

**THE PROXIMITY OF RURAL
AFRICAN AMERICAN AND
HISPANIC/LATINO COMMUNITIES
TO PHYSICIANS AND HOSPITAL
SERVICES**

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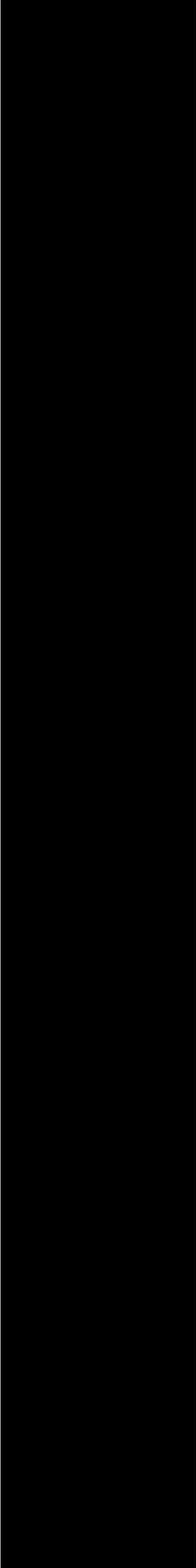
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EXECUTIVE SUMMARY

U.S. medical and health policy leaders strive to eliminate health disparities for racial and ethnic minority groups by identifying and removing barriers to health care access. The 8,750,000 racial and ethnic minorities who live in rural areas—11.1% of all US minorities—face added access problems, being members of two at-risk groups (“double jeopardy”). Distance and travel time are particularly salient access barriers in rural areas, where distance to care is, on average, twice that of urban areas. Distance to health care may pose special problems for rural minorities, most importantly because rural minorities are poorer than rural Whites, and rural poverty often brings less access to transportation and greater reliance on local care, which is often scarce. Further, for a variety of historical and social reasons rural minorities tend to live in select rural towns and sub-regions of the US in communities long recognized for their poverty. Physicians, on the other hand, preferentially locate in relatively affluent regions and communities.

Despite the known social, historical, and economic forces that may distance rural minority communities from sources of care, it is not known whether rural minorities actually must travel farther for care than rural Whites. This study assesses how local physician concentrations and distances to hospitals differ for rural communities of varying African American and Hispanic/Latino compositions.

We used 1990 data at the town-area level (i.e., towns and their immediately surrounding minor civil divisions and census civil divisions) for the nine Southern and six Western states within which lie the vast majority of town-areas with sizable proportions of minorities. Data were from the US Census, American Medical Association, and American Hospital Association. Analyses compared town-areas with low, medium, and high proportions of African Americans and Hispanics on their (1) local physician-to-population ratios and (2) distances to nearest hospitals offering each of four levels of services.

We found that Western town-areas with populations of over 50% Hispanics had lower physician densities than other Western town-areas that were predominantly non-Hispanic White (24.2 vs. 31.2 physicians per 100,000 population). In Southern town-areas, physician densities did not vary meaningfully with the proportion of African Americans. The likelihood of being without any physician at all did not vary significantly with town-areas’ minority compositions.

Distances to the nearest hospitals offering basic, intermediate, and tertiary subspecialty services were generally 25% to 35% farther for Southern town-areas comprised of over 60% African Americans and for Western town-areas comprised of over 50% Hispanics compared to communities that were predominantly non-Hispanic White within each region. For town-areas with intermediate minority compositions (20-60% African Americans and 20-50% Hispanics), physician densities and distances to hospitals did not differ in consistent ways from those of predominantly non-Hispanic White communities.

The relationships noted above between town-areas’ racial-ethnic composition and physician densities and distances to hospitals were not due to confounding by extraneous state factors, but in some cases were explained by community socio-demographic differences other than race.

Thus, this study demonstrates that the local relative unavailability of physicians is an added barrier for predominantly Hispanic rural communities in the West, and that longer travel distance to hospital services is an extra barrier for

both predominantly Hispanic Western rural communities and predominantly African American Southern rural communities. Thus, rural minorities often face longer travel distances to physicians and hospital services than non-minority rural individuals, but this varies across racial-ethnic minority groups, geographic regions, and type of health services. Longer travel distance to care is not a trivial barrier, perhaps influencing patients' use rates of services more than financial barriers and office waiting times, particularly for African Americans.

Organized transportation services sponsored by hospitals and practices are a natural solution to offset distance disparities, enabling those without reliable personal transportation to reach care. Organized free or low-cost transportation services are preferable to the common practice among the rural poor of depending on neighbors, whose good will can be overtaxed, whose schedules are sometimes inconvenient or unworkable for those needing transport, and who sometimes expect "gas fare" beyond that affordable.

As a complementary strategy, distances to nearby minority communities should be considered when locating new rural hospitals, satellite clinics, community health centers, and physicians' offices. Current and new state and federal programs could draw rural providers closer to predominantly Hispanic communities with financial incentives, such as higher reimbursement rates for care rendered, tax benefits, and educational loan repayment incentives.

It is also important to know whether the federal Health Professional Shortage Area (HPSA) and Medically Underserved Area (MUA) designations for targeting federal assistance programs capture the distance challenges faced by rural minorities.

INTRODUCTION

U.S. medical and health policy leaders strive to eliminate health disparities for racial and ethnic minority groups by identifying and removing barriers to health care access.¹⁻³ Access barriers for minorities are evidenced by lower use rates of many types of services, from outpatient physician visits to inpatient surgical procedures.⁴⁻⁷ Recognized barriers are many, including low health insurance rates^{4,8,9}, communication problems with health workers⁸, and racial bias in the health care system^{4,8,10,11}.

The 8,750,000 racial and ethnic minorities who live in rural areas—11.1% of all US minorities¹²—face added health and access problems, being members of two at-risk groups ("double jeopardy"¹³).¹⁴ Distance and travel time are particularly salient access barriers in rural areas, where distance to care is, on average, twice that of urban areas.¹⁵ Distance to health care may pose special problems for rural minorities, most importantly because rural minorities are poorer than rural Whites,¹⁶ and rural poverty often brings less access to transportation and greater reliance on local care.^{17,18} Further, for a variety of historical and social reasons, rural minorities tend to live in select rural towns and sub-regions of the US in communities long recognized for their poverty.¹⁹ Physicians, on the other hand, preferentially locate in relatively affluent regions and communities.²⁰

Despite the known social, historical, and economic forces that may distance rural minority communities from sources of care, it is not known whether rural minorities actually must travel farther for care than rural Whites. Two pertinent

studies of the 1970s came to differing conclusions: Wright ²¹ reported an inverse relationship between communities' minority population proportion and their success recruiting physicians, whereas Langwell ²² found no such association. The only more recent study found that physician-to-population ratios in 1990 were lower for counties with proportionately more African Americans and Hispanics, but higher for counties with more Native Americans. ²³ We are aware of no evaluations of the relative proximity of rural minority communities to hospitals.

This study assesses how the African American and Hispanic/Latino compositions of rural communities relate to local physician concentrations and distances to hospitals offering various levels of services. This study adds to prior research by including analyses of hospital service availability; analyzing data within specific national regions to lessen statistical bias by extraneous inter-regional differences; and performing analyses for towns and their immediate surrounding areas rather than for the commonly-studied counties. Despite its importance, we could not also evaluate the geographic access situation of rural Native Americans, Asians, and Pacific Islanders, for lack of data.

METHODS

Levels of Analysis and Data Sources

With county data readily available, county-level analyses are common in rural health studies, but they do not reflect well the geographic areas within which people obtain care. Therefore, we studied medical resource availability within town-areas, which are smaller geographic units comprised of the areas within the legal boundaries of towns combined with all surrounding minor civil divisions (MCDs) and census civil divisions (CCDs) within a 12-minute drive of each town's centroid. ²⁴ Rural residents travel a median of 12-minutes to their usual source of medical care, and in this time cover between 5.72 and 10.76 miles, depending on the region. ²⁴

Town-area data were obtained from a unique file constructed in 1998 of nonmetropolitan places and their health care resources. ²⁴ This file drew data from the 1990 Geographic Information System ²⁵ issued by the Bureau of Census for all 11,967 nonmetropolitan incorporated towns of any size and other census-designated unincorporated places of over 1,000 population in the contiguous 48 states in 1990. The file excluded places located on Native American reservations and military bases.

On this file, all US non-federal general hospitals were assigned one of four service-level ordinal values, based on a cumulative (Guttman) scaling of the services they provided as reported in the American Hospital Association's 1996 annual survey of hospitals. ²⁵ Hospitals offering only basic services, such as routine inpatient and basic emergency room care, were grouped in the "level 4" stratum. Representative services for hospitals offering increasingly more specialized and rarer care were, for level 3 hospitals, outpatient rehabilitation and cardiac ultrasound; for level 2 hospitals, cardiac catheterization and level 2 nursery care; and for level 1 hospitals, open heart surgery and pediatric psychiatry. Distances to the nearest acute care hospital offering each of the four levels of service were calculated as the linear distance in miles from the centroid of each town to the closest urban or rural hospital providing the requisite types of services. Physician data were incorporated into the town-area file from the AMA Physician Masterfile.

Selection of States, Counties, and Town-Areas

The fact that rural African Americans live predominantly in the US South and rural Hispanics reside primarily in the West makes statistical confounding by extraneous, regionally linked variables likely in nation-wide comparisons of rural minorities and non-minorities.²⁶ We therefore restricted analyses of African American communities to states in which 10% or more of rural town-areas were comprised of over 40% African Americans in 1990. Hispanic community analyses similarly were limited to states in which more than 10% of rural town-areas had over 20% Hispanics. At these eligibility thresholds, analyses of African American communities included nine contiguous Southern states (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia) and analyses of Hispanic communities assessed six contiguous Western states (Arizona, California, Colorado, New Mexico, Nevada, and Texas).

We further restricted the sample of geographic areas by eliminating from the African American analyses the 6 town-areas in the South with over 20% Hispanics, and eliminating from the Hispanic analyses the 58 Western town-areas with over 20% African Americans. We also dropped from both the African American and Hispanic analyses 44 unusually large town-areas (over 70,000 total population), and 134 town-areas with fewer than 1,500 persons, a size at which fewer than 5% of town-areas had physicians. The 1,943 remaining eligible Southern town-areas (Figure 1) included 571 (97%) of the 589 nonmetropolitan town-areas with over 40% African American in 1990, and the 785 eligible

Figure 1. African American Compositions of Southern Town-Areas, 1990

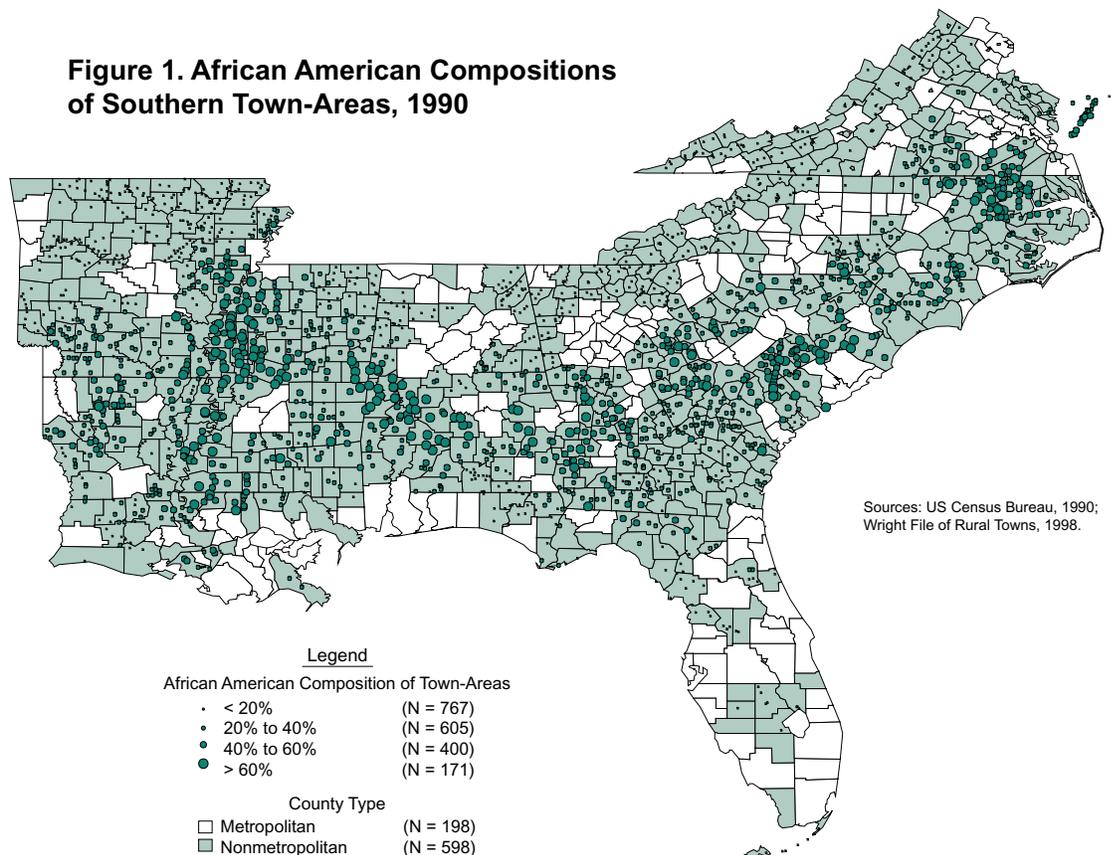
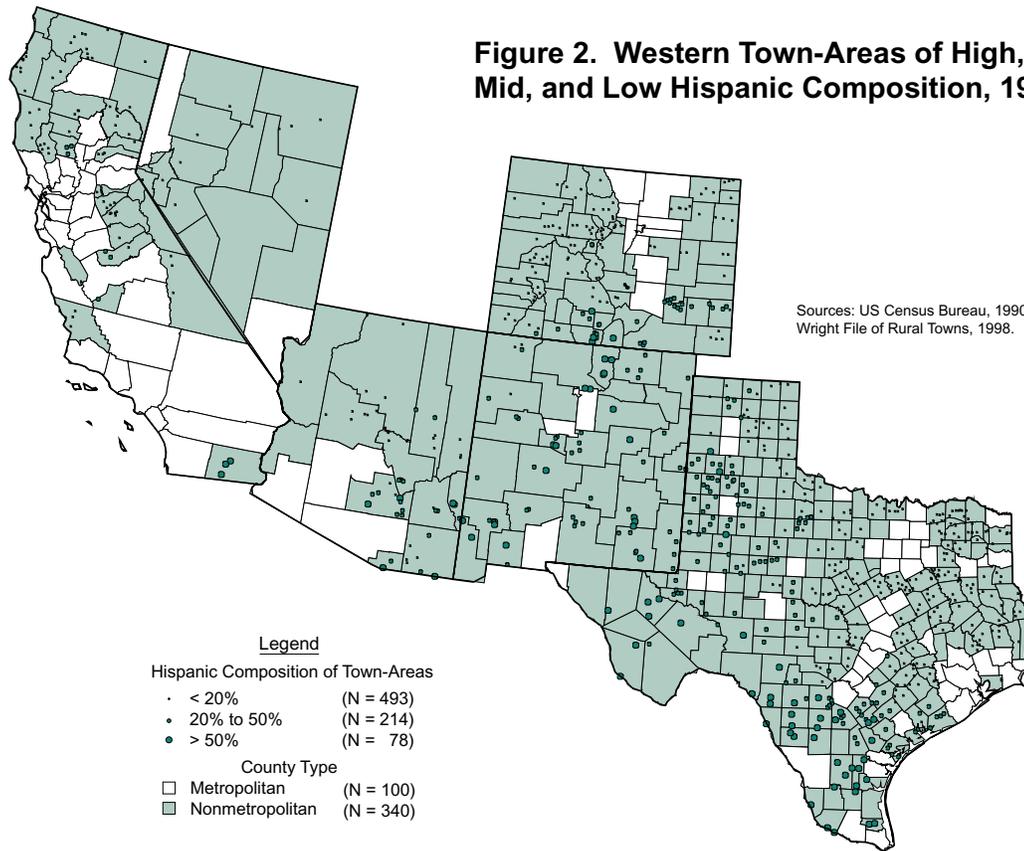


Figure 2. Western Town-Areas of High, Mid, and Low Hispanic Composition, 1990



Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Western town-areas (Figure 2) included 292 (91%) of the 320 nonmetropolitan town-areas with over 20% Hispanics.

Analyses

Analyses were conducted separately for Hispanic/Western and African American/Southern town-areas. For bivariate analyses, we divided town-areas into several strata based on their minority compositions, striving to create as many strata as sample sizes would allow. Southern town-areas were divided into four African American composition strata (<20% African Americans; 20-40%; 40-60%; >60%), which were compared on characteristics of their populations, physician-to-population ratios, whether they had any physicians at all, and distances to the nearest hospital offering each of four levels of services. We divided the fewer Western town-areas into three strata based on their Hispanic compositions (<20% Hispanics; 20-50%; >50%), which were then compared on the same population characteristics and hospital resource measures. Statistical testing was not used to test simple associations between minority composition and resources, as the study samples contained all eligible town-areas in the selected states.

To assess several possible explanations for associations found in bivariate analyses, multiple linear and logistic regression models of the medical geographic-access indicators were run with adjustments for two sets of added variables. We first added state indicators to assess for confounding by unmeasured state-to-state differences, such as state differences in geography and within-state production of physicians.²⁶ In a second adjusted model form, we further added three

socio-economic indicators—town area population size (logged), percent of the population below poverty, and percent persons over age 65—to test whether associations between minority strata and health resources were due to other inter-correlated socio-economic factors known to predict physician location.²⁰ In the regression models, we used dichotomous indicators of minority composition to compare access measures for town-areas of over 50% minorities to town-areas of under 20% minorities, omitting town-areas of between 20 and 50% minority composition. The cut-point for the high African American composition group was lowered from 60% in the bivariate analyses to 50% in the multivariate analyses to increase group size and thereby strengthen statistical power when assessing multiple variables simultaneously.

RESULTS

Characteristics of Town-Areas with Differing African American and Hispanic Compositions

With town-areas in the nine Southern states arranged into strata from low to high proportions of African Americans (Table 1), those in the higher African American proportion groups were found to have populations that were smaller, poorer, far more often in poverty, more often unemployed, but less often elderly. Indicators of geographic isolation—miles to the nearest town of 50,000 population and the proportion of county citizens who commuted to neighboring counties for work—showed no meaningful differences across low to high African American composition strata.

Western town-area groups of higher Hispanic composition similarly demonstrated smaller populations, lower incomes, more poverty, higher unemployment rates, fewer elderly, and only modest variation in the indicators of geographic isolation.

Racial-Ethnic Composition and Geographic Availability of Physicians and Hospitals

African American composition—Among Southern town-areas, physician-to-population ratios and the likelihood of having no physician did not vary greatly or in a linear fashion with the proportion of African Americans in the population (Table 2).

As expected of hospitals offering rarer and more specialized services, distances to them were generally further than to hospitals providing only more common services. Pertinent to this study's research questions was that the nearest hospital offering each of the four levels of service was generally located further from town-areas in the higher African American composition strata than from those in the lower composition strata (Figure 3). Mean distances for the highest versus lowest African American composition town-area groups were 2.3 miles (25%) longer to hospitals offering the most basic, level 4 services; 5.9 miles (38%) longer to level 3 service hospitals; 6.3 miles (25%) longer to level 2 service hospitals; and 8.7 miles (23%) longer to hospitals offering the most specialized, level 1 services.

Hispanic composition—Majority Hispanic town-areas in the West had meaningfully lower primary care, specialist and total physician-to-population ratios than town-areas with fewest Hispanics (Table 2). The likelihood of having no

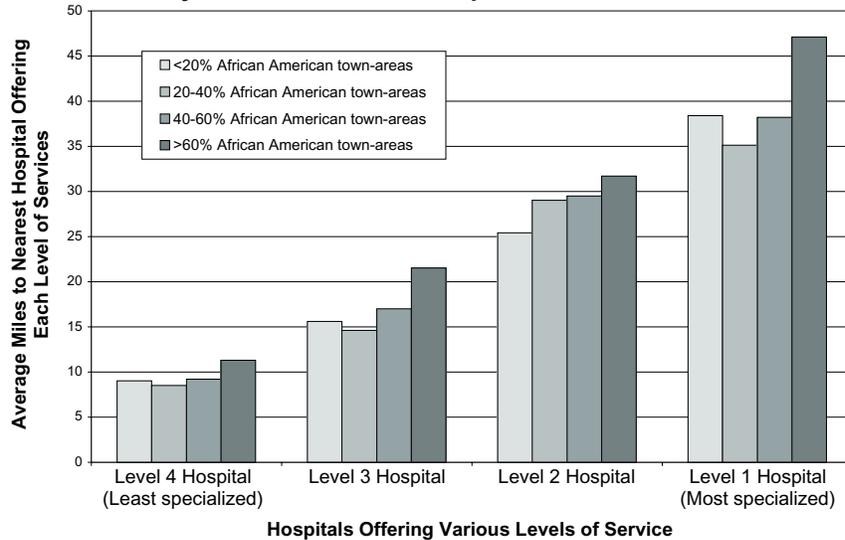
Table 1. Characteristics of town-areas in nine Southern states, by African American composition; and in six Western states, by Hispanic composition.

	Town-Areas in Southern States			Town-Areas in Western States			
	Less than 20% African American (n=767)	20 to 40% African American (n=605)	40 to 60% African American (n=400)	Over 60% African American (n=171)	Less than 20% Hispanic (n=493)	20 to 50% Hispanic (n=214)	Over 50% Hispanic (n=78)
Mean total population	11,473	12,674	10,278	7,929	12,185	10,216	10,387
Mean percent of population above age 64	16.0%	14.3%	14.7%	14.4%	16.9%	14.6%	12.3%
Mean percent population below poverty (all racial-ethnic groups)	17.9%	22.6%	28.4%	39.0%	16.7%	22.4%	32.7%
Mean family income	\$30,006	\$29,460	\$27,656	\$24,010	\$33,728	\$30,239	\$25,665
Mean percent unemployed	6.5%	7.6%	8.9%	11.7%	6.5%	7.4%	11.0%
Mean percent of employed persons who travel out of county for work	30.1%	30.7%	31.1%	29.7%	22.1%	18.6%	17.1%
Mean miles to nearest town above 50,000 population	56.6	50.8	48.0	53.0	66.1	59.5	74.2

Table 2. Availability and proximity of physicians and hospitals to town-areas in Southern states, by African American composition; and in Western states, by Hispanic composition.

	Southern Town-Areas				Western Town-Areas		
	Less than 20% African American (n=767)	20 to 40% African American (n=605)	40 to 60% African American (n=400)	Over 60% African American (n=171)	Less than 20% Hispanic (n=493)	20 to 50% Hispanic (n=214)	Over 50% Hispanic (n=78)
Mean total physicians per 100,000 population	19.2	21.7	25.6	17.7	31.2	30.7	24.2
Mean primary care physicians per 100,000 population	12.1	13.4	16.8	12.9	19.9	21.8	16.2
Mean specialist physicians per 100,000 population	7.1	8.4	8.8	4.8	11.3	8.9	8.0
Having at least one physician in the town-area	39.0%	43.5%	46.3%	40.9%	47.7%	52.8%	52.6%
Mean miles to nearest short term care hospital	9.0	8.5	9.2	11.3	10.9	10.3	14.3
Mean miles to nearest hospital with level 3 services (e.g., outpatient rehabilitation and cardiac ultrasound)	15.6	14.6	17.0	21.5	19.9	24.2	31.6
Mean miles to nearest hospital with level 2 services (e.g., cardiac catheterization and level 2 nursery)	25.4	29.0	29.5	31.7	43.4	47.9	60.6
Mean miles to nearest hospital with level 1 services (e.g., open heart surgery and pediatric psychiatry)	38.4	35.1	38.2	47.1	50.7	55.6	69.0

Figure 3. Hospital Proximity of Southern Town-areas by African American Composition



physician at all did not vary greatly across Hispanic composition strata. Distance to the nearest hospital offering each level of service was about 30% longer for town-areas in the high versus low Hispanic composition strata.

Adjusted Analyses

African American composition—After adjusting for area location within the nine Southern states, still no significant differences were found in the distribution of physicians between town-areas in the high and low African American strata (Table 3). Even further adjustments for local socio-demographic factors—town-area population size, poverty rates, and percent elderly—did not uncover differences across African American composition strata.

The finding that predominantly African American town-areas (>50% composition), compared to town-areas in the lowest African American stratum (<20%), were significantly further from hospitals offering levels 3, 2 and 1 services remained after adjusting for state location. However, with adjustments for other socio-demographic characteristics, only for hospitals offering level 3 services did a greater distance remain for town-areas in the high African American composition strata.

Hispanic composition—The relationship between town-areas' high Hispanic composition and lower total and primary care physician-to-population ratios remained with adjustments for location across the Western states and other non-ethnic socio-demographic factors (Table 3). The finding that town-areas that were predominantly Hispanic were located farther from level 3, 2 and 1 hospitals than those with fewest Hispanics also persisted after adjustments for state location and non-ethnic socio-demographic factors.

DISCUSSION

This study confirms the common belief that rural minorities often face longer travel distances to health services than non-minority rural individuals.

Table 3. Geographic availability of physicians and hospitals for Southern and Western town-areas with over 50% minorities (African American and Hispanics, respectively) relative to town-areas with fewer than 20% minorities. Results of multiple linear and logistic regression models, both unadjusted and adjusted for location within specific states ¹ and population socio-demographics ².

Resource Measure	Southern Town-Areas (n = 938)			Western Town-Areas (n = 571)		
	--Hi vs. Lo African American Composition Comparisons--			--Hi vs. Lo Hispanic Composition Comparisons--		
	Unadjusted	Adjusted only for specific state ¹	Adjusted for specific state and socio-demographics ²	Unadjusted	Adjusted only for specific state ¹	Adjusted for specific state and socio-demographics ²
Standardized Estimates (p-value)						
Mean total physicians per 100,000 population ³	-0.02 (.60)	0.00 (.94)	-0.03 (.53)	-0.12 (.02)	-0.10 (.05)	-0.14 (.04)
Mean primary care physicians per 100,000 population ³	0.01 (.77)	0.04 (.37)	-0.05 (.37)	-0.12 (.02)	-0.10 (.06)	-0.14 (.04)
Mean specialist physicians per 100,000 population ³	0.01 (.85)	0.04 (.43)	0.01 (.85)	-0.10 (.14)	-0.06 (.42)	-0.09 (.31)
Having at least one physician in the town-area	0.02 (.30)	0.01 (.80)	-0.02 (.68)	0.03 (.42)	0.04 (.31)	0.03 (.65)
Mean log miles to nearest hospital (level 4)	0.03 (.17)	0.07 (.007)	0.04 (.20)	0.01 (.86)	-0.01 (.87)	-0.06 (.19)
Mean log miles to nearest hospital with level 3 services (eg, outpatient rehab and cardiac ultrasound)	0.14 (.0001)	0.15 (.0001)	0.11 (.001)	0.11 (.001)	0.08 (.03)	0.13 (.006)
Mean log miles to nearest hospital with level 2 services (eg, level 2 nursery and cardiac catheterization)	0.12 (.0001)	0.13 (.0001)	-0.06 (.08)	0.13 (.0004)	0.15 (.0001)	0.13 (.003)
Mean log miles to nearest hospital with level 1 services (eg, open heart surgery and pediatric psychiatry)	0.10 (.0001)	0.15 (.0001)	-0.07 (.07)	0.14 (.0001)	0.09 (.007)	0.10 (.03)

Table Footnotes:

¹ Control variables in the state-adjusted models for Southern states included indicators for Alabama, Arkansas, Florida, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia. Georgia was the omitted category. In Western states, control variables included indicators for Arizona, California, Colorado, and New Mexico; Texas and Nevada were grouped as the omitted category.

² Control and explanatory variables in the fully adjusted models included the same state indicators listed above, with additional indicators for town-area population size (logged), percent of population below poverty, and percent of population over 65 years of age.

³ Town-area analyses of physician-to-population ratios exclude towns with no physicians

This study's findings for 1990 are summarized as follows:

1. Western majority Hispanic town-areas had one-quarter fewer physicians per population than Western town-areas that were overwhelmingly non-Hispanic White. This relationship was not due to extraneous differences between states, nor accounted for by socio-demographic differences across town-areas other than ethnicity.
2. The density of physicians did not vary significantly with the proportion of African Americans in Southern town-areas.
3. Distances to the nearest hospitals offering each of four levels of service—from basic to tertiary subspecialty—were generally about 25% to 35% farther for Southern town-areas comprised of over 60% African Americans and for Western town-areas comprised of over 50% Hispanics, compared to predominantly non-Hispanic White town-areas in the same regions. These relationships were not due to confounding by extraneous state factors, and in some cases were not explained by socio-economic factors other than race and ethnicity, especially for majority Hispanic town-areas in the West.
4. The meaningful disadvantages seen in physician availability and distances to hospitals were primarily for communities comprised of over 50% or 60% minorities. Differences in the relative availability of physicians and hospitals were smaller and in no uniform direction for communities of midrange minority composition (20% to 50-60%) compared to predominantly non-Hispanic White communities.

These data suggest that the relationships between rural communities' racial-ethnic composition and their proximity to health services differs for African Americans and Hispanics, differs for low, medium, and high proportion minority communities, and differs for proximity to physicians, basic hospital services, and more specialized hospital services. Generally, the geographic access of predominantly minority rural communities is poorer than that of non-minority rural communities, but not uniformly so. If we had studied access in a fully national rural context rather than within specific regions, relative access for minority communities would have been judged still lower overall, given the Northeast's closer spacing of towns, higher physician and hospital densities, and virtual absence of high-proportion minority communities.

We do not know why physician-to-population densities are lower for high compared to low-proportion Hispanic communities in the West but not for high compared to low-proportion African American communities in the South. We do not anticipate that the health care system and physicians of the West are less responsive to the needs of rural minorities by design. Instead, we suspect the explanation lies in regional differences in history, terrain, distribution of towns, and programs that produce and influence the distribution of physicians.

Unique local and regional histories and social forces have created differing access situations for the many rural minority communities. Many predominantly African American communities emerged in lowland, plantation areas of the South following the Civil War, and remained agriculturally supported until the decline of small tenant farming after World War II.^{19,27,28} Public resources of all types, from education to health care, have been slow to develop in these poor communities.

Predominantly Hispanic communities of the Rio Grand Valley in Texas were established and often prosperous as Spanish and later Mexican towns prior to the 1845 annexation of Texas into the US.¹⁹ The Hispanic settling of California's Imperial and Central Valleys and the High Plains of New Mexico and Texas occurred after 1900 with the demand of large farms for low-cost workers. Many rural Hispanics remain dependent on their low agricultural wages, and the regional organization of health care delivery remains a challenge due to their communities' poverty, small scale, isolation, language and cultural barriers, and the laws and controversies of international migration.

It should be emphasized that this study only examined counts of local physicians and distances to the closest basic and more specialized hospitals, but did not assess whether towns' inhabitants, if traveling to these local physicians and closest facilities, actually would be accepted there as patients. Some practitioners and facilities impose other barriers, such as not accepting patients covered under Medicaid, Medicare, or certain private insurance plans, or requiring payment in advance of services, thus forcing individuals to travel still further for care. These added barriers likely disproportionately affect minorities. Differences in local typology, road conditions, and availability of adequate personal and public transportation could further exacerbate or lessen the relative challenge of the added distance to care faced by rural minority communities.

Limitations

Physician data in the AMA Masterfile and incorporated into the town-area file used in this study omit an unknown number of osteopaths and include some inaccurate addresses.²⁴ Further, when the town-area file was created, 9.2% of the Masterfile's non-metropolitan physicians could not be matched to specific towns, and were omitted from the file and thus from our analyses. These data shortcomings likely did not differ systematically for minority and non-minority communities. As always in an observational study design, other untested factors may have confounded or explained the relationships between community race/ethnicity and health resource availability.

Among external validity issues, this study's findings may not apply to the 134 omitted town-areas of fewer than 1,500 people. Further, if settlement patterns during the period of tremendous growth in rural Hispanics since 1990²⁹ differ

from those earlier, the geographic access situation for Hispanics may have changed, for either the better or worse. Future studies will need to clarify the access of other ethnic, racial, and cultural minority communities in rural America.

Conclusions and Recommendations

There are many reasons why racial-ethnic minorities in the US receive fewer health services than non-minorities. Some reasons are cultural or reflect personal preferences^{7,30,31}, but often external barriers are at play. These barriers differ across minority groups, locations, and types of care-needs. This study demonstrated that the local relative unavailability of physicians is a barrier for predominantly Hispanic rural communities in the West, and that longer travel distance to hospital services is a barrier for both predominantly Hispanic Western rural communities and predominantly African American Southern rural communities. Longer travel distance to care is not a trivial barrier, perhaps influencing patients' use rates of services more than financial barriers and office waiting times, particularly for African Americans.³²⁻³⁴

Organized transportation services sponsored by hospitals and practices are a natural solution to offset distance disparities, enabling those without reliable personal transportation to reach care. Organized, free or low-cost transportation services are preferable to the common practice among the rural poor of depending on neighbors, whose good will can be overtaxed, whose schedules are sometimes inconvenient or unworkable for those needing transport, and who sometimes expect "gas fare" beyond that affordable.

As a complementary strategy, distance to nearby minority communities should be considered when locating new rural hospitals, satellite clinics, community health centers, and physicians' offices. Current and new state and federal programs could draw rural providers closer to predominantly minority communities with financial incentives, such as higher reimbursement rates for care rendered, tax benefits, and educational loan repayment incentives.

Future studies should assess the situations for which distance barriers are best addressed by expanding local health services versus adding transportation options to existing or expanded more distant services. It also will be important to know whether the federal Health Professional Shortage Area (HPSA) and Medically Underserved Area (MUA) designations for targeting federal assistance programs capture the distance challenges faced by some rural minorities. Future assessments also should monitor whether distance-to-care disparities for rural minorities disappear as an echo of history, or grow with the rapid changes in rural racial-ethnic demographics, with rural hospital closures, and with medicine's increasing dependence on hospital-linked technology that requires regional location.

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BIBLIOGRAPHY

1. US Department of Health and Human Services. *Healthy People 2010 (Conference Edition)*, dated January 2000. Available: <http://www.health.gov/healthypeople>. Access date, April 20, 2000.
2. US Department of Health and Human Services. Race and Health Initiative. <http://raceandhealth.hhs.gov> Access date, April 20, 2000.
3. Henry J. Kaiser Family Foundation. *Key Facts: Race, Ethnicity & Medical Care*. Report dated October 1999. Available on-line at www.kff.org/content/1999/1523/.
4. Mayberry RM, Milli F, Vaid IGM, et al. Racial and Ethnic Differences in Access to Medical Care: A Synthesis of the Literature. Report from the Morehouse Medical Treatment and Effectiveness Center. Menlo Park, CA: Henry J. Kaiser Family Foundation, October 1999.
5. Lieu TA, Newacheck PW, McManus MA. Race, ethnicity, and access to ambulatory care among US adolescents. *Am J Public Health*. 1993;83:960-965.
6. Gornick ME, Eggers PW, Reilly TW, Mentnech RM, Fitterman LK, Kucken LE, Vladeck BC. Effects of race and income on mortality and use of services among Medicare beneficiaries. *NEJM*. 1996;335:791-799.
7. Andersen R, Lewis SZ, Giachello AL, Aday LA, Chiu G. Access to medical care among Hispanic populations of the Southwestern United States. *Journal of Health and Social Behavior*. 1981;22:78-89.
8. Frederick Schneiders Research. *Perceptions of How Race & Ethnic Background Affect Medical Care: Highlights from Focus Groups*. Report prepared for the Henry J. Kaiser Family Foundation, October 1999.
9. Monheit AC, Vistnes JP. Race/Ethnicity and Health Insurance Status: 1987 and 1996. *Medical Care Research and Review*. 2000; 57 (supplement 1):11-35.
10. Smith DB. *Health Care Divided: Race and Healing of a Nation*. Ann Arbor: University of Michigan Press, 1999.
11. LaVeist TA, Nickerson KJ, Bowie JV. Attitudes about racism, medical mistrust, and satisfaction with care among African American and White cardiac patients. *Medical Care Research and Review*. 2000;57 (supplement 1):11-35.
12. US Census. Available: www.census.gov/population/socdemo/race/black/tabs99/tab16.txt. Access date, September 29, 2000.
13. Amey CH, Miller MK, Albrecht SL. The role of race and residence in determining stage at diagnosis of breast cancer. *Journal of Rural Health*. 1997;13:99-108.
14. Escarce JJ, Epstein KR, Colby DC, Schwartz JS. Racial differences in the elderly's use of medical procedures and diagnostic tests. *Am J Public Health*. 1993;83:948-954.
15. Edelman MA, Menz BL. Selected comparisons and implications of a national rural and urban survey on health care assess, demographics, and policy issues. *Journal of Rural Health*. 1996;12:197-205.
16. Swanson LL. *Racial/Ethnic Minorities in Rural Areas. Progress and Stagnation, 1980-1990 (AER-731)*. US Department of Agriculture, Washington, DC, 1996.
17. Bronstein JM, Morrisey MA. Determinants of rural travel distance for obstetrics care. *Med Care*. 1990;28:853-866.
18. US Congress, Office of Technology Assessment. *Health Care in Rural America (OTA-H-34)*. Washington, DC: US Government Printing Office, September 1990.

20. Langwell KM, Drabek J, Nelson SL, Lenk E. Effects of community characteristics on young physicians' decisions regarding rural practice. *Public Health Reports*. 1987;102:317-328.
21. Wright GE. *Community characteristics and the competition for physicians in rural America, 1971-1981*. Final report from Macro Systems to the Assistant Secretary for Planning and Evaluation, DHHS. January 1985.
22. Langwell K, Nelson S, Calvin D, Drabek J. Characteristics of rural communities and the changing geographic distribution of physicians. *The Journal of Rural Health*. 1980;1:42-55.
23. Kindig DA, Yan G. Physician supply in rural areas with large minority populations. *Health Affairs*. 1993 (summer);12:177-183.
24. Wright GE. *File Description for Universe of Rural Places*. University of Washington, Seattle, WA, October, 1998b.
25. Wright GE. *File Description for Town Characteristics of Rural Places*. University of Washington, Seattle, WA, October, 1998a.
26. Waidmann TA. Race and ethnic disparities in health care access and utilization: An examination of state variation. *Medical Care Research and Review*. 2000;57 (supplement):55-84.
27. Aiken, CS. Race as a factor in municipal underbounding. *Annals of the Association of American Geographers*. 1987;7:564-579.
<http://www.soulofamerica.com/towns/index.html>; Access date, November 21, 2000.
29. US Census Bureau. *Statistical Abstract of the United States: 2000*. 120th Edition. US Government Printing Office, Washington DC. Online reference: <http://www.census.gov/prod/www/statistical-abstract-us.html>.
30. Fiedler JL. A review of the literature on access and utilization of medical care with special emphasis on rural primary care. *Soc Sci & Med*. 1981;15C, 129-142.
31. Lannin DR, Matthews 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.
32. Miners LA, Greene SB, Salber EJ, Scheffler RM. Demand for medical care in a rural setting: racial comparisons. *Health Services Research*. 1978;13:261-275.
33. Blustein J, Weitzman BC. Access to hospitals with high-technology cardiac services: how is race important? *Am J Public Health*. 1995;85:345-351.
34. Mirvis DM, Graney MJ. Impact of race and age on the effects of regionalization of cardiac procedures in the Department of Veterans Affairs health care system. *Am J Cardiol*. 1998;81:982-987.

