Racial Disparities in Blood Pressure Control and Treatment Differences in a Medicaid Population, North Carolina, 2005-2006

Diane L. Downie, MPH; Dorothee Schmid, MA; Marcus G. Plescia, MD, MPH; Sara L. Huston, PhD; Susan Bostrom, RN; Angie Yow, RN; William W. Lawrence Jr., MD; C. Annette DuBard, MD, MPH

Suggested citation for this article: Downie DL, Schmid D, Plescia MG, Huston SL, Bostrom S, Yow A, et al. Racial disparities in blood pressure control and treatment differences in a Medicaid population, North Carolina, 2005-2006. Prev Chronic Dis 2011;8(3). http://www.cdc.gov/pcd/issues/may/10_0070.htm. Accessed [date].

Abstract

Introduction
Racial disparities in prevalence and control of high blood pressure are well-documented. We studied blood pressure control and interventions received during the course of a year in a sample of black and white Medicaid recipients with high blood pressure and examined patient, provider, and treatment characteristics as potential explanatory factors for racial disparities in blood pressure control.

Methods
We retrospectively reviewed the charts of 2,078 black and 1,436 white North Carolina Medicaid recipients who had high blood pressure managed in primary care practices from July 2005 through June 2006. Documented provider responses to high blood pressure during office visits during the prior year were reviewed.

Results
Blacks were less likely than whites to have blood pressure at goal (43.6% compared with 50.9%, $P = .001$). Blacks above goal were more likely than whites above goal to have been prescribed 4 or more antihypertensive drug classes (24.7% compared with 13.4%, $P < .001$); to have had medication adjusted during the prior year (46.7% compared with 40.4%, $P = .02$); and to have a documented provider response to high blood pressure during office visits (35.7% compared with 30.0% of visits, $P = .02$). Many blacks (28.0%) and whites (34.3%) with blood pressure above goal had fewer than 2 antihypertensive drug classes prescribed.

Conclusion
In this population with Medicaid coverage and access to primary care, blacks were less likely than whites to have their blood pressure controlled. Blacks received more frequent intervention and greater use of combination antihypertensive therapy. Care patterns observed in the usual management of high blood pressure were not sufficient to achieve treatment goals or eliminate disparities.

Introduction
Racial and ethnic health disparities have become a prominent issue in the national debate about health care in the United States and have been particularly well-documented in cardiovascular disease (CVD), including stroke, coronary heart disease, heart failure, and high blood pressure (1-3). Death rates from CVD are higher among blacks and have decreased at a slower rate than among whites, effectively widening the disparity (4). High blood pressure is the single most important modifiable risk factor for cardiovascular disease, yet blood pressure control is achieved in only one-third of all patients with high blood pressure.
A number of factors are important in achieving adequate control of high blood pressure, including biological, cultural, social, and health care provider and system factors (9).

Although access to health care has dominated the national debate about the inadequacies of the US health care system, racial and ethnic disparities among patients with similar access to care and similar socioeconomic status are known to exist (5). Previous studies have found higher awareness and treatment of high blood pressure among blacks than among whites, but poorer control; demographics, socioeconomic status, comorbidities, and behavioral risk factors appear to play little role in explaining these racial differences (4,6). Among patients receiving care for high blood pressure, provider nonadherence to treatment guidelines or failure to pursue treatment goals aggressively are known to contribute to low attainment of treatment goals for blood pressure. To our knowledge, however, no prior studies have explored the role of clinical practice patterns in racial disparities in blood pressure control.

Medicaid is the largest provider of health insurance for low-income and minority populations in the United States, and Medicaid patients have a disproportionate share of cardiovascular risk factor prevalence, uncontrolled blood pressure, and associated illness and death (10,11). We reviewed the charts of a representative sample of adult Medicaid recipients in North Carolina with diagnosed high blood pressure managed in the primary care setting. The objectives of this analysis were to 1) identify differences in blood pressure control between black and white Medicaid recipients with high blood pressure managed in the primary care setting; 2) examine whether these differences could be explained by differences in demographic factors, comorbidities, or provider characteristics; and 3) determine whether black patients with blood pressure above goal had received differential management for high blood pressure compared with that of white patients during the prior year.

Methods

Study population

We used Medicaid administrative data to select a representative sample of North Carolina Medicaid recipients aged 21 years or older with high blood pressure managed in the primary care setting. Recipients were enrolled with Medicaid for at least 11 months from July 1, 2005, through June 30, 2006, and had an office visit with a diagnosis of high blood pressure (ICD9 401xx), excluding pregnancy-induced high blood pressure. We excluded patients who had any office visits with a cardiologist or endocrinologist during this time and those receiving dialysis services for end-stage renal disease. This study was performed as a quality improvement activity of the North Carolina Division of Medical Assistance and was exempted from review by the University of North Carolina Office of Human Research Ethics.

North Carolina had a traditional fee-for-service (FFS) program for Medicaid recipients and 2 managed-care programs during the study period: Carolina ACCESS (CA-I), in which recipients are assigned to a primary care provider (PCP), and ACCESS II (CA-II), which additionally incorporates community-based care management and quality improvement initiatives. PCPs were identified according to administrative assignment for eligible patients in the CA-I and CA-II systems. For FFS patients, the PCP was identified by examining professional services claims submitted during the eligibility year with the following specialty type: general or family medicine, internal medicine, obstetrics and gynecology, pediatrics, federally qualified health center, rural health center, nurse practitioner, or health department. The provider who had submitted the most claims (or the most recent claim in case of a tie) was identified as that patient’s PCP. In Medicaid administrative data, “provider” refers to a single physician or a larger practice organization.

To ensure a representative statewide sample and adequate sampling from 8 counties planning a high blood pressure initiative for CA-II enrollees, we used a stratified cluster sampling design and randomly selected PCPs within 4 sampling strata (CA-II patients in pilot counties, CA-II patients in nonpilot counties, CA-I/FFS patients in pilot counties, and CA-I/FFS patients in nonpilot counties). We excluded providers with fewer than 5 eligible patients. A total of 4,046 charts were reviewed from March through July 2007. Of these, we excluded 224 patients from analysis because there was no high blood pressure diagnosis in the chart; 60 patients because they had no office visit after June 30, 2005; and 20 patients because no blood pressure measurement was documented. We limited our analyses to patients identified as black or white in the medical record, or if not available in the record, according to self-
reported race in Medicaid enrollment data. We could not
determine patient race for 3.5% of charts reviewed. The
final sample included data for 2,078 black and 1,436 white
patients from a total of 160 providers.

We abstracted medical record data from the offices of
selected PCPs by using an electronic clinical abstraction
tool developed by Michigan Peer Review Organization
and the North Carolina Division of Medical Assistance.
Q Mark Inc (Q Mark Inc, Englewood, Colorado) provided
trained nurses for the chart abstractions who passed inter-
rater reliability and consistency tests. Reviewers followed
systematic guidelines and read all summary documents
in the chart as well as clinic notes and correspondence for
a 12-month look-back period from the most recent visit.
Each chart was reviewed by a single reviewer.

PCP specialty was determined by self-identification of
the billing practice as recorded in Medicaid administra-
tive data. Length of time with PCP was calculated on the
basis of the earliest service date and the most recent ser-
vice date documented in the chart. Providers located in a
county with a population density of more than 200 people
per square mile, according to US Census 2000 data, were
classified as urban; all others were classified as rural.

**Measures**

All study analyses were based on medical record document-
tation. The goal for blood pressure treatment was defined
as less than 130/80 mm Hg for patients with diabetes and
less than 140/90 mm Hg for all others, in accordance with
the Seventh Report of the Joint National Committee on
Prevention, Detection, Evaluation, and Treatment of High
Blood Pressure (JNC 7) (12). A comprehensive, uniform
dictionary of all clinical conditions and terms meeting
study definitions of high blood pressure, diabetes, hyperlip-
iddemia, cardiovascular disease (including coronary disease,
stroke, and peripheral arterial disease), tobacco use, chron-
ic obstructive pulmonary disease, and asthma was used to
identify the presence of these conditions as documented in
the medical record. Chronic kidney disease was defined as
having an estimated glomerular filtration rate (eGFR) <60
mL/min/1.73 m² and was calculated by using the isotope
dilution mass spectrometry (IDMS)-traceable Modification
of Diet in Renal Disease (MDRD) Study equation from the
most recent serum creatinine level documented in the med-
ical record. Body mass index (BMI) was calculated from
most recent weight and height documented in the medical
record, when available. If no height was recorded in the
medical record, the sex-specific median height of the study
population was used to calculate BMI. Tobacco use status,
creatinine, and weight were not available for 31%, 9%, and
2% of patients, respectively. Antihypertensive agents listed
on the patient’s medication regimen at the time of abstrac-
tion were recorded. Combination therapy was defined as
the use of 2 or more of the following antihypertensive drug
class categories: angiotensin converting enzyme (ACE)
inhibitors, angiotensin receptor blockers, beta blockers,
calcium channel blockers, thiazide diuretics, other diuret-
ics, vasodilators, and antiadrenergic agents.

**Statistical methods**

We used the most recent blood pressure measurement
available from the patient’s medical chart to assess the
prevalence of above-goal blood pressure in blacks com-
pared with whites. Next, we examined the bivariate
relationships between race and patient and provider char-
acteristics that may influence blood pressure control. To
assess potential explanations for racial disparities in blood
pressure control, we used logistic regression to calculate
odds ratios (ORs) for the association between blood pres-
sure control and race (black vs white) and expected covari-
ates. First, in the step 1 full model, we tested for contribu-
tions of patient characteristic variables in predicting blood
pressure control, including sex, age, comorbidities, and
number of medications. Covariates associated with blood
pressure control with a P value less than .10 were included
in the final model. In step 2, we added provider char-
acteristics, including PCP specialty, rural versus urban
location, number of years of care with current PCP, and
number of visits to PCP during the prior year. Covariates
associated with blood pressure control with a P value less
than .10 were included in the final step 2 model.

To examine the hypothesis that differential treatment pat-
terns may contribute to observed differences in blood pres-
sure control, we analyzed treatment characteristics for
the subset of black and white patients with blood pressure
above goal. Treatment characteristics included discussion
of medication adherence, diet, weight reduction, exercise,
sodium restriction, and moderation of alcohol; change in
antihypertensive medication regimen in the prior year;
and number of antihypertensive drug classes prescribed
in combination.

We additionally examined provider response to high
blood pressure during office visits within the year before
the most recent office visit, up to 5 visits per patient (n =
4,812 visits for blacks, \( n = 2,931 \) for whites). For visits with blood pressure above goal, we examined the likelihood that patients had the following care components: 1) documentation of a lifestyle recommendation (any recommendation for medication adherence, diet, weight reduction, exercise, sodium restriction, or moderation of alcohol), 2) change in antihypertensive medication regimen, and 3) a documented plan for follow-up care.

To analyze data, we used SAS versions 9.1 and 9.2 (SAS Institute, Inc, Cary, North Carolina). Weights were applied to correct for the unequal chance of being selected for patient clusters within providers in the 4 sampling strata, and for unit nonresponse. Analyses accounted for the clustering of patients within providers and for stratification. For significance testing, the \( F \)-adjusted Rao-Scott \( \chi^2 \) square and Wald \( \chi^2 \) square tests were used.

**Results**

The proportion of patients who had met their blood pressure goal was significantly lower among black patients than white patients (43.6% vs 50.9%, \( P = .001 \)) (Table 1).

A greater proportion of blacks were women (74% vs 65%, \( P < .01 \)) and the relationship between race and blood pressure control (OR = 0.78; 95% CI, 0.64-0.96; \( P = .02 \)) remained significant. In addition to race, diabetes, weight status, and PCP specialty other than family practice or internal medicine were associated with poor blood pressure control in the final model.

Among patients who had not achieved their blood pressure goal (\( n = 1,157 \) blacks and \( n = 688 \) whites) (Table 3), blacks were more likely than whites to have received counseling regarding sodium restriction (12% vs 8.5%, \( P = .006 \)), whereas other types of lifestyle recommendations (medication adherence, diet, weight reduction, exercise, and moderation of alcohol) did not differ significantly by race. Only 47.4% of black and 47.2% of white patients with blood pressure above goal had any documentation of lifestyle recommendations during the prior year. Use of combination antihypertensive therapy was more common among blacks (\( P < .001 \)). Blacks were more likely than whites to have had a change of antihypertensive medication regimen during the prior year (46.7% vs 40.4%, \( P = .02 \)).

A total of 14,583 office visits were reviewed. Blood pressure was elevated during 4,812 (57.2%) office visits during the prior year for blacks, and 2,931 (49.4%) office visits for whites (Table 4). During office visits with above-goal blood pressure, blacks were significantly more likely than whites to have a documented lifestyle recommendation (medication adherence, diet, weight reduction, exercise, sodium restriction, or moderation of alcohol) (17.6% vs 13.9%, \( P = .02 \)) and more likely to have any documented intervention (medication change or lifestyle recommendation) (35.7% vs 30.0%, \( P = .02 \)). There was no significant difference between races in the likelihood of antihypertensive medication change. A follow-up care plan was noted during 64.3% of above-goal visits for blacks and 69.1% of above-goal visits for whites (\( P = .08 \)). Planned follow-up within 4 weeks was noted for only 27% of these visits for both races.

**Discussion**

In this statewide sample of Medicaid patients with high blood pressure managed in the primary care setting, blacks were less likely than whites to have their blood pressure controlled. We found that adjusting for observed patient and provider characteristics slightly attenuated the relationship between race and blood pressure control but did not completely explain racial differences.

One strength of this study is that the sample is representative of a statewide Medicaid population with high blood pressure, spanning multiple systems of care and treatment locations. Medicaid recipients are characterized by many factors known to be associated with poor blood pressure control or poor health outcomes, including low
socioeconomic status and higher prevalence of multiple comorbidities (13,14).

Our findings are consistent with prior observations that racial differences in blood pressure control among treated patients are not explained by socioeconomic factors, nonpharmacological management, health insurance, or comorbidities (3,4,6). Despite health care coverage, access to care, and frequent office visits, an unexplained racial disparity in blood pressure control still exists.

Provider characteristics, and quality and intensity of care have been shown to be significant causes of health disparities (3). Differences in blood pressure control may conceivably be due to less aggressive care patterns in black patients, culturally insensitive care, or other differences in counseling and follow-up (15,16). However, in our study, disparities in blood pressure control do not appear to be explained by differential treatment. Among those with blood pressure above goal, blacks were more likely than whites to have received counseling about sodium intake, to have been prescribed 3 or more blood pressure agents in combination, and to have a change of therapy within the prior year. Within each visit with high blood pressure, the likelihood of medication change and planned follow-up did not differ by race, although blacks were more likely than whites to receive a therapeutic lifestyle recommendation.

Lack of appropriately aggressive care, or clinical inertia, has been cited as a cause for suboptimal control of chronic disease risk factors across much of the US health care system (17). We confirmed considerable evidence of clinical inertia for both black and white patients. Fewer than half of patients with blood pressure above goal had documentation of any lifestyle counseling in the past year. During visits with high blood pressure, medical therapy was changed on only 1 in 5 opportunities. In addition, 28% of black patients and 34% of white patients with uncontrolled blood pressure were treated with fewer than 2 antihypertensive agents, which may not be sufficient to achieve blood pressure goals (18).

We were unable to explore many characteristics of patients, health systems, and environments that may contribute to racial disparities in blood pressure control, including health literacy, medication adherence, and barriers to following therapeutic lifestyle recommendations (19). Racial differences in the metabolic and hormonal pathogenesis of high blood pressure may contribute to the prevalence and severity of high blood pressure among blacks, although differences in socioeconomic conditions, access to care, and health-related knowledge or attitudes are thought to play a larger role (20). Researchers have examined the extent to which perceptions of racial/ethnic discrimination can adversely affect health (21-24). Negative attitudes attributed to discrimination have been linked to adverse physiological reactions involving blood pressure, and researchers have hypothesized that the chronic triggering of these cardiovascular reactions due to discrimination could lead to the development of high blood pressure (22). These reactions may be caused by various factors, including worry about blood pressure, care-seeking behavior of patients, lack of trust, majority provider behavior toward minority patients, or miscommunication between patients and providers (18,24-27).

This study had several limitations. We may have overestimated blood pressure control in this population because all patients sampled were receiving primary care services, and patients with more complicated disease (those seeing cardiologists and endocrinologists and those on dialysis) were excluded. Our study population had a lower proportion of patients older than 65 years than the source Medicaid population, probably because of these exclusions. Generalizability to other populations is also limited. Medicaid eligibility requires meeting state-specific thresholds of low income and assets, in addition to categorical requirements of being elderly, disabled, or pregnant, or having dependent children. Our analyses were limited to information obtainable in the medical record and relied on the accuracy of clinic blood pressure measurements and completeness of chart documentation, which may be particularly unreliable in assessing the extent of therapeutic lifestyle counseling. We counted as evidence of counseling any mention of lifestyle factors or medication adherence in the visit note.

In summary, the gap between current care and ideal care for both black and white Medicaid recipients with high blood pressure is substantial, even among patients with frequent access to primary care. Racial disparities in blood pressure control are not readily explained by socioeconomic, demographic, or comorbidity differences or by provider characteristics or treatment patterns. Current care patterns are not sufficient to eliminate racial disparities in blood pressure control or to achieve desired treatment goals. The consequences of ineffective health care for high blood pressure, in terms of avoidable cardiovascular illness, death, and health care costs, disproportionately affect blacks. Emerging models of high blood pressure care, incorporating patient-centered care teams and planned,
longitudinal stepped care approaches, show promise for improving outcomes across all patient populations (27-30). It cannot be assumed, however, that equal access and equal treatment will lead to equal outcomes. Closing the gap of racial disparities may require a more concerted clinical effort for racial minorities and better coordination between health care providers and community resources that can address cultural and health literacy needs and support patient self-management efforts in the home and community setting. Further research is needed to guide these efforts.

Author Information

Corresponding Author: Diane Downie, MPH, Public Health Preparedness Program, Division of Public Health, 1 West Wilson St, Rm 250, PO Box 2659, Madison, WI 53703. Telephone: 608-267-2887. E-mail: diane.downie@wi.gov. Ms Downie was affiliated with the North Carolina Department of Health when the research for this article was conducted.

Author Affiliations: Dorothee Schmid, Marcus G. Plescia, Sara L. Huston, Susan Bostrom, Angie Yow, William W. Lawrence, Jr, C. Annette DuBard, North Carolina Department of Health and Human Services, Raleigh, North Carolina. Dr Huston and Dr DuBard are also affiliated with the University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

References

1. Barnett E, Halverson J. Local increases in coronary heart disease mortality among blacks and whites in the United States, 1985-1995. Am J Public Health 2001;91(9):1499-506.
2. Lillie-Blanton M, Maddox TM, Rushing O, Mensah GA. Disparities in cardiac care: rising to the challenge of Healthy People 2010. J Am Coll Cardiol 2004;44(3):503-8.
3. Kramer H, Han C, Post W, Goff D, Diez-Roux A, Cooper R, et al. Racial/ethnic differences in hypertension and hypertension treatment and control in the multi-ethnic study of atherosclerosis (MESA). Am J Hypertens 2004;17(10):963-70.
4. Hertz RP, Unger AN, Cornell JA, Saunders E. Racial disparities in hypertension prevalence, awareness, and management. Arch Intern Med 2005;165(18):2098-104.
5. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington (DC): National Academies Press; 2001.
6. Howard G, Primeas R, Moy C, Cushman M, Kellum M, Temple E, et al. Racial and geographic differences in awareness, treatment, and control of hypertension: the REasons for Geographic and Racial Differences in Stroke Study. Stroke 2006;37(5):1171-8.
7. Wong MD, Shapiro MF, Boscardin WJ, Ettner SL. Contribution of major diseases to disparities in mortality. N Engl J Med 2002;347(20):1585-92.
8. Ong KL, Cheung BM, Man YB, Lau CP, Lam KS. Prevalence, awareness, treatment, and control of hypertension among United States adults[,] 1999–2005. Hypertension 2007;49(1):69-75.
9. Bosworth HB, Oddone EZ. A model of psychosocial and cultural antecedents of BP control. J Natl Med Assoc 2002;94(4):236-48.
10. Llanos K, Palmer L. Using data on race and ethnicity to improve health care quality for Medicaid beneficiaries. Hamilton (NJ): Center for Health Care Strategies; 2006.
11. National Healthcare Disparities Report, 2005. Agency for Healthcare Research and Quality. www.ahrq.gov/qual/nhdr05/nhdr05.htm. Accessed September 8, 2009.
12. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 2003;42(6):1206-52.
13. Mensah GA, Mokdad AH, Ford ES, Greenlund KJ, Croft JB. State of disparities in cardiovascular health in the United States. Circulation 2005;111(10):1233-41.
14. Kronick R, Bella M, Gilmer T, Somers S. The faces of Medicaid II: recognizing the care needs of people with multiple chronic conditions. Washington (DC): Center for Health Care Strategies; 2007.
15. Bibbins-Domingo K, Pletcher MJ, Lin F, Vittinghoff E, Gardin JM, Arynchyn A, et al. Racial differences in incident heart failure among young adults. N Engl J Med 2009;360(12):1179-90.
16. Thorpe RJ Jr, Brandon DT, LaVeist TA. Social context as an explanation for race disparities in hypertension: findings from the Exploring Health Disparities in Integrated Communities (EHDIC) Study. Soc Sci Med 2008;67(10):1604-11.
17. Phillips LS, Branch WT, Cook CB, Doyle JP, El-Kebbi IM, Gallina DL. Clinical inertia. Ann Intern Med
2001;135(9):825-34.
18. Black HR, Elliott WJ, Neaton JD, Grandits G, Grambsch P, Grimm RH Jr, et al. Baseline characteristics and elderly blood pressure control in the CONVINCE trial. Hypertension 2001;37(1):12-8.
19. Bosworth HB, Dudley T, Olsen MK, Voils CI, Powers B, Goldstein MK, et al. Racial differences in blood pressure control: potential explanatory factors. Am J Med 2006;119(1):70.e9-15.
20. National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure — complete report. p. 39. http://www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.htm. Accessed Jan 24, 2011.
21. Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: findings from community studies. Am J Public Health 2003;93(2):200-3.
22. Lillie-Blanton M, Brodie M, Rowland D, Altman D, McIntosh M. Race, ethnicity, and the health care system: public perceptions and experiences. Med Care Res Rev 2000;57 Suppl 1:218-35.
23. Roberts CB, Vines AI, Kaufman JS, James SA. Cross-sectional association between perceived discrimination and hypertension in African-American men and women: the Pitt County Study. Am J Epidemiol 2008;167(5):624-32.
24. Doescher MP, Saver BG, Franks P, Fiscella K. Racial and ethnic disparities in perceptions of physician style and trust. Arch Fam Med 2000;9(10):1156-63.
25. Van Ryn M. Research on the provider contribution to race/ethnicity disparities in medical care. Med Care 2002;40(1 Suppl 1):1140-51.
26. Balsa AI, McGuire T. Statistical discrimination in health care. J Health Econ 2001;20(6):881-907.
27. Fahey T, Schroeder K, Ebrahim S. Educational and organizational interventions used to improve the management of hypertension in primary care: a systematic review. Br J Gen Pract 2005;55(520):875-82.
28. Fahey T, Schroeder K, Ebrahim S. Interventions used to improve control of blood pressure in patients with hypertension. Cochrane Database Syst Rev 2006;(4):CD005182.
29. Walsh JM, McDonald KM, Shojania KG, Sundaram V, Nayak S, Lewis R, et al. Quality improvement strategies for hypertension management: a systematic review. Med Care 2006;44(7):646-57.
30. Bodenheimer T. Primary care — will it survive? N Engl J Med 2006;355(9):861-4.
### Table 1. Blood Pressure Control, Patient, Provider, and Treatment Characteristics of Medicaid Patients With Hypertension, by Race, North Carolina, 2005-2006

| Characteristic                      | Black (n = 2,078) | White (n = 1,436) | Total (N = 3,514) | P Value\(^c\) |
|------------------------------------|-------------------|-------------------|-------------------|---------------|
|                                    | n                  | Weighted % (95% CI) | n                  | Weighted % (95% CI) | n                  | Weighted % (95% CI) |               |
| High blood pressure                | 1,155             | 54.8 (51.5-58.2)   | 923               | 64.4 (60.6-68.1)   | 2,078             | 59.2 (56.2-62.1)   | <.001           |
| Blood pressure at goal             | 921               | 43.6 (40.5-46.8)   | 748               | 50.9 (47.1-54.6)   | 1,669             | 46.9 (44.2-49.6)   | .001            |
| Age group, y                       |                   |                   |                   |               |                   |                   |                  |
| 21-39                              | 371               | 17.8 (15.2-20.5)   | 242               | 16.6 (13.4-19.7)   | 613               | 17.3 (15.0-19.5)   | <.001           |
| 40-64                              | 1,302             | 62.3 (59.6-65.1)   | 917               | 64.3 (61.3-67.3)   | 2,219             | 63.2 (61.0-65.5)   | .6              |
| ≥65                                | 405               | 19.8 (16.4-23.3)   | 277               | 19.1 (15.9-22.4)   | 682               | 19.5 (16.9-22.2)   |               |
| Sex                                |                   |                   |                   |               |                   |                   | <.001           |
| Men                                | 522               | 25.8 (23.2-28.3)   | 490               | 34.6 (31.9-37.3)   | 1,012             | 29.8 (27.7-31.8)   |               |
| Women                              | 1,556             | 74.2 (71.7-76.8)   | 946               | 65.4 (62.7-68.1)   | 2,502             | 70.2 (68.2-72.3)   |               |
| Weight distribution\(^d\)         |                   |                   |                   |               |                   |                   |                  |
| Normal (BMI <25 kg/m\(^2\))       | 298               | 14.5 (12.5-16.4)   | 227               | 15.6 (13.6-17.6)   | 525               | 15.0 (13.4-16.5)   | .40            |
| Overweight (BMI 25-29.9 kg/m\(^2\)) | 441             | 21.9 (19.3-24.4)   | 340               | 23.4 (21.0-25.8)   | 781               | 22.6 (20.8-24.3)   |               |
| Obese (BMI >30 kg/m\(^2\))        | 1,292             | 63.7 (60.2-67.1)   | 845               | 61.0 (58.6-63.5)   | 2,137             | 62.5 (60.3-64.6)   |               |
| Comorbidities and risk factors     |                   |                   |                   |               |                   |                   |                  |
| Diabetes                           | 802               | 39.6 (37.2-42.1)   | 530               | 37.9 (34.5-41.2)   | 1,332             | 38.8 (36.8-40.9)   | .40            |
| Hyperlipidemia                     | 826               | 41.6 (37.7-45.6)   | 676               | 46.7 (43.7-49.7)   | 1,502             | 43.9 (41.1-46.9)   | .02            |
| Cardiovascular disease             | 376               | 19.2 (16.5-21.9)   | 270               | 17.4 (14.2-20.7)   | 646               | 18.4 (16.2-20.7)   | .38            |
| Current tobacco use\(^e\)         | 564               | 39.4 (34.7-44.2)   | 549               | 51.5 (47.0-55.9)   | 1,113             | 45.2 (41.4-49.3)   | <.001          |
| Chronic kidney disease (eGFR<60)\(^f\) | 412             | 24.7 (22.0-27.5)   | 384               | 28.7 (26.5-30.8)   | 796               | 26.5 (24.5-28.5)   | .01            |
| COPD or asthma/reactive airway disease | 357             | 17.5 (15.5-19.5)   | 327               | 22.8 (19.2-26.4)   | 684               | 19.9 (17.9-21.9)   | .006           |

Abbreviations: CI, confidence interval; BMI, body mass index; GFR, glomerular filtration rate; COPD, chronic obstructive pulmonary disease; PCP, primary care provider; JNC-7, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

\(^a\) Blood pressure at goal according to JNC-7 standards; <130/80 mm Hg for patients with diabetes; otherwise <140/90 mm Hg (12).

\(^b\) Variables with missing data overall and by race are as follows: tobacco use (overall = 1,077, black = 717, and white = 360), chronic kidney disease (eGFR<60) (overall = 332, black = 211, and white = 121), and length of time with current PCP (overall = 107, black = 85, and white = 22). Total n for blacks, 2,078; for whites, 1,436; and overall, 3,514 (no missing data for sex, age group, both blood pressure measures, diabetes, hyperlipidemia, cardiovascular disease, COPD/asthma, provider location, PCP visits in past year).

\(^c\) P value based on F-adjusted Rao-Scott \(\chi^2\) test comparing black and white patients.

\(^d\) Weight distribution for those patients for whom both height and weight were documented in the medical chart. For patients without height, median height of the population was used (total n = 3,332; black n = 2,031; white n = 1,121). No weight abstracted for 71 patients.

\(^e\) Tobacco use among those who have been screened for tobacco use and whose status was known (total n = 2,370; black n = 1,314; white n = 1,076).

\(^f\) Chronic kidney disease for those for whom eGFR was available (total n = 3,182; black n = 1,871; white n = 1,311).

\(^g\) Providers located in a county with a population density of more than 200 people per square mile, according to US Census 2000 data, were classified as urban; all others were classified as rural.

\(^h\) For 107 patients, no first visit date was abstracted. Therefore, length of care with their provider could not be established.

(Continued on next page)
Table 1. (continued) Blood Pressure Control, Patient, Provider, and Treatment Characteristics of Medicaid Patients With Hypertension, by Race, North Carolina, 2005-2006

| Characteristic                          | Black (n = 2,078) | White (n = 1,436) | Total (N = 3,514) | P Value<sup>c</sup> |
|----------------------------------------|------------------|-------------------|-------------------|---------------------|
| No. of total active medications        |                  |                   |                   |                     |
| 0-3                                    | 319              | 134               | 453               | 11.9 (10.3-13.6)    | <.001               |
| 4-7                                    | 811              | 503               | 1,314             | 36.9 (34.6-39.2)    |
| ≥8                                     | 948              | 799               | 1,747             | 51.2 (5.9-24.3)     |
| Provider and treatment characteristics  |                  |                   |                   |                     |
| PCP specialty                          |                  |                   |                   |                     |
| General/family practice                | 971              | 852               | 1,823             | 55.7 (41.0-70.3)    | .035                |
| Internal medicine                      | 821              | 480               | 1,301             | 29.2 (16.5-54.19)   |
| Other/unknown                          | 286              | 104               | 390               | 15.1 (5.9-24.3)     |
| Geographic location, by provider county|                  |                   |                   |                     |
| Rural                                  | 957              | 666               | 1,623             | 53.5 (38.2-68.8)    | .261                |
| Urban                                  | 1,121            | 770               | 1,891             | 46.5 (31.2-61.8)    |
| Length of time with current PCP, y<sup>h</sup> |                  |                   |                   |                     |
| >1 y                                   | 201              | 116               | 317               | 8.2 (6.6-9.9)       | .703                |
| 1-2 y                                  | 716              | 476               | 1,192             | 32.5 (27.5-37.5)    |
| 3-4 y                                  | 300              | 287               | 647               | 19.7 (16.6-22.7)    |
| ≥5 y                                   | 716              | 535               | 1,251             | 39.6 (34.1-45.1)    |
| No. of PCP visits in past year         |                  |                   |                   |                     |
| 1-2 visits                             | 262              | 137               | 399               | 11.8 (9.7-13.8)     | .094                |
| 3-4 visits                             | 569              | 352               | 921               | 26.4 (23.4-29.4)    |
| ≥5 visits                              | 1,247            | 947               | 2,194             | 61.8 (57.4-66.2)    |

Abbreviations: CI, confidence interval; BMI, body mass index; GFR, glomerular filtration rate; COPD, chronic obstructive pulmonary disease; PCP, primary care provider; JNC-7, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

<sup>a</sup> Blood pressure at goal according to JNC-7 standards; <130/80 mm Hg for patients with diabetes; otherwise <140/90 mm Hg (12).

<sup>b</sup> Variables with missing data overall and by race are as follows: tobacco use (overall = 1,077, black = 717, and white = 360), chronic kidney disease (eGFR<60) (overall = 332, black = 211, and white = 121), and length of time with current PCP (overall = 107, black = 85, and white = 22). Total n for blacks, 2,078; for whites, 1,436; and overall, 3,514 (no missing data for sex, age group, both blood pressure measures, diabetes, hyperlipidemia, cardiovascular disease, COPD/asthma, provider location, PCP visits in past year).

<sup>c</sup> P value based on F-adjusted Rao-Scott χ² test comparing black and white patients.

<sup>d</sup> Weight distribution for those patients for whom both height and weight were documented in the medical chart. For patients without height, median height of the population was used (total n = 3,343; black n = 2,031; white n = 1,412. No weight abstracted for 71 patients).

<sup>e</sup> Tobacco use among those who have been screened for tobacco use and whose status was known (total n = 2,437; black n = 1,361; white n = 1,076).

<sup>f</sup> Chronic kidney disease for those for whom eGFR was available (total n = 3,182; black n = 1,867; white n = 1,315).

<sup>g</sup> Providers located in a county with a population density of more than 200 people per square mile, according to US Census 2000 data, were classified as urban; all others were classified as rural.

<sup>h</sup> For 107 patients, no first visit date was abstracted. Therefore, length of care with their provider could not be established.

(Continued on next page)
Table 1. (continued) Blood Pressure Control, Patient, Provider, and Treatment Characteristics of Medicaid Patients With Hypertension, by Race, North Carolina, 2005-2006

| Characteristic | Black (n = 2,078) | White (n = 1,436) | Total (N = 3,514) |
|---------------|------------------|------------------|------------------|
|               | Weighted % (95% CI) | Weighted % (95% CI) | Weighted % (95% CI) |
| No. of antihypertensive drug classes prescribed | | | |
| 0-1           | 32.3 (28.8-35.8) | 40.6 (36.3-44.9) | 36.1 (33.1-39.1) |
| 2             | 20.9 (28.9-35.8) | 28.0 (21.4-34.6) | 24.1 (19.7-28.6) |
| 3             | 25.5 (23.2-27.9) | 19.3 (17.6-21.1) | 22.7 (21.0-24.4) |
| ≥4            | 21.2 (18.4-24.1) | 12.0 (9.0-15.0) | 17.1 (14.3-19.9) |

Abbreviations: CI, confidence interval; BMI, body mass index; GFR, glomerular filtration rate; COPD, chronic obstructive pulmonary disease; PCP, primary care provider; JNC-7, Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

<sup>a</sup> Blood pressure at goal according to JNC-7 standards: <130/80 mm Hg for patients with diabetes; otherwise <140/90 mm Hg (12).

<sup>b</sup> Variables with missing data overall and by race are as follows: tobacco use (overall = 1,077, black = 717, and white = 360), chronic kidney disease (eGFR<60) (overall = 332, black = 211, and white = 121), and length of time with current PCP (overall = 107, black = 85, and white = 22). Total n for blacks, 2,078; for whites, 1,436; and overall, 3,514 (no missing data for sex, age group, both blood pressure measures, diabetes, hyperlipidemia, cardiovascular disease, COPD/asthma, provider location, PCP visits in past year).

<sup>c</sup> P value based on F-adjusted Rao-Scott $\chi^2$ test comparing black and white patients.

Table 2. Odds of Blood Pressure at Goal Among Black Versus White Medicaid Patients With Hypertension, North Carolina, 2005-2006

| Characteristic<sup>a</sup> | Step 1: Patient Characteristics | | |
|---------------------------|---------------------------------|-----------------|-----------------|
|                           | Odds Ratio (95% CI)<sup>a</sup> | P Value<sup>a</sup> | Odds Ratio (95% CI)<sup>a</sup> | P Value<sup>a</sup> |
| Race (black vs white)     | 0.78 (0.64-0.96)                | .02             | 0.75 (0.61-0.93) | .009            |
| Age                       | 1.00 (0.99-1.00)                | .39             | NC              | NC              |
| Sex (men vs women)        | 1.06 (0.82-1.37)                | .64             | NC              | NC              |

Abbreviations: CI, confidence interval; NC, not calculated; BMI, body mass index; COPD, chronic obstructive pulmonary disease; PCP, primary care provider.

<sup>a</sup> Calculated with Wald $\chi^2$ test.

<sup>b</sup> BMI is calculated as weight in kilograms divided by height in meters squared.

<sup>c</sup> Tobacco use among those who have been screened for tobacco use and whose status was known (total n = 2,437; black n = 1,361; white n = 1,076).

<sup>d</sup> Chronic kidney disease for those for whom eGFR was available (total n = 3,182; black n = 1,87; white n = 1,315).

<sup>e</sup> Providers located in a county with a population density of more than 200 people per square mile, according to US Census 2000 data, were classified as urban; all others were classified as rural.

For 107 patients, no first visit date was abstracted. Therefore, length of care period with their provider could not be established.
### Table 2. (continued) Odds of Blood Pressure at Goal Among Black Versus White Medicaid Patients With Hypertension, North Carolina, 2005-2006

| Characteristica | Full Model | Final Model | Full Model | Final Model | Full Model | Final Model | Full Model | Final Model |
|----------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
| Weight (vs BMI <25)b | Odds Ratio (95% CI)a | P Valuea | Odds Ratio (95% CI)a | P Valuea | Odds Ratio (95% CI)a | P Valuea | Odds Ratio (95% CI)a | P Valuea |
| Overweight (BMI 25-29.9 kg/m²) | 0.96 (0.75-1.24) | .76 | 0.88 (0.70-1.11) | .286 | 0.86 (0.68-1.08) | .20 | 0.88 (0.70-1.11) | .29 |
| Obese (BMI ≥30 kg/m²) | 0.75 (0.59-0.97) | .03 | 0.74 (0.60-0.91) | .005 | 0.74 (0.60-0.91) | .005 | 0.76 (0.62-0.93) | .008 |
| Comorbidities and risk factors | | | | | | | | |
| Diabetes | 0.24 (0.18-0.32) | <.001 | 0.26 (0.21-0.31) | <.001 | 0.26 (0.20-0.31) | <.001 | 0.26 (0.21-0.31) | <.001 |
| Hyperlipidemia | 1.00 (0.82-1.21) | .97 | NC | NC | NC | NC | NC | NC |
| Cardiovascular disease | 0.86 (0.70-1.05) | .13 | NC | NC | NC | NC | NC | NC |
| Current tobacco usec | 1.12 (0.91-1.38) | .28 | NC | NC | NC | NC | NC | NC |
| Chronic kidney disease(eGFR <60)d | 0.86 (0.72-1.04) | .12 | NC | NC | NC | NC | NC | NC |
| COPD or asthma/reactive airway disease | 0.96 (0.72-1.28) | .77 | NC | NC | NC | NC | NC | NC |
| No. of medications | 1.03 (1.00-1.06) | .03 | NC | NC | NC | NC | NC | NC |
| Provider and treatment | | | | | | | | |
| PCP specialtye (vs family practice) | | | | | | | | |
| Internal medicine Specialty | NC | NC | NC | NC | 0.96 (0.73-1.27) | .78 | 0.96 (0.73-1.26) | .76 |
| Other/unknown specialty | NC | NC | NC | NC | 0.68 (0.51-0.90) | .007 | 0.68 (0.52-0.90) | .007 |
| Rural vs urbanf | NC | NC | NC | NC | 1.06 (0.85-1.32) | .63 | NC | NC |
| Time with PCP,g | | | | | | | | |
| <1 year of care (vs >5 y) | NC | NC | NC | NC | 0.89 (0.68-1.17) | .40 | NC | NC |
| 1 to <3 y of care (vs >5 y) | NC | NC | NC | NC | 1.00 (0.83-1.21) | .99 | NC | NC |
| 3 to <5 y of care (vs >5 y) | NC | NC | NC | NC | 1.20 (0.94-1.53) | .14 | NC | NC |

Abbreviations: CI, confidence interval; NC, not calculated; BMI, body mass index; COPD, chronic obstructive pulmonary disease; PCP, primary care provider.

a Calculated with Wald χ² test.
b BMI is calculated as weight in kilograms divided by height in meters squared.
c Tobacco use among those who have been screened for tobacco use and whose status was known (total, n = 2,437; black, n = 1,361; white, n = 1,076).
d Chronic kidney disease for those for whom eGFR was available (total, n = 3,182; black, n = 1,872; white, n = 1,315).
e Providers located in a county with a population density of more than 200 persons per square mile, according to US Census 2000 data, were classified as urban; all others were classified as rural.
f For 107 patients, no first visit date was abstracted. Therefore, length of care period with their provider could not be established.

(Continued on next page)
Table 2. (continued) Odds of Blood Pressure at Goal Among Black versus White Medicaid Patients With Hypertension, North Carolina, 2005-2006

| Characteristic | Step 1: Patient Characteristics | Step 2: Treatment Characteristics |
|---------------|---------------------------------|----------------------------------|
|               | Full Model                       | Final Model                      | Full Model | Final Model |
|               | Odds Ratio (95% CI)<sup>a</sup> | P Value<sup>a</sup>               | Odds Ratio (95% CI)<sup>a</sup> | P Value<sup>a</sup> | Odds Ratio (95% CI)<sup>a</sup> | P Value<sup>a</sup> |
| No. of PCP visits | NC | NC | NC | NC | 0.74 (0.52-1.06) | .101 | NC | NC |
| 1-2 (vs >5) | NC | NC | NC | NC | 0.91 (0.7-1.10) | .32 | NC | NC |
| 3-4 (vs >5) | NC | NC | NC | NC | NC | NC | NC | NC |

Abbreviations: CI, confidence interval; NC, not calculated; BMI, body mass index; COPD, chronic obstructive pulmonary disease; PCP, primary care provider.

<sup>a</sup> Calculated with Wald χ² test.

<sup>b</sup> BMI is calculated as weight in kilograms divided by height in meters squared.

<sup>c</sup> Tobacco use among those who have been screened for tobacco use and whose status was known (total, n = 2,437; black, n = 1,361; white, n = 1,076).

<sup>d</sup> Chronic kidney disease for those for whom eGFR was available (total, n = 3,182; black, n = 1,87; white, n = 1,315).

<sup>e</sup> Providers located in a county with a population density of more than 200 persons per square mile, according to US Census 2000 data, were classified as urban; all others were classified as rural.

<sup>f</sup> For 107 patients, no first visit date was abstracted. Therefore, length of care period with their provider could not be established.

Table 3. Treatment Characteristics for Medicaid Patients at Above Goal Blood Pressure<sup>a</sup> by Race, North Carolina, 2005-2006

| Treatment Characteristic | Black (n = 1,157) | White (n = 688) | P Value<sup>b</sup> |
|--------------------------|------------------|-----------------|---------------------|
|                         | n    | Weighted % (95% CI) | n    | Weighted % (95% CI) |  |
| PCP discussed the following topics during the year |      |                  |      |                  |   |
| Medication adherence     | 159  | 15.0 (11.8-18.2)   | 76   | 12.1 (7.7-16.6)   | .22 |
| Diet                     | 316  | 28.6 (22.9-34.3)   | 210  | 30.6 (23.3-38.0)  | .53 |
| Weight reduction         | 160  | 13.8 (9.90-17.7)   | 116  | 16.7 (13.1-20.2)  | .18 |
| Exercise                 | 243  | 22.6 (17.3-27.9)   | 140  | 21.8 (17.2-26.3)  | .70 |
| Sodium restriction       | 132  | 12.0 (8.3-15.7)    | 67   | 8.5 (5.9-11.1)    | .006 |
| Moderation of alcohol    | 35   | 2.6 (0.3-5.0)      | 20   | 2.0 (0.0-4.0)     | .42 |
| Any lifestyle recommendation was provided<sup>c</sup> |      |                  |      |                  |   |
| No                       | 640  | 52.6 (46.4-58.8)   | 375  | 52.8 (46.6-58.7)  | .97 |
| Yes                      | 517  | 47.4 (41.2-53.6)   | 313  | 47.2 (41.3-53.2)  |   |
| Number of antihypertensive drug classes prescribed |      |                  |      |                  |   |
| 0-1                      | 352  | 28.0 (24.4-31.5)   | 245  | 34.3 (27.1-41.6)  | <.001 |
| 2                        | 233  | 20.8 (18.1-23.4)   | 193  | 30.9 (22.5-39.3)  |   |
| 3                        | 287  | 26.6 (23.8-29.4)   | 150  | 21.3 (18.3-24.4)  |   |
| ≥4                       | 285  | 24.7 (21.6-27.7)   | 100  | 13.4 (9.6-17.2)   |   |
| Change in antihypertensive medication regimen in the prior year | 552  | 46.7 (41.9-51.5)   | 283  | 40.4 (35.6-45.2)  | .02 |

Abbreviation: CI, confidence interval; PCD, primary care provider.

<sup>a</sup> High blood pressure was defined as ≥140/90 mm Hg and ≥130/80 mm Hg for patients with diabetes (12).

<sup>b</sup> Calculated with F-adjusted Rao-Scott χ² test.

<sup>c</sup> Includes any documentation that medication adherence, diet, weight reduction, exercise, sodium restriction, or moderation of alcohol was addressed.

(Continued on next page)
### Table 3. (continued) Treatment Characteristics for Medicaid Patients at Above Goal Blood Pressure,\(^a\) by Race, North Carolina, 2005-2006

| Treatment Characteristic | Black (n = 1,157) | White (n = 688) | P Value\(^b\) |
|--------------------------|------------------|-----------------|---------------|
|                          | n    | Weighted % (95% CI) | n    | Weighted % (95% CI) |
| **Screened for the following risk factors** |      |                  |      |                  |
| Diabetes                 | 1,106 | 96.3 (94.8-97.9) | 648  | 95.0 (92.8-97.2) | .280 |
| Cholesterol              | 943   | 82.5 (79.0-85.9)  | 586  | 85.2 (81.1-89.3) | .300 |
| Family history           | 583   | 55.1 (46.2-64.0)  | 421  | 65.2 (55.7-74.7) | .036 |
| Smoking                  | 764   | 68.7 (61.0-76.4)  | 511  | 74.0 (65.4-82.7) | .282 |
| Obesity                  | 275   | 22.3 (15.4-29.2)  | 182  | 27.8 (21.6-34.0) | .072 |

Abbreviation: CI, confidence interval; PCD, primary care provider.
\(^a\) High blood pressure was defined as ≥140/90 mm Hg and ≥130/80 mm Hg for patients with diabetes (12).
\(^b\) Calculated with F-adjusted Rao-Scott \(\chi^2\) test.
\(^c\) Includes any documentation that medication adherence, diet, weight reduction, exercise, sodium restriction, or moderation of alcohol was addressed.

### Table 4. Provider Response to High Blood Pressure\(^a\) During Office Visits, by Race, North Carolina, 2005-2006

| Provider Response | Office Visits With High Blood Pressure, Black Patients, n = 4,812 (57.2%) | Office Visits With High Blood Pressure, White Patients, n = 2,931 (49.4%) | P Value\(^b\) |
|-------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------|
|                   | n    | Weighted % (95% CI) | n    | Weighted % (95% CI) |                  |
| Change in antihypertensive medication regimen | 1,064 | 22.5 (18.9-26.1) | 553  | 19.6 (16.3-22.9) | .178 |
| Lifestyle recommendation (total)\(^c\) | 843   | 17.6 (14.5-20.6)  | 413  | 13.9 (11.5-16.2) | .002 |
| Visits during which any intervention was noted (medication or lifestyle recommendation) | 1,683 | 35.7 (30.9-40.4) | 864  | 30.0 (26.5-33.6) | .021 |

**Any plan for follow-up**

|                   | n    | Weighted % (95% CI) | n    | Weighted % (95% CI) |
|-------------------|------|---------------------|------|---------------------|
| Yes               | 3,051| 64.3 (56.9-71.6)   | 1,979| 69.1 (64.5-73.7)   | .083 |
| No                | 1,761| 35.7 (28.4-43.1)   | 952  | 30.9 (26.3-35.5)   |

**Follow-up plan within 4 weeks**

|                   | n    | Weighted % (95% CI) | n    | Weighted % (95% CI) |
|-------------------|------|---------------------|------|---------------------|
| Yes               | 1,298| 27.0 (23.7-30.2)   | 802  | 27.1 (23.4-30.8)   | .955 |
| No                | 3,514| 73.0 (69.8-76.3)   | 2,129| 72.9 (69.2-76.6)   |

Abbreviation: CI, confidence interval.
\(^a\) High blood pressure was defined as ≥140/90 mm Hg and ≥130/80 mm Hg for patients with diabetes.
\(^b\) Calculated with F-adjusted Rao-Scott \(\chi^2\) test.
\(^c\) Includes any documentation that medication adherence, diet, weight reduction, exercise, sodium restriction, or moderation of alcohol was addressed.