

Disentangling the Influence of Socioeconomic Status on Differences Between African American and White Women in Unmet Medical Needs

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African Americans are more likely than Whites to have unmet medical care needs according to objective clinical standards such as burden of disease (e.g., higher rates of heart disease and cancer deaths), clinical symptoms of ill health, and preventable hospitalizations.^{1,2} Unmet medical need, considered a critical indicator of lack of access to care, is also commonly assessed through subjective indices such as self-reported ability to obtain needed medical care or postponing of needed medical care.^{3,4} Studies based on these subjective measures often reveal that African Americans report less need for medical care than Whites,^{5–7} but this finding has not been consistent.^{8–10} In any event, such a finding suggests that subjective measures capture personal perceptions of need for care rather than (or in addition to) true clinical need.^{3,4,11}

Complex and poorly studied factors influence the link between true medical needs and perceived medical needs, especially among members of racial/ethnic minority groups. Theoretical and empirical research has underscored the limitations of subjective measures of medical need. Signs and symptoms of disease may be a better proxy for unmet medical needs among vulnerable populations.^{11–14} For example, Cunningham and Hadley¹¹ recently showed that, among members of racial/ethnic minority groups, symptom-specific measures of unmet need were more accurate than general measures.

In the United States, race/ethnicity, socioeconomic status (SES), and health have been historically intertwined.¹⁵ SES (e.g., education, occupation, and income) accounts for a large portion of the health disparities observed between members of racial/ethnic minority groups and members of more advantaged groups.^{15,16} Also, SES may partly account for differences in how illness severity and risk are perceived. Individuals of low SES, especially members of racial/ethnic minority groups, are more likely than individuals of high SES to underestimate

illness severity and the need of medical care for serious conditions such as cancer, stroke, and obesity.^{17–21} African Americans and all individuals with low incomes are more likely to underestimate their risk for heart attack, stroke, and cancer than are their counterparts and are less likely to use screening programs and seek appropriate care.^{22,23} Thus, perceptions of medical need among members of racial/ethnic minority groups are strongly linked to SES.²⁴

Although the literature clearly documents strong links between race/ethnicity, SES, and medical need, the overall picture is not clear. Nationally representative studies with detailed adjustment for SES among specific demographic populations are not available. More specifically, women are more likely than are men to delay or not obtain needed medical care,^{25,26} and their unmet needs are more likely to result in mortality.²⁷ The relationship between SES and health may be critically shaped by gender.²⁸ For example, lower SES is associated

with poorer health, and, in general, women have lower levels of education than men.^{29,30} However, little has been done to disentangle the complex interrelationships among race/ethnicity, SES, and perceptions of unmet or delayed need, especially among women.

In an attempt to fill this important gap, we used data from a nationally representative, community-based survey of African American and White women to examine how race/ethnicity and SES are associated with perceived unmet medical care needs. More specifically, we attempted to answer the following question: how does SES influence the relationship between race/ethnicity and perceptions of unmet or delayed need for care among women? Our study was guided by the King and Williams²⁴ conceptual framework for understanding racial differences in health. According to that framework,

race is a proxy variable representing how biological, cultural, socioeconomic, sociopolitical, and discrimination factors . . . jointly influence

Objectives. We sought to disentangle the relationships between race/ethnicity, socioeconomic status (SES), and unmet medical care needs.

Methods. Data from the 2003–2004 Community Tracking Study Household Survey were used to examine associations between unmet medical needs and SES among African American and White women.

Results. No significant racial/ethnic differences in unmet medical needs (24.8% of Whites, 25.9% of African Americans; $P=.59$) were detected in bivariate analyses. However, among women with 12 years of education or less, African Americans were less likely than were Whites to report unmet needs (odds ratio [OR]=0.57; 95% confidence interval [CI]=0.42, 0.79). Relative to African American women with 12 years of education or less, the odds of unmet needs were 1.69 (95% CI=1.24, 2.31) and 2.18 (95% CI=1.25, 3.82) among African American women with 13 to 15 years of education and 16 years of education or more, respectively. In contrast, the relationship between educational level and unmet needs was nonsignificant among White women.

Conclusions. Among African American women, the failure to recognize unmet medical needs is related to educational attainment and may be an important driver of health disparities, representing a fruitful area for future interventions. (*Am J Public Health.* 2009;99:1659–1665. doi:10.2105/AJPH.2008.154088)

health practices, psychosocial and environmental stress, medical care, and ultimately health outcomes.^{24(p107)}

METHODS

Data for this study were drawn from the 2003 wave of the Community Tracking Study (CTS) Household Survey, a nationally representative, telephone-administered survey of civilian, noninstitutionalized individuals.³¹ The CTS, conducted in 60 communities across the United States, collected information on health and health care markets (i.e., environments in which individuals buy and receive health care services) from individuals in randomly selected households. Detailed descriptions of the CTS and its design have been published elsewhere.^{31,32}

The 2003 wave of the CTS included information on 45 587 individuals, of whom 21 476 were adult women. The analytic sample for our study was limited to 17 748 female respondents 18 years or older who self-identified as White or non-Hispanic Black. Our analytic sample was also limited to White and non-Hispanic Black women with complete or applicable responses on the outcome variables (i.e., perceived unmet or delayed need for care).

Measures

The main outcome variable in our analyses was a dichotomous variable indicating self-reported unmet need for medical care. In the CTS, the following questions were used to assess unmet need: “During the past 12 months, was there any time you didn’t get the medical care you needed?” and “Was there any time during the past 12 months when you put off or postponed getting medical care you thought you needed?” Responses were coded as yes or no. We combined the 2 questions into a single indicator of unmet medical needs. Respondents answering yes to either question were coded as positive with respect to the indicator variable for unmet medical needs.

The main independent variables were race/ethnicity (non-Hispanic White or non-Hispanic Black) and SES, defined in terms of years of education (≤ 12 , 13–15, or ≥ 16), income level (based on the 2002 federal poverty guidelines; low [0%–199% of the poverty level], medium [200%–399%], or high [$\geq 400\%$]), and

employment status (employed or unemployed). Control variables included age (18–44, 45–64, ≥ 65 years), marital status (married versus not married), rural residence (yes or no), geographic region (Northeast, Midwest, South, West), insurance coverage (private, public, uninsured), and perceived health status (poor or fair, good, very good or excellent).

Statistical Analysis

We initially examined data distributions and summaries. Next, we compared respondents’ characteristics according to race/ethnicity and presence of reported unmet medical needs. Two-tailed χ^2 tests or *t* tests were used in determining statistical significance for the initial bivariate comparisons. If these tests revealed an important interaction between race/ethnicity, educational level, and unmet medical needs, stratified analyses were subsequently performed. More specifically, we conducted logistic regression analyses to examine the adjusted association between race/ethnicity and unmet medical needs after stratification by educational level. Confounders in the logistic regression models included patient characteristics, geography, and SES. Finally, to more clearly illustrate the association of education with unmet need, we also stratified our models by race/ethnicity. Although all of the previous confounders were included in this final step, only results for education (within each race/ethnicity stratum) are reported here.

SUDAAN, which accounted for the complex, multistage sampling design of the CTS, was used in conducting the logistic regression analyses.³³ In SUDAAN, Taylor series methods for robust variance estimators account for intra-cluster correlation and provide valid inferences.³³ The sample was weighted to represent the overall US population of White and African American women and adjusted for oversampling and nonresponse. We used odd ratios (ORs), confidence intervals (CIs), and *P* values to assess the magnitude of associations between independent variables and unmet need for care. The level of statistical significance was set at $P < .05$.

RESULTS

Table 1 summarizes overall and race-specific sample characteristics. The sample was 85.5%

White and 14.5% African American. African American women were more likely than were White women to be poor and uninsured, to have less than a high school education, and to be in poor or fair health. Overall, 25% of the participants reported unmet medical care needs. There was no statistically significant bivariate association between race/ethnicity and self-reported unmet need for medical care. Women in the low income category, those with no insurance coverage, and those in poor or fair health were more likely to report unmet medical needs than were their more advantaged counterparts (Table 2).

Table 3 presents odds ratios and confidence intervals from the logistic regression models examining unmet medical need after stratification by educational level. Among women at the lowest levels of educational attainment, African Americans were less likely than were Whites to report unmet medical needs (OR=0.57; 95% CI=0.42, 0.79). Odds ratios for racial/ethnic differences were not significant in the case of women at higher levels of educational attainment.

Table 4 shows that, among African American women, higher educational attainment was associated with increased odds of reporting unmet need for medical care. Relative to African American women with 12 years of education or less, odds of reporting unmet medical needs were 1.69 (95% CI=1.24, 2.31) among African American women with 13 to 15 years of education and 2.18 (95% CI=1.25, 3.82) among those with at least 16 years of education. In contrast, the relationship between education and unmet medical need was non-significant among White women.

DISCUSSION

We found that African American women were more likely than were White women to be of low SES, to have substandard or no insurance coverage, and to be in poor health. In addition, women who were facing these conditions were more likely to report unmet medical care needs than were their peers who were in better circumstances with respect to SES, insurance coverage, and health status. Although our bivariate analyses indicated no disparities between African American and White women in terms of unmet medical need,

TABLE 1—Study Sample Characteristics, by Race/Ethnicity: Community Tracking Study Household Survey, 2003–2004

Characteristic	Total, No. (%)	White, No. (%)	African American, No. (%)	<i>P</i> ^a
Demographic				
Age, y				<.001
18–44	7 638 (47.7)	6 350 (46.1)	1 288 (57.3)	
45–64	6 878 (32.6)	6 003 (33.0)	875 (30.4)	
≥65	3 888 (19.7)	3 518 (20.9)	370 (12.2)	
Marital status				<.001
Married	10 782 (57.0)	9 944 (61.6)	1 695 (29.5)	
Not married	7 622 (43.0)	5 927 (38.4)	838 (70.5)	
Rural residence				.759
Yes	2 269 (23.5)	1 990 (23.5)	279 (20.6)	
No	16 135 (76.5)	13 881 (76.5)	2 254 (79.4)	
Region of residence				<.001
Northeast	4 207 (20.8)	3 717 (21.3)	490 (18.2)	
Midwest	4 531 (23.5)	3 986 (24.4)	545 (18.3)	
South	6 245 (35.3)	4 897 (31.6)	1 348 (57.3)	
West	3 421 (20.3)	3 271 (22.7)	150 (6.2)	
Socioeconomic status				
Years of education				<.001
≤12	8 437 (45.8)	6 940 (43.4)	1 497 (60.0)	
13–15	4 632 (29.5)	4 071 (30.3)	561 (24.9)	
≥16	5 335 (24.7)	4 860 (26.3)	475 (15.1)	
Income level ^b				<.001
Low	4 558 (29.9)	3 369 (25.9)	1 189 (53.1)	
Medium	5 807 (31.0)	5 069 (31.6)	738 (27.7)	
High	8 039 (39.1)	7 433 (42.4)	606 (19.2)	
Employed				.686
No	8 648 (48.3)	7 415 (48.1)	1 233 (49.0)	
Yes	9 756 (51.7)	8 465 (51.9)	1 300 (51.0)	
Insurance coverage ^c				<.001
Uninsured	1 502 (10.4)	1 125 (9.3)	377 (17.4)	
Public insurance	5 511 (30.0)	4 644 (29.2)	867 (34.7)	
Private insurance	11 391 (59.5)	10 102 (61.5)	1 289 (47.9)	
Health				
Perceived health status				<.001
Poor/fair	2 963 (16.6)	2 285 (14.8)	678 (27.5)	
Good	4 873 (26.6)	4 095 (26.2)	778 (28.9)	
Very good/excellent	10 568 (56.8)	9 491 (59.0)	1 077 (43.6)	
Unmet need for care				.588
Yes	4 386 (25.0)	3 713 (24.8)	673 (25.9)	
No	14 018 (75.0)	12 158 (75.2)	1 860 (74.1)	

Note. All numbers are unweighted; all percentages are weighted. Values in columns may not sum to 100 because of rounding. For the total sample, *n* = 18 404; for Whites, *n* = 15 871; for African Americans, *n* = 2 533.

^aBy the χ^2 test.

^bBased on 2002 federal poverty guidelines: low = 0%–199% of the poverty level, medium = 200%–399%, and high = ≥400%.

^cAs an indicator of access to care.

careful examinations of interactions between race/ethnicity and educational attainment revealed a strikingly different picture.

Results of analyses stratified according to race/ethnicity showed that higher levels of educational attainment were positively associated

with reported unmet medical needs among African American women but not White women. Further examination of these associations revealed that African American women at lower levels of educational attainment reported fewer unmet needs than did White women at similar levels, whereas racial differences were nonsignificant in the higher educational groups. These differences in perceived need among women at low levels of education remained after adjustment for other measures of health care access and self-reported health.

The findings just described suggest that the bivariate analysis was limited by “suppression” or “negative confounding,” a particular form of confounding in which the true relationship between 2 variables is underestimated as a consequence of the omission of a third relevant variable.³⁴ In the bivariate analysis, the reduced perception of unmet need among African American women at low levels of educational attainment was “suppressed” by an interaction with education, indicating the need for a stratified multivariable model capable of more clearly demonstrating the relationships among these constructs.

Our results imply that educational attainment may be the key SES measure driving perceived need for care among African Americans. Education has been described as the strongest SES predictor of health in many epidemiological studies. A high level of education facilitates attainment of the psychosocial and economic skills and resources that promote positive health behaviors, values, and outcomes.³⁵ Winkleby et al.³⁵ clearly showed that of the traditional measures of SES (i.e., education, income, and occupation), education was the most reliable indicator of cardiovascular disease risks and outcomes. Similar to Winkleby et al.,³⁵ we found a significantly reduced likelihood of recognizing need for medical care among African Americans at low levels of educational attainment.

As mentioned earlier, a few studies have shown that African Americans report less need for care than do Whites,^{5–7} but this finding has not been uniform.^{8–10} There are several possible reasons for this inconsistency. For example, careful analytic approaches are required to disentangle the complex relationship between perceived medical need and SES. In fact, without careful assessment of whether SES confounds

TABLE 2—Study Sample Characteristics, by Reported Unmet Need for Medical Care: Community Tracking Study Household Survey, 2003–2004

Characteristic	Reported Unmet Need for Medical Care		p ^a
	Yes, % (No.)	No, % (No.)	
Overall	25.0 (4386)	75.0 (14 018)	
Demographic			
Race/ethnicity			.588
African American	25.9 (673)	74.1 (1860)	
White	24.8 (3713)	75.2 (12 158)	
Age, y			<.001
18–44	29.4 (2167)	70.6 (5471)	
45–64	25.0 (1681)	75.0 (5197)	
≥ 65	14.3 (538)	85.7 (3350)	
Marital status			<.001
Married	27.2 (1981)	72.8 (5641)	
Not married	23.3 (2405)	76.7 (8377)	
Rural residence			.575
Yes	25.2 (3824)	74.8 (12 308)	
No	24.3 (559)	75.7 (1710)	
Region of residence			<.001
Northeast	20.7 (870)	79.3 (3337)	
Midwest	25.6 (1086)	74.4 (3445)	
South	25.2 (1532)	74.8 (4713)	
West	28.2 (898)	71.8 (2523)	
Socioeconomic status			
Years of education			.004
≤ 12	25.7 (2008)	74.3 (6429)	
13–15	26.5 (1195)	73.5 (3437)	
≥ 16	21.9 (1183)	78.1 (4152)	
Income level ^b			<.001
Low	30.4 (1333)	69.6 (3225)	
Medium	25.5 (1442)	74.5 (4365)	
High	20.5 (1611)	79.5 (6428)	
Employed			<.001
No	22.3 (1871)	77.7 (6777)	
Yes	27.4 (2515)	72.6 (7241)	
Health			
Insurance coverage ^c			<.001
Uninsured	47.8 (704)	52.2 (798)	
Public insurance	20.8 (1044)	79.2 (4467)	
Private insurance	23.1 (2638)	76.9 (8753)	
Perceived health status			<.001
Poor/fair	36.7 (1072)	63.3 (1891)	
Good	29.7 (1373)	70.3 (3500)	
Very good/excellent	19.3 (1941)	80.7 (8627)	

Note. All percentages are weighted; all numbers are unweighted. Row percentages may not sum to 100 because of rounding.
^aBy the χ^2 test.
^bBased on 2002 federal poverty guidelines: low = 0%–199% of the poverty level, medium = 200%–399%, and high = ≥ 400%.
^cAs an indicator of access to care.

the relationship between race/ethnicity and unmet needs, this study’s analysis would have been misleading. As mentioned, self-reported measures of need may capture personal perceptions of medical need rather than true clinical need for care.^{3,11–14,36}

Two studies conducted by Mayer et al. demonstrate this biased need perception^{5,9} among vulnerable children and their parents. Both studies used data from the National Survey of Children with Special Health Care Needs to investigate actual receipt of preventive and specialty physician care. In the first study, Mayer et al.⁹ examined receipt of needed services and found that members of racial/ethnic minority groups and economically disadvantaged children were at increased odds of not receiving needed services. In the second study, Mayer et al.⁵ found that parents of rural and economically disadvantaged children were less likely to believe that their children needed physician services than did their urban and advantaged counterparts. These studies indicate that perceptions of need for care are heavily influenced by social vulnerability.

Biased need perception has also been well demonstrated in studies of emergency medical care. For example, Hunt et al. found that 20% of the patients in their study rated their condition as less urgent than did their physicians.³⁷ Richards and Ferrall reported that emergency medical service providers deemed 56% of patients in their study as having true emergencies, whereas 77.5% of patients believed they had a true emergency.³⁸ In that study, the accuracy of patients’ perceptions was strongly associated with their race/ethnicity and educational level.

Several reasons have been put forward to explain African Americans’ reduced perceptions of unmet medical needs. Researchers have suggested that, as a result of discrimination, negative medical care experiences, lack of empowerment, or low health literacy, African Americans may have lower expectations with respect to health care.⁷ In addition, the historical lack of providers serving African American patients may contribute to this population’s lower expectations.⁵

Health literacy, defined as the “ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions,”^{39(p32)} may strongly influence how individuals recognize their need for care.⁴⁰ For example, in a Canadian study, Wyatt and Ratner⁴¹ assessed women’s

TABLE 3—Adjusted Odds Ratios (AORs) for Reported Unmet Medical Care Needs, by Education Level: Community Tracking Study Household Survey, 2003–2004

Characteristic	Education Level		
	12 or Fewer Years, AOR (95% CI)	13–15 Years, AOR (95% CI)	16 or More Years, AOR (95% CI)
Demographic			
Race/ethnicity			
African American	0.57** (0.42, 0.79)	0.80 (0.59, 1.09)	1.20 (0.75, 1.92)
White (Ref)	1.00	1.00	1.00
Age, y			
45–64	0.75** (0.64, 0.89)	0.73** (0.59, 0.90)	0.85 (0.67, 1.08)
≥ 65	0.38*** (0.28, 0.52)	0.23*** (0.13, 0.40)	0.34** (0.19, 0.61)
18–44 (Ref)	1.00	1.00	1.00
Marital status			
Married	0.94 (0.81, 1.10)	1.12 (0.90, 1.38)	1.26* (1.01, 1.58)
Not married (Ref)	1.00	1.00	1.00
Rural residence			
Yes	0.89 (0.65, 1.23)	0.85 (0.63, 1.14)	0.94 (0.58, 1.51)
No (Ref)	1.00	1.00	1.00
Region of residence			
Northeast	0.85 (0.64, 1.14)	0.72* (0.56, 0.94)	1.00 (0.72, 1.39)
Midwest	1.03 (0.83, 1.29)	1.01 (0.78, 1.30)	1.36 (0.98, 1.90)
West	1.30* (1.00, 1.67)	1.16 (0.89, 1.50)	1.32 (0.94, 1.84)
South (Ref)	1.00	1.00	1.00
Socioeconomic status			
Income level ^a			
Low	1.58*** (1.24, 2.01)	0.92 (0.72, 1.19)	1.55* (1.06, 2.24)
Medium	1.30* (1.03, 1.66)	1.00 (0.78, 1.30)	1.36* (1.08, 1.71)
High (Ref)	1.00	1.00	1.00
Employed			
No	0.73*** (0.62, 0.87)	0.70** (0.57, 0.86)	0.81 (0.64, 1.03)
Yes (Ref)	1.00	1.00	1.00
Health			
Insurance coverage ^b			
Uninsured	2.95*** (2.30, 3.79)	2.59*** (1.82, 3.70)	2.19* (1.21, 3.94)
Public insurance	1.23 (0.99, 1.53)	1.60* (1.09, 2.34)	1.24 (0.76, 2.02)
Private insurance (Ref)	1.00	1.00	1.00
Perceived health status			
Poor/fair	2.74*** (2.29, 3.28)	3.24*** (2.44, 4.31)	3.08*** (2.13, 4.43)
Good	1.75*** (1.47, 2.10)	2.22*** (1.69, 2.91)	1.96*** (1.48, 2.61)
Very good/excellent (Ref)	1.00	1.00	1.00

Note. CI = confidence interval. For 12 or fewer years of education, n = 8437; for 13–15 years, n = 4632; for 16 or more years, n = 5335.

^aBased on 2002 federal poverty guidelines: low = 0%–199% of the poverty level, medium = 200%–399%, and high = ≥ 400%.

^bAs an indicator of access to care.

*P ≤ .05; **P ≤ .005; ***P ≤ .001; for comparisons with reference group.

differences in health status and health behaviors.^{36,42–46} In 1 recent study, Sentell and Halpin⁴⁴ examined the effects of health literacy on race and education differences in health status among a nationally representative sample of US adults. They found that differences in work disabilities and chronic health problems between African Americans and Whites and between individuals at different educational levels became statistically insignificant when health literacy was added to the logistic regression model. Although not addressed in our study, low health literacy may blunt recognition of medical need among African American women. Although our findings suggest that low levels of education influence perceptions of medical need, the nature of our data did not allow us to distinguish low literacy from low health literacy.

Our results must be tempered by an understanding of important limitations. First, this study's data were cross sectional, precluding causal inferences. Second, the data were self-reported and thus subject to recall bias. However, self-reports are the only means of obtaining data on perceived medical needs. Third, several variables omitted from the CTS Household Survey or not included in our analysis have been shown to affect the process of care and perceptions regarding need for care, including health literacy^{47,48} and trust in one's physician.⁶ However, our population was drawn from a large, nationally representative, community-based sample of White and African American women, allowing a rich assessment of social and economic contexts.⁴⁹

In conclusion, the findings of this study suggest that, in the case of African American women, less self-perceived unmet need for medical care does not necessarily represent less actual need for care. For example, women may underreport medical need owing to a lack of knowledge regarding important routine medical care. Failure to report existing medical need is strongly confounded by SES, in particular educational attainment, and it may be one of the many complex factors driving health disparities between members of racial/ethnic minority groups and members of more advantaged groups. Additional research is needed to understand how socioeconomic and social circumstances influence recognition of medical needs, to suggest new methods for measuring

understanding of acute myocardial infarction and found that many women had a poor understanding of their risk for such an event. Thirty-six percent of the women in the study

stated that they would delay seeking treatment even with suspicious cardiovascular symptoms.

Several other studies have shown that health literacy contributes to racial/ethnic

TABLE 4—Adjusted Odds (AORs) Ratios for Reported Unmet Medical Care Needs, Stratified by Race/Ethnicity and Educational Level: Community Tracking Study Household Survey, 2003–2004

Education Level	African American (n = 2533)		White (n = 15 871)	
	AOR (95% CI)	P	AOR (95% CI)	P
≤12 y (Ref)	1.00		1.00	
13–15 y	1.69 (1.24, 2.31)	.001	1.10 (0.93, 1.30)	.276
≥16 y	2.18 (1.25, 3.82)	.006	0.99 (0.81, 1.19)	.884

Note. CI = confidence interval. Both models included adjustment for age, marital status, rural residence, geographic region, income level, employment status, insurance coverage, and self-reported health status.

unmet medical needs with minimal bias, and to develop interventions for improving the accuracy of personal assessments of medical need as one potential approach to reducing health disparities. ■

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Contributors

J. C. Wiltshire conceptualized the study, conducted the analyses, and led the writing. S.D. Person and C.I. Kiefe assisted with the conceptualization and analyses and reviewed drafts of the article. J.J. Allison assisted with the conceptualization, analyses, writing, and content revision of the article.

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References

1. Baker DW, Shapiro MF, Schur CL, Freeman H. A revised measure of symptom-specific health care use. *Soc Sci Med*. 1998;47:1601–1609.

- Institute of Medicine. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academy Press; 2003.
- Berk ML, Schur CL. Measuring access to care: improving information for policymakers. *Health Aff (Millwood)*. 1998;17:180–186.
- Newacheck PW, Hughes DC, Hung YY, Wong S, Stoddard JJ. The unmet health needs of America's children. *Pediatrics*. 2000;105:760–766.
- Mayer ML, Slifkin RT, Skinner AC. The effects of rural residence and other social vulnerabilities on subjective measures of unmet need. *Med Care Res Rev*. 2005;62:617–628.
- Mollborn S, Stepanikova I, Cook KS. Delayed care and unmet needs among health care system users: when does fiduciary trust in a physician matter? *Health Serv Res*. 2005;40:1898–1917.
- Shi L, Stevens GD. Vulnerability and unmet health care needs: the influence of multiple risk factors. *J Gen Intern Med*. 2005;20:148–154.
- Diamant AL, Hays RD, Morales LS, et al. Delays and unmet need for health care among adult primary care patients in a restructured urban public health system. *Am J Public Health*. 2004;94:783–789.
- Mayer ML, Skinner AC, Slifkin RT. Unmet need for routine and specialty care: data from the National Survey of Children with Special Health Care Needs. *Pediatrics*. 2004;113:e109–e115.
- Pathman DE, Fowler-Brown A, Corbie-Smith G. Differences in access to outpatient medical care for black and white adults in the rural South. *Med Care*. 2006;44:429–438.
- Cunningham PJ, Hadley J. Differences between symptom-specific and general survey questions of unmet need in measuring insurance and racial/ethnic disparities in access to care. *Med Care*. 2007;45:842–850.
- Chen MK, Buck RD. Measuring the health care needs of an adult population in California. *Med Care*. 1981;19:452–464.
- Hoffer CR, Schuler EA. Measurement of health needs and health care. *Am Sociol Rev*. 1948;13:719–724.
- Osmond DH, Vranizan K, Schillinger D, Stewart AL, Bindman AB. Measuring the need for medical care in an ethnically diverse population. *Health Serv Res*. 1996;31:551–571.

- Fiscella K, Williams DR. Health disparities based on socioeconomic inequities: implications for urban health care. *Acad Med*. 2004;79:1139–1147.
- Williams DR. Socioeconomic differentials in health: a review and redirection. *Soc Psychol Q*. 1990;53:81–99.
- Allen B Jr, Unger JB. Sociocultural correlates of menthol cigarette smoking among adult African Americans in Los Angeles. *Nicotine Tob Res*. 2007;9:447–451.
- Ard JD, Greene LE, Malpede CZ, Jefferson WK. Association between body image disparity and culturally specific factors that affect weight in black and white women. *Ethn Dis*. 2007;17:34–39.
- Hughes Halbert C, Barg FK, Weathers B, et al. Differences in cultural beliefs and values among African American and European American men with prostate cancer. *Cancer Control*. 2007;14:277–284.
- Lannin DR, Mathews HF, Mitchell J, Swanson MS, Swanson FH, Edwards MS. Influence of socioeconomic and cultural factors on racial differences in late-stage presentation of breast cancer. *JAMA*. 1998;279:1801–1807.
- Matthews AK, Sellergren SA, Manfredi C, Williams M. Factors influencing medical information seeking among African American cancer patients. *J Health Commun*. 2002;7:205–219.
- Haas JS, Kaplan CP, Des Jarlais G, Gildengoin V, Perez-Stable EJ, Kerlikowske K. Perceived risk of breast cancer among women at average and increased risk. *J Womens Health (Larchmt)*. 2005;14:845–851.
- Harralson TL. Factors influencing delay in seeking treatment for acute ischemic symptoms among lower income, urban women. *Heart Lung*. 2007;36:96–104.
- King G, Williams DR. Race and health: a multidimensional approach to African-American health. In: Amick BC II, Levine S, Tarlov AR, Walsh DC, eds. *Society and Health*. New York, NY: Oxford University Press; 1995:93–130.
- Salganicoff A, Beckerman JZ, Wyn R, Ojeda VD. *Women's Health in the United States: Health Coverage and Access to Care*. Menlo Park, CA: Kaiser Family Foundation; 2002.
- Weisman CS. *Women's Health Care: Activist Traditions and Institutional Change*. Baltimore, MD: Johns Hopkins University Press; 1998.
- Franks P, Gold MR, Clancy CM. Use of care and subsequent mortality: the importance of gender. *Health Serv Res*. 1996;31:347–363.
- Antonucci TC, Ajrouch KJ, Janevic MR. The effect of social relations with children on the education-health link in men and women aged 40 and over. *Soc Sci Med*. 2003;56:949–960.
- Anderson NB, Armstead CA. Toward understanding the association of socioeconomic status and health: a new challenge for the biopsychosocial approach. *Psychosom Med*. 1995;57:213–225.
- Krieger N, Rowley DL, Herman AA, Avery B, Phillips MT. Racism, sexism, and social class: implications for studies of health, disease, and well-being. *Am J Prev Med*. 1993;9:82–122.
- Community Tracking Study 2003 Household Survey Public Use File: User Guide*. Washington, DC: Center for Studying Health System Change; 2005.

32. Kemper P, Blumenthal D, Corrigan JM, et al. The design of the Community Tracking Study: a longitudinal study of health system change and its effects on people. *Inquiry*. 1996;33:195–206.
33. *SUDAAN Language Manual*, Release 9.0. Research Triangle Park, NC: Research Triangle Institute; 2004.
34. MacKinnon DP, Krull JL, Lockwood CM. Equivalence of the mediation, confounding and suppression effect. *Prev Sci*. 2000;1:173–181.
35. Winkleby MA, Jatulis DE, Frank E, Fortmann SP. Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. *Am J Public Health*. 1992;82:816–820.
36. Baker DW, Parker RM, Williams MV, Clark WS. Health literacy and the risk of hospital admission. *J Gen Intern Med*. 1998;13:791–798.
37. Hunt RC, DeHart KL, Allison EJ Jr, Whitley TW. Patient and physician perception of need for emergency medical care: a prospective and retrospective analysis. *Am J Emerg Med*. 1996;14:635–639.
38. Richards JR, Ferrall SJ. Inappropriate use of emergency medical services transport: comparison of provider and patient perspectives. *Acad Emerg Med*. 1999;6:14–20.
39. Nielsen-Bohlman L, Panzer AM, Kindig DA, eds. *Health Literacy: A Prescription to End Confusion*. Washington, DC: National Academy Press; 2004.
40. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav*. 1995;36:1–10.
41. Wyatt PA, Ratner PA. Evaluating treatment-seeking for acute myocardial infarction in women. *Can J Cardiovasc Nurs*. 2004;14:39–45.
42. Lindau ST, Tomori C, Lyons T, Langseth L, Bennett CL, Garcia P. The association of health literacy with cervical cancer prevention knowledge and health behaviors in a multiethnic cohort of women. *Am J Obstet Gynecol*. 2002;186:938–943.
43. Scott TL, Gazmararian JA, Williams MV, Baker DW. Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Med Care*. 2002;40:395–404.
44. Sentell TL, Halpin HA. Importance of adult literacy in understanding health disparities. *J Gen Intern Med*. 2006;21:862–866.
45. Williams MV, Baker DW, Honig EG, Lee TM, Nowlan A. Inadequate literacy is a barrier to asthma knowledge and self-care. *Chest*. 1998;114:1008–1015.
46. Williams MV, Baker DW, Parker RM, Nurss JR. Relationship of functional health literacy to patients' knowledge of their chronic disease: a study of patients with hypertension and diabetes. *Arch Intern Med*. 1998;158:166–172.
47. Parker RM, Ratzan SC, Lurie N. Health literacy: a policy challenge for advancing high-quality health care. *Health Aff (Millwood)*. 2003;22:147–153.
48. Schillinger D, Barton LR, Karter AJ, Wang F, Adler N. Does literacy mediate the relationship between education and health outcomes? A study of a low-income population with diabetes. *Public Health Rep*. 2006;121:245–254.
49. Ginsburg PB, Kemper P, Baxter R, Kohn LT. The Community Tracking Study analyses of market change: introduction. *Health Serv Res*. 2000;35:7–16.