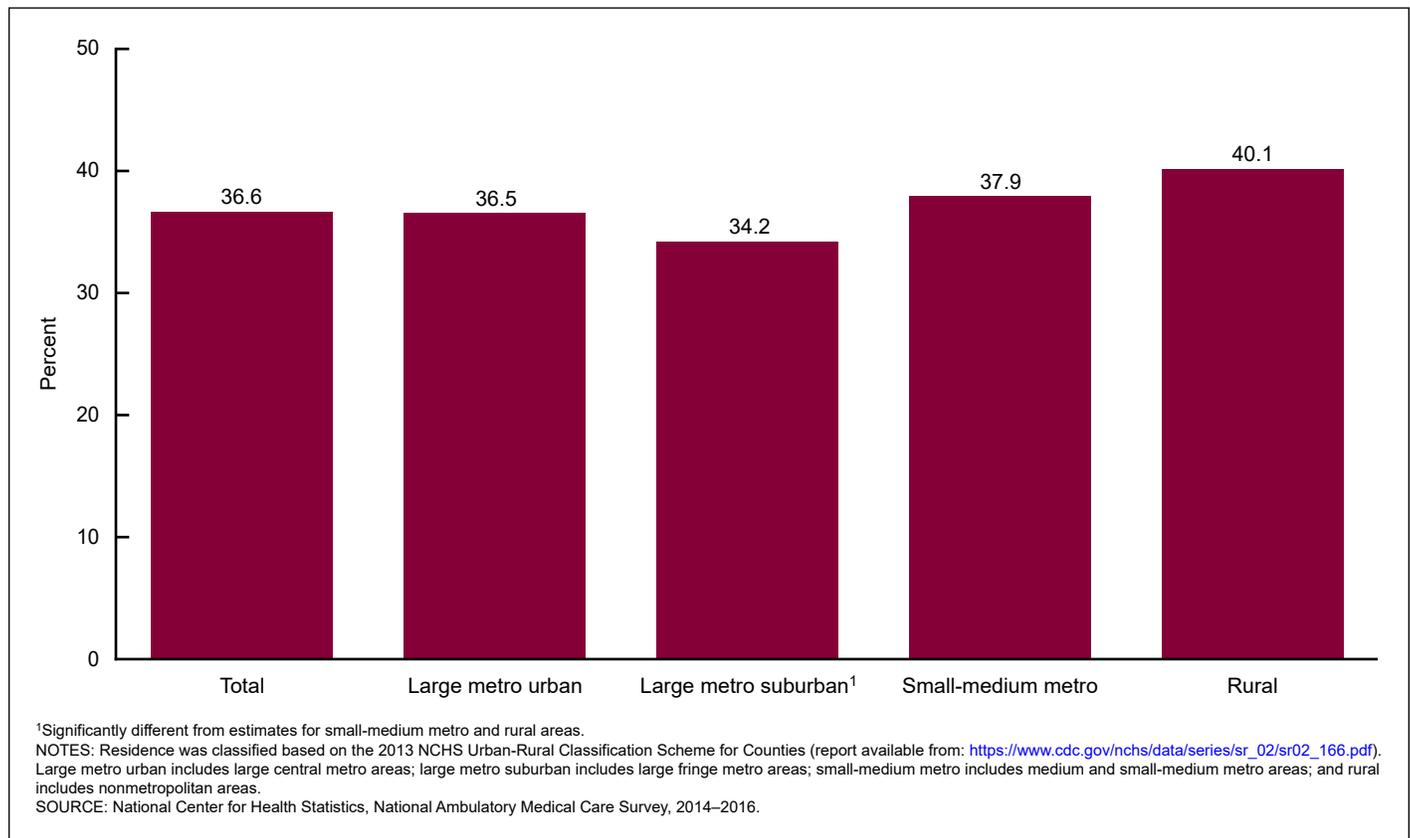
## Results

### Variation by patient residence

- In 2014–2016, over one-third of visits by adults (36.6%) included diagnosed hypertension documented in the medical record (Figure 1).
- The percentage of visits by adults with documented hypertension who lived in large metro suburban areas (34.2%) was lower than the percentage who lived in small-medium metro areas (37.9%) and rural areas (40.1%). No other significant differences were observed by area of residence.

### Variation by patient residence and gender

- For both women and men, the percentage of visits with documented hypertension was lower in large metro suburban areas (31.0% for

**Figure 1. Percentage of adult visits with hypertension in the medical record, by patient residence: United States, 2014–2016**

women and 38.7% for men) than the percentage in rural areas (36.5% for women and 44.9% for men).

For men, the percentage was also lower in large metro suburban areas compared with small-medium metro areas (43.5%) (Figure 2).

- Among women, the observed difference between large metro suburban areas and both small-medium metro areas and large metro urban areas was not statistically significant. Among men, the observed difference between small-medium metro and large metro urban and rural areas was also not significant.
- The percentage of visits by men with hypertension (41.0%) was higher than the percentage of visits by women (33.5%) overall. By urban-rural residence, the difference by sex was statistically significant in large metro suburban areas, small-medium metro areas (43.5% for men and 33.8% for women), and rural areas.

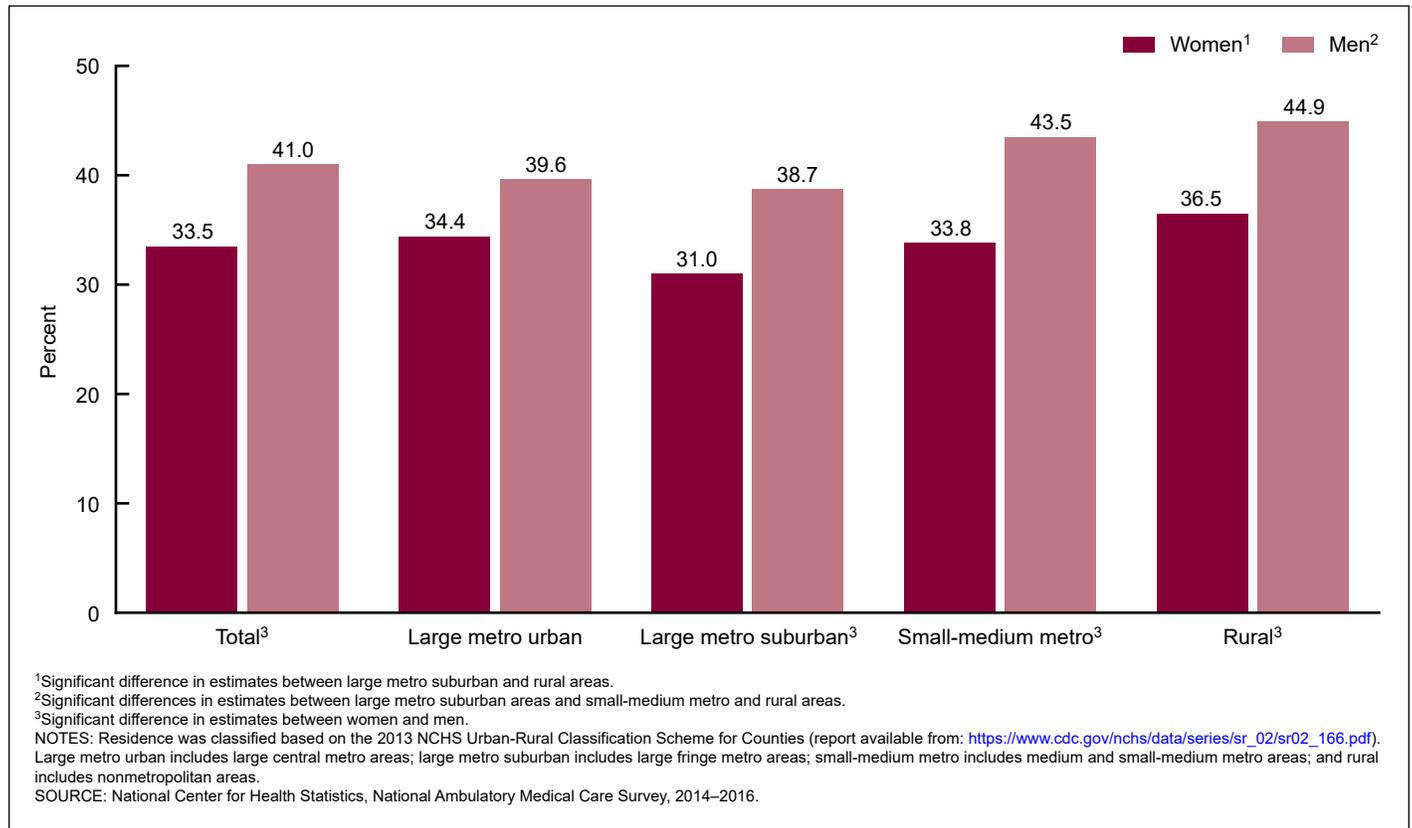
### Variation by patient residence and age

- For patients aged 45–64, the percentage of visits with documented hypertension was lower in large metro suburban areas (33.1%) compared with small-medium metro areas (37.1%) and rural areas (38.5%) (Figure 3).
- For patients aged 65–74, the percentage of visits with documented hypertension was lowest in large metro suburban areas (47.9%).
- For patients aged 18–44 and 75 and over, although the percentage of visits with documented hypertension was lower in large metro suburban areas compared with small-medium metro and rural areas, the differences were not statistically significant.
- The percentage of visits by adults with hypertension increased with age, from 10.3% for adults aged 18–44 to 58.6% for adults aged 75 and over. This same pattern of increasing hypertension visits with age was observed in all areas.

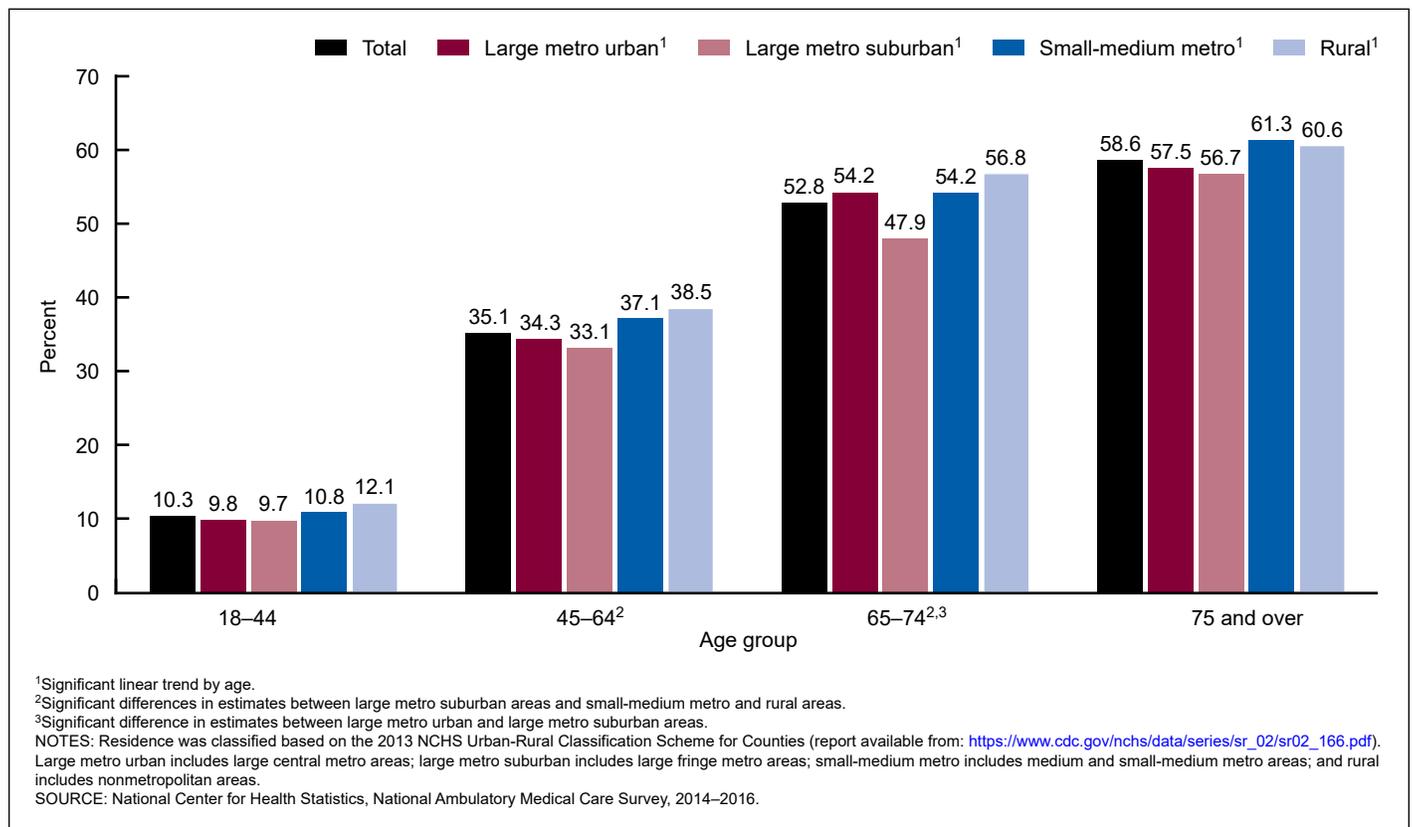
### Variation by patient residence and race and ethnicity

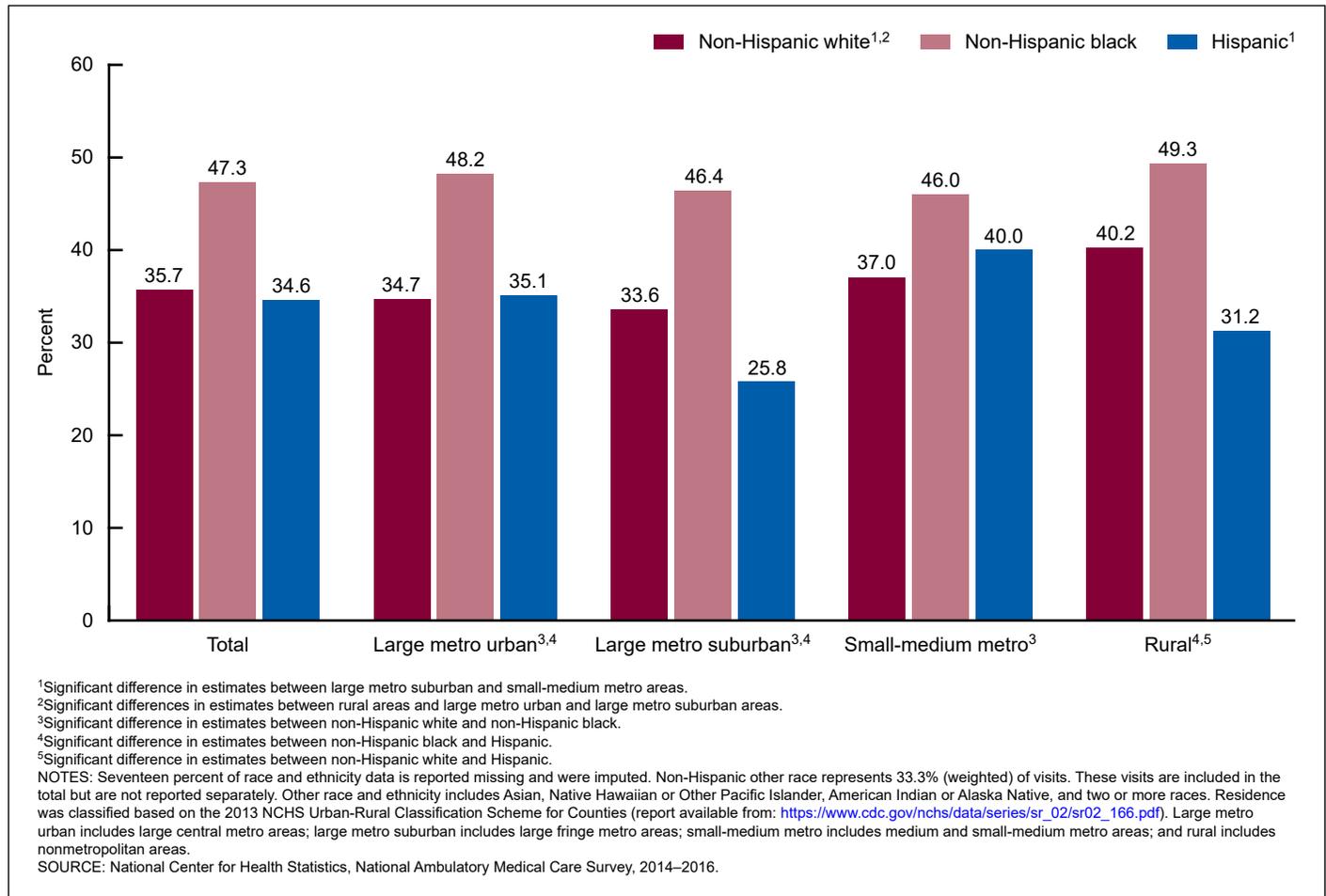
- For non-Hispanic white adults, the percentage of visits with documented hypertension was lower in large metro suburban areas (33.6%) compared with small-medium metro areas (37.0%) and rural areas (40.2%) (Figure 4). The percentage of visits with hypertension was also lower in large metro urban areas (34.7%) compared with rural areas.
- For Hispanic adults, the percentage of visits with documented hypertension was lower in large metro suburban areas (25.8%) compared with small-medium metro areas (40.0%). None of the other differences were statistically significant.
- Among non-Hispanic black adults with documented hypertension, no statistically significant differences were observed by urban-rural residence.

**Figure 2. Percentage of adult visits with hypertension in the medical record, by patient residence and sex: United States, 2014–2016**



**Figure 3. Percentage of adults with hypertension in the medical record, by patient residence and age: United States, 2014–2016**



**Figure 4. Percentage of adults with hypertension in the medical record, by patient residence and race and ethnicity: United States, 2014–2016**

- The percentage of visits by non-Hispanic black adults with hypertension was higher than the percentage of visits by non-Hispanic white adults in large metro urban areas (48.2% for non-Hispanic black and 34.7% for non-Hispanic white), large metro suburban areas (46.4% for non-Hispanic black and 33.6% for non-Hispanic white), and small-medium metro areas (46.0% for non-Hispanic black and 37.0% for non-Hispanic white). The observed difference in rural areas was not statistically significant.
- The percentage of visits by non-Hispanic black adults with hypertension was higher than the percentage of visits by Hispanic adults in large metro urban areas (48.2% for non-Hispanic black and 35.1% for Hispanic), large metro suburban areas (46.4% for non-Hispanic black and 25.8% for Hispanic), and rural areas (49.3% for

non-Hispanic black and 31.2% for Hispanic). The observed difference in small-medium metro areas was not statistically significant.

## Summary

During 2014–2016, in all areas, approximately 36% of visits by adults included diagnosed hypertension documented in the medical record. Compared with large metro suburban areas, a higher percentage of visits by adults who lived in rural areas or small-medium metro areas included documented hypertension. Overall, a higher percentage of visits by men compared with women had documented hypertension. For non-Hispanic white adults and adults aged 45–74, the same pattern was observed—the percentage of visits with hypertension was higher for adults who lived in rural areas or small-medium metro areas compared with

large metro suburban areas. Regardless of where adults lived, as age increased, visits with hypertension also increased. In contrast with Hispanic adults, no urban-rural differences were observed in the percentage of visits by non-Hispanic black adults with diagnosed hypertension. Overall, a higher percentage of visits by non-Hispanic black adults had diagnosed hypertension compared with other race and ethnicity groups, but no differences by area of residence for this group were observed.

This analysis has limitations that should be taken into consideration when interpreting results. Even with 3 years of combined data, statistical power was somewhat limited to detect differences for some groups. NAMCS race and ethnicity data were missing for 17% of office-based visits in 2014–2016 and were imputed. Despite this rate, race and ethnicity were included in this report due to known racial disparities in hypertension and hypertension-related

disease outcomes related to mortality and morbidity (13). Additionally, residence is based on county of patient residence, which may misclassify patients living in smaller areas as large metro urban areas if they are located within a county classified as large metro urban.

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