

The Relationship between the Race/Ethnicity of Generalist Physicians and Their Care for Underserved Populations

ABSTRACT

Objectives. The purpose of this study was to examine empirically the relationship between physicians' race or ethnicity and their care for medically underserved populations.

Methods. Generalist physicians who received the MD degree in 1983 or 1984 (n = 1581) were surveyed. The personal and background characteristics of four racial/ethnic groups of physicians were compared with the characteristics of their patients.

Results. When the potentially confounding variables of gender, childhood family income, childhood residence, and National Health Services Corps financial aid obligations were controlled, generalist physicians from underrepresented minorities were more likely than their nonminority counterparts to care for medically underserved populations.

Conclusions. Physicians from underrepresented minorities are more likely than others to care for medically underserved populations. (*Am J Public Health.* 1997;87:817-822)

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Introduction

The specialty distribution of the physician workforce has been a fundamental issue in discussions of health care reform. The relatively low proportion of medical school graduates entering family practice, general internal medicine, and general pediatrics in recent years¹ has caused much concern about the growing shortage of generalist physicians. There is particular concern about how a shortage of generalists would affect access to primary care, especially in underserved areas.² Consequently, there has been a major drive to increase the number of physicians who deliver primary care in underserved areas.

Both theoretical^{3(p268)} and empirical⁴ studies have suggested that personal background and medical school experiences are the two major forces that influence choice of specialty and practice location. Along with gender and age, students' race or ethnicity has generated much interest among policymakers and medical educators.⁵⁻⁸

The racial/ethnic composition of the nation's physician workforce differs from that of the general population. African Americans, Hispanic Americans, and Native Americans make up 22% of the total population,^{8(p13)} and this proportion is increasing annually. These groups, however, represent only 10% of entering medical students and 7% of practicing physicians.^{8(p13)} Currently, African Americans, Hispanic Americans, and Native Americans are considered to be underrepresented minorities, defined as those with lower representation in health professions schools than in the general population.^{8(p13)} Asian Americans are excluded from this definition because they constitute about 3% of the US population but 13.1% of all

1993 medical school graduates.¹ In an effort to increase the number of underrepresented-minority medical students, Congress challenged medical schools to broaden minority representation.⁹ Congress has appropriated funds to spur medical education in general and support minority student opportunities in particular, such as the Health Careers Opportunity Program and the National Health Service Corps Scholarship and Loan Program.⁹ More recently, the Association of American Medical Colleges launched a campaign entitled Project 3000 by 2000 with the goal of nearly doubling the number of entering underrepresented-minority medical students by the year 2000.^{10,11} The ultimate aim of these efforts is to increase the number of underrepresented-minority physicians, under the assumption that they would be more likely than White physicians to care for underserved populations.

Empirical studies of the relationship between physicians' race or ethnicity and the characteristics of their patients have generally confirmed this assumption. A 1985 study reported that underrepresented-minority physicians in general were more likely than their majority counterparts to care for poor or underrepresented-minority patients.¹² A recent study using the patient data from the 1987 National Medical Expenditure Survey also found

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TABLE 1—Generalist Physicians' Specialties and Personal Characteristics, by Race/Ethnicity (n = 1581)

	Race/Ethnicity, %			
	White (n = 1389)	African American (n = 97)	Hispanic American (n = 42)	Asian American (n = 53)
Specialty				
Family practice	45	39	43	40
General internal medicine	36	49	26	36
General pediatrics	19	13	31	25
Combinations of primary care specialties	0.4	0	0	0
Gender*				
Male	67	47	69	60
Female	33	53	31	40
Rural/inner-city background*				
Yes	34	67	50	42
No	66	33	50	48
Childhood family income*				
High	4	1	0	2
Upper middle	28	11	14	21
Middle	41	33	24	43
Lower middle	22	27	36	19
Low	5	27	26	15
Career decision made				
Before medical school	39	39	39	27
During basic science years	6	12	12	6
During clerkship years	41	37	34	41
After clerkship years	15	13	15	27
National Health Service Corps financing with service obligation*				
Yes	10	51	24	8
No	90	49	76	92
Other federal/state financing with service obligation				
Yes	11	8	12	12
No	89	92	88	88

Note. The total number of respondents varied among the variables. Chi-square tests were performed for ethnic group by each of the seven nominal variables.

*P < .001.

that underrepresented-minority physicians were more likely to care for minority, indigent, and sicker patients than were White physicians.¹³ Yet many factors could affect this relationship. For example, higher proportions of underrepresented-minority students obtain financial aid that includes obligations to work in underserved areas after graduation, and these obligations could confound the relationship between ethnicity and care for underserved populations. To examine the relationship between physicians' ethnicity and the characteristics of the populations they serve while taking into account possible confounding variables, we conducted a national survey of generalist physicians.

Methods

We developed a written questionnaire that addressed physicians' race/ethnicity, gender, family income during childhood, rural/inner-city background, age at graduation, educational debt upon graduation, and National Health Service Corps or other financial aid with service obligations. The questionnaire also included timing of the physicians' decisions to enter primary care, their practice specialties within primary care, and characteristics of their patient populations, including percentage of patients of various ethnicities, patients' insurance coverage, and percentage of patients the physicians considered to be poor.

The study population included physicians who graduated from medical school in 1983 or 1984 and whose self-reported specialty was family practice, general internal medicine, or general pediatrics. These two classes were chosen because most of these physicians would have completed postgraduate education and would have fulfilled any financial aid service obligations by the time of the study.¹⁴ We excluded physicians in the military.

A random sample of 2600 physicians meeting these criteria was selected from the American Medical Association (AMA) Physician Masterfile. (See Martini et al.¹⁵ for a detailed description of the sample stratification and selection procedure.) Study physicians received the questionnaire by mail in January 1993. Mailed reminders and telephone follow-ups by trained interviewers were used to maximize the response rate. Chi-square tests were used to examine the association between physicians' ethnic status and each of the nominal variables. The differences among the ethnic groups were analyzed in terms of age at graduation, amount of debt, and characteristics of practice and population served by analysis of variance *F* tests. Duncan post hoc tests were performed for pairwise comparisons, following the significant *F* test on the ethnic group.

To control for possible confounding effects in the relationship between physicians' race/ethnicity and the characteristics of their patient population, we examined these interaction effects in a factorial analysis of variance. The dependent variable of caring for an underserved population was defined as the mean percentage of patients with Medicaid and poor patients in the physicians' practices. The independent variables were physicians' race/ethnicity and the possible confounding variables. For instance, a significant interaction effect of physicians' ethnicity by financial aid service obligation in a two-way analysis of variance model would indicate that underrepresented-minority physicians' caring for underserved populations varies depending on whether or not they have a financial aid obligation. On the other hand, a nonsignificant interaction effect of these two variables in the model would indicate that underrepresented-minority physicians' caring for underserved patients does not depend on whether or not they have a financial aid obligation. We first examined interaction effects, followed by the main effect of each independent variable. For

each statistical test, the significance level was set at .05.

Multiple regression analyses were also performed with the percentage of underserved patients as the dependent variable and potential confounding variables as the independent variables. Two regression models were developed: The first used a stepwise procedure in which the variables were added one by one to the model. After each variable was added, the stepwise method looked at all the variables already included in the model and deleted any variables that did not produce a significant *F* statistic, which was defined at the .15 level. The second, full regression model examined the independent effect of physician race/ethnicity on caring for underserved patients, having controlled other potential confounding variables. To achieve this control, all potential confounding variables were first forced into the model, and physician race/ethnicity was then added to the model. The percentage of the variance of the dependent variable accounted for by physician ethnicity was examined in addition to those explained by other variables.

Results

Responses were received from 1911 (74%) of the 2600 study physicians. Of these, 306 (16%) were deemed ineligible because they reported leaving primary care or being employed by the military, and an additional 18 were excluded because they failed to provide information about their ethnicity. Because the number of Native American respondents was too small to permit meaningful analysis ($n = 6$), we excluded them from the final sample, which included 1581 respondents, representing 69% of the 2294 eligible for the survey.

Information available on the AMA Physician Masterfile was used to compare respondents and nonrespondents. The variables used as a basis for comparison included the medical school quartile from which the physicians graduated (each of the 126 allopathic medical schools was classified into one of four quartiles based on the percentage of the school's graduates entering primary care specialties), the location of practice, primary care specialty, major professional activities, and AMA membership status. The chi-square tests indicated that only primary care specialty and AMA membership status by respondent status reached significance ($P < .05$). There was a higher proportion

TABLE 2—Mean Age and Debt upon Graduation and Characteristics of Practice, by Physician Race/Ethnicity

	Race/Ethnicity			
	White (n = 1389)	African American (n = 97)	Hispanic American (n = 42)	Asian American (n = 53)
Mean age upon graduation, y	27.8	27.6	27.1	27.3
Debt upon graduation, \$*	29 274 ^b	37 510 ^a	36 238 ^a	26 670 ^b
Practice location, %				
Large city (population >500 000)**	21.2 ^b	36.7 ^a	37.3 ^a	40.6 ^a
Suburb of a large city	20.1	9.7	21.4	21.7
Population 50 000–499 999	24.0	26.0	22.6	23.0
Population 26 000–49 999	8.7	6.2	9.2	9.1
Population 10 000–25 999	10.1	9.4	6.8	1.9
Population 2 500–9 999	10.9	6.9	2.7	1.9
Rural (population <2 500)	4.8	4.1	0	1.9
Insurance coverage of patients, %				
Private insurance**	29.4 ^a	17.4 ^b	20.8 ^b	24.2
HMO/PPO	25.1	24.6	23.2	34.6
Medicaid**	12.7 ^b	20.5 ^a	21.0 ^a	13.6
Medicare	18.7	16.5	17.1	13.0
State/locally funded indigent program	1.6	3.0	1.4	1.4
Uninsured (self-pay)***	6.5	9.3	8.3	7.1
Uninsured (no-pay)	3.1	4.5	4.0	1.9
Other	2.0	2.1	2.0	4.2
Race/ethnicity of patients, %				
White**	73.0 ^a	37.5 ^c	36.6 ^c	48.8 ^b
African American**	14.2 ^b	48.0 ^a	14.8 ^b	15.8 ^b
Hispanic American**	7.6 ^c	10.6 ^c	44.8 ^a	15.2 ^b
Asian American**	3.0 ^b	1.5 ^b	3.1 ^b	16.9 ^a
Poor patients, %	17.6 ^c	31.1 ^a	20.2 ^b	17.9 ^c

Note. HMO = health maintenance organization; PPO = preferred provider organization. The total number of respondents may vary among the variables. *F* tests were performed on the comparisons of the ethnic groups for each variable, and Duncan post hoc tests were performed following significant *F* tests. The superscripts indicate significant comparisons (Duncan tests) among the groups for that particular variable ($a > b > c$). In this table, for instance, the White group had a higher percentage of patients with private insurance than the African-American and Hispanic-American groups, whereas there were no significant differences among the other group comparisons.
* $P < .01$; ** $P < .001$; *** $P < .05$.

of general internists in the nonrespondent group (42%) than in the respondent group (36%). The proportions of respondents and nonrespondents were 47% and 44% for family/general practice and 17% and 14% for general pediatrics. Current members of the AMA were more likely to respond to the survey than nonmembers or those whose membership was delinquent. The proportions of members, nonmembers, and delinquent members among the respondents were 29%, 33%, and 39%, respectively; the corresponding proportions among the nonrespondents were 22%, 31%, and 47%.

Table 1 displays characteristics of the respondents. Comparisons among the four racial/ethnic groups indicated that a higher proportion of African-American physicians were women. The underrepre-

sented-minority physicians were significantly more likely to have grown up in inner-city or rural areas and to have had a lower childhood family income. Over half of the African Americans and about one fourth of the Hispanic Americans had National Health Service Corps service obligations, compared with 10% of Whites and only 8% of Asian Americans. There was no significant difference among the ethnic groups in other sources of financial support. There was also no significant difference among the ethnic groups in practice specialty or timing of the decision to enter primary care. Four of the seven nominal variables were significantly associated with ethnicity: gender, rural/inner-city background, childhood family income, and having National Health Service Corps financial aid.

TABLE 3—Mean Percentage of Underserved Patients by Factorial Analysis of Variance of Gender, Rural/Urban Background, Childhood Family Income, and National Health Service Corps Financial Aid Obligations, by Physician Race/Ethnicity

	Race/Ethnicity				Overall Mean
	White (n = 1389)	African American (n = 97)	Hispanic American (n = 42)	Asian American (n = 53)	
Gender					
Men	17.8	33.9	25.1	18.7	18.0
Women	21.5	34.7	36.7	24.7	23.0
Rural/inner-city background					
Rural/inner-city	21.9	35.8	34.2	21.1	23.9
Not rural/inner-city	17.6	31.4	23.1	20.9	18.2
Childhood family income					
High	16.6	7.0	0	30.0	16.7
High middle	19.1	28.7	28.8	35.8	19.9
Middle	18.1	35.2	23.2	15.5	18.7
Lower middle	20.4	33.2	27.0	18.4	21.5
Lower	23.4	38.1	36.2	18.9	28.3
National Health Service Corps financing with service obligations					
Yes	27.2	36.5	26.1	36.2	30.0
No	18.1	32.2	29.6	19.7	18.9

Note. The percentage of underserved patients was the mean percentage of poor patients and patients whose primary insurance was Medicaid. A two-way factorial analysis of variance *F* test on providing care to the underserved was performed by physician ethnicity with each of the four variables: gender, rural/inner-city background, childhood family income, and National Health Service Corps financial aid obligations. None of the interaction effects in the four factorial analyses was significant ($P = .36, .83, .44, \text{ and } .27$, respectively). In each of the four factorial analyses, the main effect of ethnic group was significant ($P < .001$), as were the main effects for gender ($P < .001$), rural/inner-city background ($P < .001$), childhood family income ($P < .03$), and National Health Service Corps financial aid obligations ($P < .001$).

Underrepresented-minority physicians also had a higher mean debt upon graduation (Table 2). The *F* test indicated that there was no significant difference among ethnic groups in age at graduation.

Table 2 displays the reported characteristics of the physicians' patient populations. The underrepresented-minority physicians reported caring for a higher percentage of Medicaid patients and poor patients than did White and Asian-American physicians. Physicians were likely to serve a higher proportion of patients with a racial/ethnic background similar to their own.

Gender, rural/inner-city background, childhood family income, and having National Health Service Corps financial aid were significantly associated with physicians' ethnicity and could possibly confound observed relationships between race/ethnicity and care for the underserved. Thus, we conducted four two-way analyses of variance with each of these four variables and physician ethnicity as two independent variables in each model, and the percentage of underserved patients (Medicaid and/or poor) as the dependent variable (see Table 3). None of the interaction effects in the four two-way analyses of variance of gender, childhood

residence, childhood family income, and National Health Service Corps financial aid obligations by ethnic group was significant ($P = .36, .83, .44, \text{ and } .27$, respectively). The main effect of ethnic group was significant in each of the statistical models ($P < .001$). Also consistent were significant main effects of gender ($P < .001$), rural/inner-city background ($P < .001$), childhood family income ($P < .03$), and National Health Service Corps financial aid obligations ($P < .001$).

In our regression analysis, the four physician race/ethnicity groups were combined into two: 0 = Whites and Asians, and 1 = African Americans and Hispanics. Similar codings were used for gender (0 = male and 1 = female), for National Health Service Corps financial aid obligations (0 = no and 1 = yes), and for rural/inner-city background (0 = not rural/inner-city and 1 = rural/inner-city). Childhood family income was coded as follows: 1 = high, 2 = upper middle, 3 = middle, 4 = lower middle, and 5 = low. Among the five independent variables, physician race/ethnicity entered the stepwise regression model and accounted for the largest portion of the variance of the dependent variable (4%; $F = 62.94$,

$P < .0001$), followed by National Health Service Corps financial aid obligations (2%; $F = 29.06, P < .0001$), rural/inner-city background (1%; $F = 14.79, P < .0001$), and gender (1%; $F = 12.46, P < .0004$). Childhood family income was not significant. In the second, full regression, model, the four variables of gender, childhood family income, rural/inner-city background, and National Health Service Corps financial aid obligations were forced into the model, which accounted for a total of 6% of the variance of caring for underserved patients. When physician's race/ethnicity was added to the model, it was highly significant ($F = 28.14, P < .0001$), accounting for an additional 2% of the variance (Table 4).

Discussion

This study investigated the relationship between the race/ethnicity of generalist physicians and the percentage of their patients who belonged to underserved populations while controlling for potential confounding physician characteristics. Our findings support the hypothesis that underrepresented-minority physicians are more likely to care for medically underserved patient populations.

These findings corroborate the assumptions of those concerned with strategies for recruiting underrepresented-minority medical students. In some published documents and reports, the relationship between physicians' ethnicity and their care for underserved populations has been illustrated⁸ and examined empirically.^{10,11} However, to our knowledge, this is the first national study to examine this relationship empirically while controlling for other relevant physician factors. The absence of significant interaction effects in the two-way analysis of variance models tells us that the observed differences in the population served by physician race/ethnicity persist even after the possible confounding variables of gender, rural/inner-city background, childhood family income, and financial aid service obligations are controlled. Two regression models further indicated that physicians' ethnicity was the most important variable associated with their caring for underserved patients. This suggests that physician ethnicity had an independent impact on the physicians' likelihood of providing care to medically underserved patients. It should be noted here, however, that the percentage of the criterion variance accounted for by those independent variables, including physician race/ethnicity, was low. Future studies should examine whether other variables, not examined here, might be associated with providing care to an underserved population.

The data in Table 3 suggest that having financial aid obligations might have more impact on White and Asian-American groups than on African- and Hispanic-American groups. We suspect that the small sample size of the Asian- and Hispanic-American groups might contribute to this otherwise significant interaction effect of race/ethnicity by financial aid obligation. There might be an identifiable group of White and Asian Americans who care for similar populations of uninsured, self-paying, or Medicaid patients, and financial aid obligation could be one of the variables related to this group. Insufficient sample sizes for the Hispanic-American and Asian-American groups make it difficult to perform higher levels of interactions (e.g., three-way or four-way interactions) of the physicians' racial/ethnic status by those interacting variables.

No significant differences were found among racial/ethnic groups in the timing of the decision to enter primary care (see Table 1). Because more than half of the respondents made the decision to enter

TABLE 4—Results of a Full Regression Model Using Physicians' Race/Ethnicity and Other Variables to Predict Their Caring for Underserved Patients

	Regression Coefficient	SE	F	P	Standardized Regression Weight
Gender	3.65	1.03	12.51	.0004	.09
Childhood family income	.35	.54	.41	.52	.02
Rural/inner-city background	3.84	1.06	13.06	.0003	.09
National Health Service Corps financing with service obligations	7.46	1.54	23.53	.0001	.13
Race/ethnicity	9.77	1.84	28.14	.0001	.14

Note. The dependent variable, underserved patients, was the mean percentage of poor patients and patients whose primary insurance was Medicaid. The four independent variables—gender, childhood family income, rural/inner-city background, and having National Health Service Corps financial aid obligations—accounted for a total of 6% of the variance of caring for underserved patients. When physician ethnicity was added to the model, it accounted for an additional 2% of the variance.

primary care during the clinical years, we speculate that medical school experiences played an important role in the physicians' decision. Previous research has indicated that, although recruitment of underrepresented-minority students into medical school is important in meeting a school's goal of graduates entering primary care and caring for the underserved, the school's emphasis on early experience in community health centers and other community-based health-related programs also plays an important role in this process.^{16,17} Some medical schools are fairly successful in recruiting, retaining, and training underrepresented-minority students.¹⁸⁻²¹ Because certain medical schools, such as public schools and predominantly African-American schools, have far more underrepresented-minority students than others, research on the relationship of institutional characteristics to care for the underserved, independent of students' race/ethnic status, should be considered in the future.

Consistent with earlier studies,^{12,13} we found that patients were more likely to be cared for by physicians of their own ethnic background than by physicians of other ethnic backgrounds. As the ratios of physicians per 100 000 population are much lower for underrepresented minorities than for other ethnic groups,²² it is even more important to increase the number of underrepresented-minority physicians to improve underserved populations' access to basic health care. We speculate that a number of sociocultural factors (e.g., language, physical character-

istics, personal background and experiences) might have contributed to these physicians' disproportionate share of patients of similar ethnicity. How racial/ethnic identifications influence the physician-patient relationship, or the choice of physician in particular, is an important topic for future study. The data here seem to empirically support the notion that underrepresented-minority groups should have greater representation in medicine.²³

The present study has several limitations. First, it includes only generalist physicians. Second, the physicians' self-reported practice profiles, including the proportion of underserved patients, could be subjective or biased. Third, each ethnic group is heterogeneous, and substantial subgroup differences and variations could exist within each group. The relatively small numbers of African Americans, Hispanic Americans, and Asian Americans would seem to limit the ability to make generalizations from this study. Finally, some other factors not examined in the present study may differentiate underrepresented-minority physicians from other physicians. For instance, it has been documented consistently over the past decade that a higher proportion of underrepresented-minority students failed to obtain first-year residency positions through the National Residency Matching Program. In the 1984 National Residency Matching Program from which our respondents were partly derived, only 30% of underrepresented-minority students were matched to their first choice of residency program, and the 14% of underpre-

sented-minority students who went unmatched that year was more than two and a half times the national norm.²⁴ It is possible, therefore, that a number of underrepresented-minority generalist physicians surveyed in the present study might have entered generalist careers after failing to enter the subspecialty of their choice. How this possibility might be related to the care such physicians provide to underserved populations is an interesting topic for future study.

One could speculate that underrepresented-minority physicians are more willing to care for underserved patients because they are sensitive to the unmet needs of this population. Such an attitude, brought to medical school and reinforced by educational experiences, might lead to their ultimate decision to enter primary care and provide care to medically underserved patients. Conversely, underrepresented-minority patients may prefer and seek out physicians of similar background. In either case, medical schools might wish to implement specific strategies to recruit underrepresented-minority students, as well as to encourage all students to serve underserved populations. □

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