ORIGINAL ARTICLES

Racial and Ethnic Disparity in Blood Pressure and Cholesterol Measurement

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OBJECTIVE: **To evaluate racial and ethnic disparity in blood pressure and cholesterol measurement and to analyze factors associated with any observed disparity.**

DESIGN: **Cross-sectional analysis of the household component of the 1996 Medical Expenditure Panel Survey.**

PARTICIPANTS: **Representative sample of the U.S. non-institutionalized population age 21 or older.**

MEASUREMENTS: **Prevalence of self-reported blood pressure measurement within 2 years and cholesterol measurement within 5 years were calculated by race/ethnicity. Logistic regression was used to adjust for health insurance status, having a usual source of care, health status, and socioeconomic and demographic factors. Odds ratios and 95% confidence intervals (95% CIs) from the logistic regression were converted to prevalence ratios to estimate relative risk (RR).**

MAIN RESULTS: **Mexican Americans compared to non-Hispanic whites were less likely to have a blood pressure measurement (RR, 0.85; 95% CI, 0.81 to 0.89) or a cholesterol measurement (RR, 0.72; 95% CI, 0.65 to 0.78). Non-Hispanic blacks had blood pressure and cholesterol measurements similar to non-Hispanic whites. In a multivariate analysis, Mexican Americans had similar blood pressure measurements (RR, 0.97; 95% CI, 0.94 to 1.00) and cholesterol measurements (RR, 1.04; 95% CI, 0.99 to 1.08). The factors associated with the largest disparity were lack of health insurance, not having a usual source of care, and low education.**

CONCLUSIONS: **No disparity was found between non-Hispanic blacks and non-Hispanic whites in undergoing blood pressure and cholesterol measurement. Disparities in cardiovascular preventive services for Mexican Americans were associated with lack of health insurance and a usual source of care, but other demographic and socioeconomic factors were also important.**

KEY WORDS: **health services accessibility; health surveys; socioeconomic factors; minority groups; blood pressure; cholesterol.**

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The elimination of racial and ethnic disparities in health care access and disease incidence and prognosis has assumed a high priority, as evidenced by the goals of Healthy People 2010.[1] Cardiovascular disease is the largest cause of mortality in the United States, and disparities in the screening, diagnosis, and treatment of cardiovascular disease are important potential explanations of disparities in morbidity and mortality.[2–6] Among the Public Health Service's Healthy People 2010 goals is limiting cardiovascular mortality through the detection of risk factors such as hypertension and hypercholesterolemia. The specific goals are that 95% of Americans over the age of 18 should have a blood pressure measurement within the previous 2 years, and 80% should have a cholesterol measurement within the previous 5 years.[7] The objective of this study is to evaluate racial and ethnic disparities in undergoing blood pressure and cholesterol measurement as recommended in Healthy People 2010, and to evaluate the contribution of socioeconomic and demographic factors, perceived health status, having a usual source of care, and health insurance to any observed disparities.

METHODS

The 1996 Household Component of the Medical Expenditure Panel Survey (MEPS) was analyzed for this study. MEPS is sponsored by the Agency for Healthcare Research and Quality, and provides a sample representative of the civilian, non-institutionalized population of the United States.[8] Subjects for the 1996 MEPS Household Component were derived from a complex probability sample with oversampling of non-Hispanic blacks and Hispanics to provide precise estimates for these populations. For this study, survey participants aged 21 and older, who participated for the year 1996, provided responses on blood pressure and cholesterol measurement and other factors of interest, and who were alive as of December 31, 1996 were studied. Data were collected by self-report or from the report of a proxy from the subject's household.

The outcomes of interest were self-report or proxy respondent report of a blood pressure measurement within 2 years and a cholesterol measurement within 5 years. Race or ethnicity was the independent factor of primary interest, and included non-Hispanic black, Mexican American, other Hispanic, Asian-Pacific Islander, and

non-Hispanic white. Native Americans were also evaluated; however, results for this group are not reported separately because of the small sample size (N = 112, with fewer than 100 reporting blood pressure or cholesterol measurement). Covariates included sociodemographic factors (age, gender, poverty level, education, and census region), perceived health status, health insurance status, and having a usual source of care. Age was categorized as 21 to 34, 35 to 49, 50 to 64, and 65 and older as of December 31, 1996. Poverty level was categorized according to the original MEPS classification as less than 100%, 100% to 124%, 125% to 199%, 200% to 399%, and greater than or equal to 400% of federal poverty level. Education was categorized as less than 9 years, 9 to 11 years, 12 years, 13 to 15 years, 16 years, and greater than 16 years. Census regions included Northeast, South, Midwest, and West. Self-reported health status was also categorized as in the MEPS as poor, fair, good, very good, and excellent. Health insurance was classified as Medicare only, Medicaid only, other public insurance, having private insurance at any time during 1996, and having no health insurance at any time during 1996. Having a usual source of care was categorized dichotomously.

The initial analysis included an unadjusted estimate of the prevalence of self-reported blood pressure measurement within 2 years and cholesterol measurement within 5 years by race and ethnicity. Population estimates were calculated using the MEPS sample weights and were rounded to the nearest 1,000. Multivariate logistic regression was subsequently used to analyze the relationship of blood pressure measurement and cholesterol measurement to race and ethnicity adjusting for the covariates. We also evaluated 1-way interaction terms between age, gender, and race/ethnicity. The age and gender interaction was statistically significant in the analysis of blood pressure measurement (P = .003), and the age estimates are therefore reported by gender. None of the other interactions were statistically significant. Because the outcomes are common in the population, unadjusted and adjusted prevalence ratios and their 95% confidence intervals (95% CIs) were calculated from the odds ratios and their 95% CIs to estimate relative risk.[9] Subjects with missing data were excluded from each analysis; the number varied depending on the specific calculation, and in all analyses resulted in the exclusion of less than 7% of the total sample. The original data set was constructed with SAS version 8 (SAS Corporation, Cary, NC). Variables were further categorized and all analyses performed with Intercooled Stata version 6 (Stata Corp., College Station, Tex), using methods appropriate for complex survey data.

RESULTS

Study Population

The 1996 Medical Expenditure Panel Survey Household Component study sample of 14,226 adults, age 21 or over, represented an estimated 183 million persons. A substantial proportion of the study population had 1 or more characteristics that may be associated with limitations in access to the cardiovascular preventive measures of blood pressure or cholesterol measurement; approximately 32 million (17%) were older than age 65, 20 million (11%) were non-Hispanic black, 17 million (10%) were Hispanic including Mexican American and members of other ethnic groups, 35 million (19%) had less than a high school education, 24 million (14%) were in fair or poor health, 23 million (12%) were uninsured, and 38 million (21%) reported not having a usual source of care (Table 1).

Racial and Ethnic Disparity in Blood Pressure and Cholesterol Measurement

A racial/ethnic disparity in blood pressure measurement and cholesterol measurement was evident, with significantly lower prevalence of measurements reported by Mexican-American respondents, but not by non-Hispanic black respondents compared to non-Hispanic white respondents (Tables 2 and 3). A blood pressure measurement within the previous 2 years was reported by 77.0% of Mexican-American respondents compared to 90.8% of the non-Hispanic white respondents (unadjusted prevalence ratio 0.85; 95% CI, 0.81 to 0.89). A cholesterol measurement within the previous 5 years was reported by 50.7% of Mexican-American respondents compared to 71.3% of non-Hispanic white respondents (unadjusted prevalence ratio 0.72; 95% CI, 0.65 to 0.78). In contrast to the disparity in blood pressure and cholesterol measurement in Mexican Americans, there was a smaller disparity in blood pressure measurement (unadjusted prevalence ratio 0.94; 95% CI, 0.90 to 0.97) and no disparity in cholesterol measurement (unadjusted prevalence ratio 1.00; 95% CI, 0.93 to 1.07) for other Hispanics compared to non-Hispanic whites. Asian-Pacific Islanders also reported a lower prevalence of blood pressure measurement (unadjusted prevalence ratio 0.91; 95% CI, 0.84 to 0.96) compared to non-Hispanic whites. The corresponding difference in cholesterol measurement was not statistically significant (unadjusted prevalence ratio 0.94; 95% CI, 0.84 to 1.04). Non-Hispanic black respondents had similar reports of a blood pressure measurement within the previous 2 years (89.4% compared to 90.8% in non-Hispanic whites) and a cholesterol measurement within the previous 5 years (72.5% compared to 71.3% in non-Hispanic whites). These prevalence ratios were not significantly different than 1.0 (blood pressure measurement unadjusted prevalence ratio 0.99; 95% CI, 0.96 to 1.01 and cholesterol measurement unadjusted prevalence ratio 1.02; 95% CI, 0.98 to 1.06).

Factors Associated with Disparities in Blood Pressure and Cholesterol Measurements

Several factors were independently and significantly associated with a lower prevalence of blood pressure measurement or cholesterol measurement. Respondents with no usual source of care were significantly less likely to

Table 1. Characteristics of Adults Age 21 or Older from the Household Component of the 1996 Medical Expenditure Panel Survey

Characteristic	Sample* (*N* = 14,226)	Population Estimate	Population, %
Age, y			
21 to 34	4,081	54,003,000	29
35 to 49	4,824	62,143,000	34
50 to 64	2,885	35,298,000	19
65+	2,436	31,938,000	17
Gender			
Male	6,565	87,852,000	48
Female	7,661	95,530,000	52
Race/ethnicity			
Mexican American	1633	10,848,000	6
Other Hispanic	865	6,543,000	4
Asian-Pacific Islander	393	6,160,000	3
Native American	112	1,500,000	1
Black, non-Hispanic	1,725	20,404,000	11
White, non-Hispanic	9,488	137,797,000	75
Income as % of Federal poverty level			
<100	2,118	19,998,000	11
101 to 124	703	8,133,000	4
125 to 199	2,047	25,960,000	14
200 to 399	4,428	60,579,000	33
>400	4,930	68,712,000	37
Years of education			
<9	1,448	13,717,000	7
9 to 11	1,850	21,281,000	12
12	4,783	61,866,000	34
13 to 15	3,004	40,967,000	22
16	1,926	28,023,000	15
>16	1,198	17,382,000	10
Self-reported health			
Poor	549	6,526,000	4
Fair	1,518	17,770,000	10
Good	3,766	46,664,000	25
Very good	4,516	59,957,000	33
Excellent	3,865	52,332,000	29
Census region			
Northeast	2,859	36,078,000	20
West	3,247	40,541,000	22
Midwest	3,158	42,441,000	23
South	4,962	64,323,000	35
Usual source of care			
No usual source	3,088	37,869,000	21
Has usual source	11,064	144,531,000	79
Insurance status			
Medicare only	1,091	12,396,000	7
Medicaid only	676	6,686,000	4
Other public	215	2,373,000	1
Private	10,232	139,055,000	76
Uninsured	2,012	22,872,000	12

** Differences between total sample size and strata summation are due to missing values.*

report a blood pressure measurement (adjusted prevalence ratio 0.87; 95% CI, 0.84 to 0.89) or cholesterol measurement (adjusted prevalence ratio 0.77; 95% CI, 0.74 to 0.81). Similarly, respondents who were uninsured were less likely to report a blood pressure measurement (adjusted prevalence ratio 0.89; 95% CI, 0.86 to 0.92) or a cholesterol measurement (adjusted prevalence ratio 0.79; 95% CI, 0.74 to 0.84) compared to those with private insurance. Other factors associated with lower prevalence of blood pressure or cholesterol measurement were younger age in males, fewer years of education, and lower income (for cholesterol measurement only).

In the multivariable analysis that adjusted for demographic factors, socioeconomic factors, geographic region, health status, and health policy relevant factors such as having a usual place of care and having health insurance, disparities in blood pressure measurement persisted in Mexican Americans and Asian-Pacific Islanders. While adjustment attenuated the disparity in Mexican Americans, these factors did not significantly impact the disparity in blood pressure measurement noted in Asian-Pacific Islanders. Interestingly, in the adjusted analysis, non-Hispanic black respondents were more likely to report a cholesterol measurement within the previous 5 years.

DISCUSSION

Non-Hispanic white and non-Hispanic black Americans had similar report of blood pressure measurement within 2 years and cholesterol measurement within 5 years, but a lower proportion of Mexican Americans underwent both measurements. Asian-Pacific Islanders were less likely than non-Hispanic whites to have a blood pressure measurement within 2 years. Having health insurance and a usual source of care were strongly associated with these outcomes and are likely important contributors to racial and ethnic disparities. Socioeconomic and demographic factors such as age, gender, poverty, and education may also be important determinants.

The lower proportion of Mexican-American persons reporting use of these preventive services is consistent with results from analyses of the Behavioral Risk Factor Surveillance System,[10] as is the similar ratio of non-Hispanic whites and non-Hispanic blacks. In explaining access disparities observed in Mexican Americans, these results suggest that health policy initiatives aimed at increasing access to health care coverage for preventive care, linked with incentives to obtain a regular provider, have the potential to significantly reduce the disparity in blood pressure and cholesterol measurement. This is supported by the strength of the associations of being uninsured and not having a usual source of care with the outcomes, and the higher representation of Mexican Americans in these categories. However, the contribution of other factors (gender and age distribution, poverty, and education) suggests that increasing the availability of health insurance and sources of care would reduce, but may not eliminate, the Mexican-American disparity for access to these preventive services. Hispanic Americans represent a heterogeneous group including Mexican Americans, Cuban Americans, Puerto Ricans and members of other ethnic groups. Our findings highlight the importance of evaluating these ethnic groups separately, and suggest that

Table 2. Blood Pressure Measurement within Previous 2 Years

Characteristic	Prevalence, %	Unadjusted Prevalence Ratio (95% CI)	*Adjusted Prevalence Ratio (95% CI)
Race/ethnicity			
Mexican American	77.0	0.85 (0.81 to 0.89)	0.97 (0.94 to 1.00)
Other Hispanic	85.2	0.94 (0.90 to 0.97)	1.00 (0.97 to 1.02)
Asian-Pacific Islander	82.3	0.91 (0.84 to 0.96)	0.93 (0.85 to 0.98)
Non-Hispanic black	89.4	0.99 (0.96 to 1.01)	1.01 (0.99 to 1.03)
Non-Hispanic white (reference)	90.8	1.00	1.00
Age strata, females			
21 to 34	92.1	0.96 (0.94 to 0.98)	0.98 (0.97 to 1.00)
35 to 49	92.8	0.97 (0.94 to 0.99)	0.96 (0.93 to 0.99)
50 to 64	94.8	0.99 (0.97 to 1.01)	0.98 (0.95 to 1.00)
65+ (reference)	95.6	1.00	1.00
Age strata, males			
21 to 34	78.1	0.82 (0.75 to 0.88)	0.90 (0.85 to 0.95)
35 to 49	82.8	0.87 (0.81 to 0.93)	0.90 (0.84 to 0.95)
50 to 64	89.5	0.94 (0.90 to 0.97)	0.94 (0.90 to 0.98)
65+ (reference)	95.0	1.00	1.00
Poverty level, %			
<100	85.7	0.93 (0.91 to 0.96)	0.98 (0.96 to 1.01)
100 to 124	87.6	0.95 (0.92 to 0.99)	1.00 (0.97 to 1.02)
125 to 199	85.8	0.94 (0.91 to 0.96)	0.98 (0.96 to 1.00)
200 to 399	89.4	0.97 (0.96 to 0.99)	1.00 (0.98 to 1.01)
>400 (reference)	91.7	1.00	1.00
Years of education			
<9	86.3	0.92 (0.87 to 0.95)	0.90 (0.84 to 0.94)
9 to 11	86.2	0.91 (0.87 to 0.95)	0.92 (0.87 to 0.95)
12	87.9	0.93 (0.90 to 0.96)	0.93 (0.89 to 0.96)
13 to 15	90.1	0.96 (0.93 to 0.98)	0.96 (0.93 to 0.98)
16	92.1	0.98 (0.95 to 1.00)	0.99 (0.96 to 1.01)
>16 (reference)	94.3	1.00	1.00
Physical health status			
Poor	96.0	1.12 (1.09 to 1.14)	1.12 (1.09 to 1.14)
Fair	94.1	1.10 (1.08 to 1.11)	1.10 (1.08 to 1.11)
Good	90.2	1.05 (1.03 to 1.07)	1.07 (1.05 to 1.08)
Very good	89.4	1.04 (1.02 to 1.05)	1.04 (1.02 to 1.06)
Excellent (reference)	85.9	1.00	1.00
Usual source of care			
No usual source	73.9	0.79 (0.76 to 0.82)	0.87 (0.84 to 0.89)
Has a usual source (reference)	93.3	1.00	1.00
Insurance status			
Medicare only	93.0	1.01 (0.99 to 1.03)	0.96 (0.92 to 0.99)
Medicaid only	90.3	0.98 (0.95 to 1.01)	0.98 (0.94 to 1.01)
Other public	86.8	0.94 (0.85 to 1.01)	0.98 (0.88 to 1.03)
Uninsured	71.4	0.78 (0.74 to 0.81)	0.89 (0.86 to 0.92)
Private (reference)	91.8	1.00	1.00

* *Prevalence ratios are adjusted for all covariates in the table and for census region.*

Hispanic disparities in access to these preventive services are concentrated in the Mexican-American population.

Estimates for Asian-Pacific Islanders are not as precise as those for other racial/ethnic groups because of the smaller sample size. However, this group is significantly less likely than non-Hispanic whites to report blood pressure measurement in both unadjusted and adjusted analyses. The lack of effect for the risk factors analyzed in this study is of interest, and presents a marked contrast to the effect of these factors on Mexican-American disparities. The Asian-Pacific Islander group is also quite heterogeneous and less well studied than other ethnic populations.[11] We hope the potential reasons for this disparity will be addressed in future analyses.

For non-Hispanic blacks overall, blood pressure and cholesterol measurement was comparable to non-Hispanic whites, suggesting that detection of hypertension and hypercholesterolemia may be similar in these groups. Current underdetection of high blood pressure and cholesterol may not contribute to the higher incidence of cardiovascular disease mortality in non-Hispanic black Americans. Other factors such as the severity of hypertension and hypercholesterolemia, the responsiveness of these risk factors to currently available therapies, and the adequacy of subsequent care may explain the current disparities in cardiovascular disease. It is also possible that detection of these risk factors differed in the past, and that the current differences in cardiovascular mortality may be

Table 3. Cholesterol Measurement within Previous 5 Years

Characteristic	Prevalence, %	Unadjusted Prevalence Ratio (95% CI)	*Adjusted Prevalence Ratio (95% CI)
Race/ethnicity			
Mexican American	50.7	0.72 (0.65 to 0.78)	1.04 (0.99 to 1.08)
Other Hispanic	71.5	1.00 (0.93 to 1.07)	1.14 (1.07 to 1.20)
Asian-Pacific Islander	67.3	0.94 (0.84 to 1.04)	1.00 (0.89 to 1.09)
Non-Hispanic black	72.5	1.02 (0.98 to 1.06)	1.13 (1.09 to 1.17)
Non-Hispanic white (reference)	71.3	1.00	1.00
Gender			
Female	73.0	1.10 (1.07 to 1.12)	1.07 (1.04 to 1.09)
Male (reference)	66.7	1.00	1.00
Age strata			
21 to 34	50.3	0.57 (0.52 to 0.62)	0.56 (0.50 to 0.62)
35 to 49	69.8	0.79 (0.74 to 0.83)	0.75 (0.71 to 0.80)
50 to 64	83.3	0.94 (0.91 to 0.97)	0.91 (0.87 to 0.94)
65+ (reference)	88.7	1.00	1.00
Income, as % Federal poverty level			
<100	61.1	0.79 (0.74 to 0.83)	0.90 (0.85 to 0.95)
100 to 124	60.4	0.78 (0.70 to 0.85)	0.85 (0.77 to 0.93)
125 to 199	64.0	0.82 (0.78 to 0.87)	0.89 (0.85 to 0.94)
200 to 399	68.1	0.88 (0.84 to 0.91)	0.93 (0.89 to 0.96)
>400 (reference)	77.7	1.00	1.00
Years of education			
<9	67.2	0.81 (0.74 to 0.87)	0.69 (0.61 to 0.77)
9 to 11	65.2	0.78 (0.72 to 0.84)	0.79 (0.73 to 0.85)
12	66.7	0.80 (0.75 to 0.85)	0.82 (0.77 to 0.87)
13 to 15	69.6	0.84 (0.79 to 0.89)	0.89 (0.84 to 0.93)
16	74.8	0.90 (0.85 to 0.95)	0.95 (0.90 to 1.00)
>16 (reference)	83.0	1.00	1.00
Physical health status			
Poor	83.1	1.26 (1.20 to 1.31)	1.22 (1.15 to 1.29)
Fair	78.2	1.19 (1.14 to 1.23)	1.16 (1.10 to 1.21)
Good	70.8	1.07 (1.04 to 1.11)	1.09 (1.05 to 1.13)
Very good	69.2	1.05 (1.02 to 1.08)	1.05 (1.01 to 1.09)
Excellent (reference)	65.9	1.00	1.00
Usual source of care			
No usual source	47.6	0.63 (0.59 to 0.66)	0.77 (0.74 to 0.81)
Has a usual source (reference)	75.8	1.00	1.00
Insurance status			
Medicare only	82.9	1.12 (1.08 to 1.16)	0.92 (0.85 to 0.99)
Medicaid only	61.7	0.84 (0.77 to 0.90)	0.95 (0.88 to 1.02)
Other public	50.6	0.69 (0.56 to 0.81)	0.83 (0.69 to 0.96)
Uninsured	43.8	0.59 (0.55 to 0.63)	0.79 (0.74 to 0.84)
Private (reference)	73.8	1.00	1.00

* *Prevalence ratios are adjusted for all other covariates in the table and for census region.*

partially due to previous underdetection and undertreatment. In this case, disparities in cardiovascular mortality may narrow in the future. This analysis also found that the prevalence of cholesterol measurement for non-Hispanic blacks is significantly greater compared to non-Hispanic whites after adjusting for the covariates. The reasons for this are not clear, but perhaps indicate a higher average concern for cardiovascular risk modification in non-Hispanic black Americans with access to care, or recognition on the part of health care providers that non-Hispanic blacks are at particularly high risk for cardiac mortality.

Several factors other than race and ethnicity are independently associated with lower prevalence of blood pressure and cholesterol measurement, including younger age, poverty (for cholesterol only), and fewer years of education. Younger respondents (particularly males) are much less likely to report the recommended blood pressure and cholesterol measurement. This may be due in part to the lack of agreement on the benefits of cholesterol lowering in younger adults, as evidenced by the variety of screening recommendations available.[12–14] With the evidence accumulating on the risk of high cholesterol in younger years on long-term outcomes,[15] the results of primary prevention trials,[16,17] and the known early onset of arteriosclerosis,[18,19] a greater consensus on screening younger adults may be forthcoming. It is probable that increased screening for hypercholesterolemia in younger adults would also increase blood pressure screening, as a provider visit would generally include blood pressure measurement. Increased efforts by providers to screen

younger adults, as well as public health campaigns directed toward younger adults, might help improve cardiovascular risk factor detection and contribute to achieving the Healthy People 2010 goals.

Strengths of this analysis include the use of the MEPS, a nationally representative sample of the noninstitutionalized U.S. population with data on socioeconomic status, health status, and other factors associated with access to health care. We analyzed the potential causes of disparities in access to 2 important cardiovascular preventive services for populations of special interest, an area in which further action is needed.[20] Hypotheses generated by this analysis suggest both long-term policy initiatives (based on poverty and education disparities) and short-term initiatives (based on availability of health insurance and usual care) may be needed to eliminate racial and ethnic disparities for these preventive services.

Limitations include the cross-sectional study design, which does not allow a cause and effect relationship to be established between outcomes and risk factors. It is possible that other confounding factors explain the association of the predictive factors with the reporting of blood pressure and cholesterol measurement. An additional limitation is the use of self-reported data for the variables analyzed. If self-report systematically differs by race/ethnicity, the resulting risk estimates would be biased. However, in a national survey of this size and quality, systematic errors of sufficient magnitude to invalidate the results are unlikely. A limited analysis of the Behavioral Risk Factor Surveillance Survey has indicated that self-report of preventive services has high sensitivity and intermediate specificity.[21] This would result in more subjects reporting preventive services when they had not actually received them. While this may artificially elevate the proportions measured and result in optimistic estimates of achieving Healthy People goals, there is no evidence that it should influence estimates of racial disparities. This analysis adjusts for health status, and the increased reporting of blood pressure and cholesterol measurement in those with fair or poor health may be due to their current access to health care. We did not adjust for specific acute or chronic illnesses resulting in a visit to a physician or admission to a hospital, because this would correlate highly with blood pressure measurement and to a lesser extent with cholesterol measurement. Although this factor may explain some variation in obtaining a recent blood pressure or cholesterol measurement, it is not likely to impact population estimates of racial and ethnic differences in these outcomes.

In conclusion, compared to non-Hispanic white Americans, Mexican Americans and Asian-Pacific Islanders are less likely to report having a blood pressure measurement as recommended by Healthy People 2010. Mexican Americans are also less likely to report cholesterol measurement within 5 years. Sociodemographic factors, perceived health status, health insurance, and having a usual source of care are associated with the racial and ethnic differences in these important preventive services. Health policies directed toward improving health insurance coverage and access to a usual source of care, as well as interventions to reduce disparities in education and income, may be needed to fully eliminate disparities in blood pressure and cholesterol measurement.

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REFERENCES

1. U.S. Public Health Service. Healthy People 2010: Understanding and Improving Health. U.S. Government Printing Office stock # 017–001–00550–9. Available from: URL: http://www.health.gov/healthypeople.
2. Carlisle DM, Leake BD, Shapiro MF. Racial and ethnic disparities in the use of cardiovascular procedures: associations with type of insurance. Am J Public Health. 1997;87:263–7.
3. Kass BL, Weinick RN, Monheit AC. Racial and ethnic differences in health, 1996. Rockville, Md: Agency for Health Care Policy and Research; 1999. MEPS Chartbook No. 2. AHCPR Publication No. 99–0001.
4. Kahn KL, Pearson ML, Harrison ER, et al. Health care for black and poor hospitalized Medicare patients. JAMA. 1994;271:1169–74.
5. Whittle J, Conigliaro J, Good CB, Lofgren RP. Racial differences in the use of invasive cardiovascular procedures in the Department of Veteran's Affairs medical system. N Engl J Med. 1993;329:621–7.
6. Ayanian JZ, Udvarhelyi IS, Gatsonis CA, Pashos CL, Epstein AM. Racial differences in the use of revascularization procedures after coronary angiography. JAMA. 1993;269:2642–6.
7. US Public Health Service. Healthy People 2010: Objectives for Improving Health, Part A, Focus Area 12, Heart Disease and Stroke, 2nd ed, vol. 1. U.S. Government Printing Office stock # 017–001–00547–9. Available from URL:http://www.health.gov/healthypeople/Document/HTML/Volume/12Heart.htm#_Toc471819933.
8. Cohen JW, Monheit AC, Beauregard KM, et al. The Medical Expenditure Panel Survey: a national health information resource. Inquiry. 1996;33:373–89.
9. Zhang J, Yu KF. What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. JAMA. 1998;280:1690–1.
10. Bolen JC, Rhodes L, Powell-Griner EE, Bland SD, Holtzman D. State-specific prevalence of selected health behaviors, by race and ethnicity-behavioral risk factor surveillance system, 1997. Mor Mortal Wkly Rep. 2000;49:1–60.
11. Srinivasan S, Guillermo T. Toward improved health: disaggregating Asian American and Native Hawaiian/Pacific Islander data. Am J Public Health. 2000;90:1731–4.
12. Atkins D, DiGiuseppi C. Screening for high blood cholesterol and other lipid abnormalities. In: U.S. Preventive Services Task Force Guide to Clinical Preventive Services, 2nd ed. Baltimore, Md: Williams and Wilkins; 1996:15.
13. National Cholesterol Education Program. Second report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Bethesda, Md: National Heart, Lung, and Blood Institute, National Institutes of Health; 1993. (Publication 93–3095). Available from URL/: http://www.nhlbi.nih.gov/guidelines cholesterol/atp_ii.htm.
14. American College of Physicians. Serum cholesterol, high density lipoprotein cholesterol, and triglycerides screening tests for the

prevention of coronary heart disease in adults. Ann Intern Med. 1996;124:518–31.
15. Stamler J, Daviglus M, Garside DB, Dyer AR, Greenland P, Neaton JD. Relationship of baseline serum cholesterol levels in 3 large cohorts of younger men to long-term coronary, cardiovascular, and all-cause mortality and to longevity. JAMA. 2000;284: 311–8.
16. Kjekshus J, Pedersen TR. Reducing the risk of coronary events: evidence from the Scandanavian Simvistatin Survival Study (4S). Am J Cardiol. 1995;76:64C–8C.
17. Shepard J, Cobbe SM, Ford I, et al. Prevention of coronary heart disease with pravastatin in men with hypercholesterolemia. West of Scotland Coronary Prevention Study Group. N Engl J Med. 1995;333:1301–7.
18. Lenfant C, Savage PJ. The early natural history of atherosclerosis and hypertension in the young: National Institutes of Health perspectives. Am J Med Sci. 1995; 310(suppl 1):3–7.
19. McGill HC, McMahan CA, Zieske AW, et al. Associations of coronary heart disease risk factors with the intermediate lesion of atherosclerosis in youth.The Pathobiological Determinants of Atherosclerosis in Youth (PDAY) Research Group. Arterioscler Thromb Vasc Biol. 2000;20:1998–2004.
20. Mangione CM, Reynolds E. Disparities in health and healthcare: moving from describing the problem to a call for action. J Gen Intern Med. 2000;16:276–80.
21. Martin LM, Leff M, Calonge N, Garrett C, Nelson DE. Validation of self-reported chronic conditions and health services in a managed care population. Am J Prev Med. 2000;18:215–8.

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