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RACE AND PLACE

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**Race and Place: Urban-Rural Differences in Health
For Racial And Ethnic Minorities**

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**RACE AND PLACE:
URBAN-RURAL DIFFERENCES IN HEALTH
FOR RACIAL AND ETHNIC MINORITIES**

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Executive Summary

In his February 21, 1998 radio address, the President announced an initiative to eliminate the access and outcomes disparities in health status experienced by racial and ethnic minority populations, with the goal of eliminating these disparities by the year 2010. The initiative focused on six health areas: infant mortality, cancer screening and management, cardiovascular disease, diabetes, HIV infection, and child and adult immunizations.

Although it is well established that nationally there are disparities in health status and access to health care between whites and racial and ethnic minorities, less is known about how the health status and health care access of minorities residing in rural areas compares to that of their urban counterparts and rural whites. It is possible that the gap in health status and poorer access to the full range of health care services that exists for minorities nationally is exacerbated by a variety of factors in the rural health care delivery environment such as poverty, transportation problems, and limited provider availability. In addition, recent migration of new ethnic and minority groups into rural areas may be creating the need for a more diverse provider base to overcome cultural and language differences.

This working paper investigates the issue of urban-rural disparities for racial and ethnic minorities in the six health areas in the President's initiative, combining information from the literature with analyses using secondary data. The information from the literature is sparse, as few studies consider interaction between race/ethnicity and rural residence with respect to either health status or access to care. The vast majority of studies that looked at differences across racial and ethnic groups did not consider geographic place of residence. The summary of the literature primarily focuses on those studies that are generalizable to the entire United States. The majority of studies (25) either lacked an urban comparison group, were inconclusive, or found no difference across race and place. Rural minorities were found to be worse off than rural whites when assessing Infant Mortality Rates (6 studies), cancer screening and management (4 studies), HIV and AIDS (3 studies) and childhood immunization coverage (1 study), although for IMR and HIV/AIDS rural minorities have been found to be better off than their urban counterparts (2 and 3 studies respectively).

Analyses of secondary data (Table 1) were able to inform the issue at a national level. Rural non-white female Medicare beneficiaries have a significantly lower rate of receiving mammograms

Table 1
Summary of secondary data analyses

	MSA			Non-MSA		
	White	Non-White		White	Non-White	
% Medicare beneficiaries with influenza shot ¹	52%	36%		53%	34%	
% Medicare beneficiaries with pneumonia shot ¹	22%	14%		24%	10%	
% Medicare beneficiaries with Pap test ¹	29%	28%		23%	17%	
% Medicare beneficiaries with mammogram ¹	35%	35%		29%	19%	
		Black	Other		Black	Other
% children with all shots ²	88%	84%	82%	87%	85%	87%
% population with diabetes ³	1.93%	3.61%	2.64%	2.31%	5.34%	2.86
Diabetes mortality rate ⁴	116	284	99	122	295	273
Heart disease mortality rate ⁴	1638	2555	1017	1793	2796	1486
AIDS mortality rate ⁴	128	565	37	40	209	41
Infant mortality rate ⁵	6.1	15.1	4.5	7.1	15.4	7.8

¹ Medicare Current Beneficiary Survey

² Immunization Supplement to the 1994 NHIS

³ 1994 National Health Interview Survey

⁴ Death rates per million, National Center for Health Statistics 1991-1995 Compressed Mortality Files

⁵ Deaths per 1000 live births, National Center for Health Statistics 1991-1995 Compressed Mortality Files

and Pap tests than all other groups of individuals. The rural black population has a higher age-adjusted death rate from heart disease and diabetes than individuals in other categories, and death rates are also much higher among rural than urban "other race" persons.

Analyses of the limited number of health status and health care indicators that are available for the six health areas in the President's initiative suggest that in addition to the known national disparities between whites and other races, rural minorities are further disadvantaged than their urban counterparts in certain health areas. While findings in the literature and data analyses conducted here do not point to a rural-specific differential regarding minority rates of HIV infection, infant mortality or immunization receipt, rural minorities do appear to be further disadvantaged regarding cancer screening and management, cardiovascular disease, and diabetes. The differential in both the prevalence and death rate from diabetes is the greatest, and also one of the most troubling, as this is a highly prevalent disease whose incidence is increasing.

The question that these analyses are not able to address is why the gap in health status between whites and minorities is greater in rural areas, and why rural minorities fare worse than their urban counterparts. Further research is needed to understand the mechanisms that result in poorer access and outcomes for rural minorities. Without this understanding, it will be difficult to design programs and policies that will be effective in reducing the gap between rural and urban racial and ethnic groups. Although such research can currently be conducted for specific minority populations in small geographic areas, national surveys will need to be enhanced if they are to facilitate statistical analysis of sub-groups in rural areas.

Introduction

In his February 21, 1998 radio address, the President announced an initiative to eliminate the access and outcomes disparities in health status experienced by racial and ethnic minority populations, with the goal of eliminating these disparities by the year 2010. The initiative

focused on six health areas: infant mortality, cancer screening and management, cardiovascular disease, diabetes, HIV infection, and child and adult immunizations. It is well established that nationally there are disparities in health status and access to health care between whites and racial and ethnic minorities (Berglas and Lim, 1998). The Office of the Assistant Secretary for Health (OASH) has published data that point to large differences in the six areas between white populations and other racial and ethnic groups (US Department of Health and Human Services [DHHS], 1998).

Less is known about how the health status and health care access of minorities residing in rural areas compares to that of their urban counterparts and rural whites. It is possible that the gap in health status and poorer access to the full range of health care services that exists for minorities nationally is exacerbated by a variety of factors in the rural health care delivery environment such as poverty, transportation problems, and limited provider availability. Rural residents tend to be poorer than those who reside in urban areas (Braden and Beauregard, 1994), and among rural populations, blacks, Hispanics, and Native Americans are three times as likely to be poor as are whites (US Department of Agriculture, 1996).

In recent years there has been a migration of new ethnic and minority groups into rural areas (for example, the influx of Asian-Americans in the midwest). The stress that these migrant streams place on the health care system, and the inability of the system to meet the needs of these individuals, is only beginning to be recognized and documented. With this flow of new populations, including recent immigrants with limited English language capacity, the historical problem of health care provider shortages may become more acute, as a more diverse provider base is needed to overcome cultural and language differences.

This working paper investigates the issue of urban-rural disparities for racial and ethnic minorities in the six health areas in the President's initiative. Creating a comprehensive picture of these disparities is difficult; specific

racial and ethnic groups tend to be concentrated in different parts of the country, and problems with empirical data (discussed later in this paper) limit the ability to reach definitive conclusions. In an attempt to provide as much information as is available, this paper has three distinct sections. First, the current literature is summarized, and significant gaps in current knowledge are identified. Second, analyses of existing secondary data are presented and discussed. Finally, analysis limitations imposed by the lack of secondary data and the unavailability of geographic identifiers in national survey analysis files are discussed.

Literature Review

This review organizes studies of urban versus rural health disparities according to the six areas identified in the President's initiative on race. For each of the six health areas, a listing of the included studies and a short summary of their findings are presented in tabular form in the appendix. In the tables, studies are categorized by whether they investigate disparities only across "place", or consider the differences between whites and minorities in addition to contrasting rural areas to urban ones ("race and place"). Much of the material was identified previously in a 1994 report by WWAMI Rural Health Research Center on patient outcomes and medical effectiveness in rural areas (University of Washington AHCPR Center for Rural Health Research, 1994). To bring this review up to date, a literature search was conducted in Medline for the period January 1994-August 1999. Keywords included "race" and "rural", in conjunction with "infant mortality", "cancer management", "cancer screening", "immunizations", "diabetes", and "cardiovascular disease". Articles that appeared promising based on their title and abstract were reviewed, if available, as well as articles on reference lists of relevant articles. Studies on disparities in health or health care across race and residence that do not address one of the six areas are not discussed here. Studies that investigate race only are also not discussed. Only a few articles were identified

that had been published since the WWAMI report and focused on any of the six health conditions.

As noted in a recently published summary article, the literature contains few analyses that consider the interaction between race/ethnicity and rural residence with respect to either health status or access to care (Mueller et al., 1999). The vast majority of studies that look at differences across racial and ethnic groups do not consider geographic place of residence. Some studies report race-specific rates after controlling for rural or urban residence; such control only indicates that there may be a differential gap in health for minorities who live in rural areas, but firm conclusions cannot be derived without examining the interaction of race/ethnicity and rurality.

The majority of studies we identified investigated differences between white and black¹ populations. The next most frequent minority group studied was American Indians and Alaska Natives (AI/AN). No studies of Asian or Pacific Islanders (A/PI) as a specific group were encountered. Most of the studies used residence in a nonmetropolitan county as the definition of rural residence. For the purposes of this review, American Indian reservations are considered as rural areas if they were not specified as urban.

One of the most significant findings of this analysis is that few studies examined the entire United States. Thus, the majority of rates and statistics presented in the tables are for smaller areas and are therefore limited in generalizability. The summaries accompanying the tables focus predominately on those studies that are generalizable to the entire United States.

Infant Mortality (Table A.1): Although the infant mortality rate (IMR) of blacks is substantially higher than for whites, studies of data from the 1980s find that among blacks, the IMR rate is actually lower in rural areas than in urban ones (Farmer et al., 1993; Kleinman et al., 1991). According to Farmer and colleagues, the 1987 infant mortality rate for metropolitan blacks was 18.07 deaths per 1,000 live births, compared with

¹ Use of identifiers of racial categories is based on the categories most frequently used in both the literature and by the agencies collecting the data presented later in the paper.

16.73 for nonmetropolitan blacks. For whites, residence had the opposite effect; infant mortality rates were lower for urban whites (8.52 for metropolitan areas and 8.84 for non-metropolitan areas). There is substantial heterogeneity across types of rural counties. Infant mortality rates in blacks vary by as much as 3.31 deaths per 1,000 live births across types of nonmetropolitan counties, with lowest rates in mid-sized, non-metropolitan areas (Farmer et al., 1993). Further analyses by Farmer and colleagues explored regional differences. While black infant mortality rates in metropolitan areas are consistently higher than in non-metropolitan areas, the ratio of the two varies from 1.65 in the North Central U.S. to 1.03 in the South. Overall, the authors concluded that rural health policy initiatives must consider degree of rurality, race, region, and state to be successful.

While rural blacks do not appear to be disadvantaged relative to their urban counterparts regarding IMR, this may not be the case for rural AI/AN. In a study of urban and rural AI/AN IMR in Washington state, urban AI/AN infants had a ten-year mortality rate of 14.7 deaths per 1,000 live births compared to a rural AI/AN rate of 23.2 (Grossman et al., 1994). The fact that these data are for only one state make conclusions on a national scale difficult; AI/AN infant mortality rates vary greatly by geographic area (Rhoades et al., 1992). In addition, infant mortality rates in Washington State have been increasing over time for the urban AI/AN population and decreasing for the rural AI/AN population (Grossman et al., 1994).

Cancer Screening and Management (Tables A.2a-A.2c): Comparisons of cancer screening and management across populations and places encompass far more sub-topics than could be included in this review. We have chosen to focus on the same three cancer screening tools presented by the OASH—clinical breast examinations (Table A.2a), mammograms (Table A.2b), and Pap tests (Table A.2c).

The results of studies that focus on one or more distinct geographic areas show that the receipt of cancer screening tests varies geographically (National Cancer Institute [NCI]

Consortium for Underserved Women, 1995; Strickland and Strickland, 1996; Skaer et al., 1996; Gilliland et al., 1999; O'Malley et al., 1997). The extent to which there are racial and ethnic differences across urban and rural areas thus depends in part upon which area of the country is examined.

Nationally, rural women are less likely to have received clinical breast exams than women residing in urban areas (Office for Technology Assessment [OTA], 1990). Among the few studies we were able to identify, there was no evidence that rural minority women had rates of clinical breast examinations that were different than rural whites. Rates reported in a study of black women in rural Georgia were similar to rural rates nationally (Strickland and Strickland, 1996) and in a regression analysis of the predictors of having had a clinical breast exam, the interaction of race and residence was not significant (Duelberg, 1992).

The evidence regarding a gap in mammogram receipt between rural minorities and either rural whites or urban minorities is inconclusive. Among Medicare enrollees, rural black elderly were significantly less likely to receive mammograms than rural white elderly, and there was a greater difference between rural blacks and whites as compared to urban blacks and whites (Escarce et al., 1993). These findings were supported by analyses of the 1987 National Health Interview Survey (NHIS) (Breen and Kessler, 1994; Makuc, 1999), but the 1990 data from this same survey show that race and ethnicity were no longer significant predictors of mammography use (Breen and Kessler, 1994). An analysis of data from the 1987 NHIS Cancer Control Supplement found that after adjusting for place of residence and other demographic factors, there was no significant difference between black and white women, although Hispanics and women of "other" races (non-white, non-black, non-Hispanic) were significantly less likely to have had a mammogram than were white women (Calle et al. 1993). However, the authors also constructed profiles of women at high risk for never having had a mammogram, and black women in rural areas living at between 100% and 200% of the poverty level

ranked in the top risk profiles (although the top two-way risk profiles did not include race and place — only when poverty is added do race and place become risk factors).

With respect to Pap test incidence, although Calle and colleagues (1993) found that being Hispanic or of other (non-white, non-black) race or ethnicity decreased the likelihood of women ever having had a Pap test, the combination of race and rurality did not appear in the top risk profiles for never having had a Pap test. The findings are in contrast to those of Duelberg (1992), who found that the interaction of race and urban residence was statistically significant; black women living in urban areas were the most likely to have had a Pap test, followed by black women in rural areas. Urban white women were slightly more likely to have a Pap test than were rural white women. The difference in likelihood of receiving a Pap test was larger in blacks across urban and rural areas than in whites, even though more blacks were likely to receive a Pap test than whites.

Cardiovascular Disease (Table A.3):

Nationally, cardiovascular disease deaths are substantially higher in black populations compared with both whites and other minorities (US DHHS, 1998). Crude rates of ischemic heart disease and stroke among respondents to the NHIS were higher in rural areas, but these rates were not age-adjusted (US DHHS, Centers for Disease Control and Prevention [CDC], 1995). After adjusting for age, sex, and race, rural cardiovascular disease death rates were found to be lower than in urban areas (OTA, 1990), but the declines in ischemic heart disease death rates that have occurred in the last thirty years happened earlier in urban than in rural areas (CDC 1997). The rate of stroke mortality for various race groups has been found to vary geographically, with higher rates in the Southeast and the Mississippi River Valley (Pickle et al., 1997).

Although the national rate of cardiovascular disease mortality is low for the AI/AN population (US DHHS, 1998), Grossman and colleagues (1994) found that rural AI/AN persons had a statistically significantly higher rate of coronary heart disease and stroke compared with urban AI/AN people. Since the authors were unable to

use linked birth and death records to confirm race classification for these mortality rates, they caution that these rates may underestimate AI/AN numbers, particularly in urban areas where coroners may be less aware of the identification of AI/AN persons.

Diabetes (Table A.4): Non-white populations face a two to six times greater risk of non-insulin-dependent diabetes compared with white individuals (Carter et al., 1996). In addition, the prevalence of diabetes in rural areas is substantially higher than in urban areas (Pearson and Lewis, 1998; US DHHS, CDC, 1995), and the patterns of care for rural residents with diabetes differ from their urban counterparts (Dansky and Dirani, 1998). Although these separate findings suggest that rural minority populations would be at particular risk, after adjustment for age, sex, and race, death rates from diabetes are identical in rural and urban areas (OTA, 1990).

HIV Infection (Table A.5): Although the AIDS epidemic has historically been centered in metropolitan areas, several studies have documented that HIV infection and AIDS cases have been increasing more rapidly in rural areas than in urban areas (Berry, 1993; CDC, 1995; Ellerbrock et al., 1991; Lam & Liu, 1994). The spread of HIV and AIDS to rural areas appears to be a regional phenomenon; several studies have found that the highest rate of HIV or AIDS in rural areas occurs in the South (CDC 1995; St. Louis et al., 1991; Wasser et al., 1993).

In a systematic review of the literature addressing HIV and AIDS in rural America, Berry (1993) documented a number of trends. First, there are few studies documenting HIV rates in rural areas. Second, rural HIV and AIDS may be complicated by migration (“returning home”) patterns, but the literature is not sufficiently generalizable, as studies tend to focus on small areas. Third, AIDS is becoming more of a concern for women in rural areas. Some studies find that black and Hispanic rural women are more likely to be infected than white women (e.g., Ellerbrock et al., 1991; Ellerbrock et al., 1992, as cited in Berry, 1993) while other studies find the reverse (e.g., Wooten, 1989, as cited in Berry, 1993). Again, the results are not sufficient-

ly generalizable. Fourth, rates of HIV infection in rural adolescents are increasing, and are higher in minority than in white adolescents. Fifth, migrants and seasonal workers (groups composed of high rates of minorities) are also high risk groups for HIV infection.

When considering AIDS cases across the United States, Steinberg and Fleming (2000) found that the infection rate in blacks and Hispanics is higher than their proportionate representation in the general population. While this trend holds for both MSAs and non-MSAs, the gradient is more marked in non-MSAs. Specifically, 41% of AIDS cases in non-MSAs were in blacks and 8% were in Hispanics, while blacks comprised 8% and Hispanics 4% of the overall non-MSA population.

Child and Adult Immunization (Tables A.6a and A.6b): Childhood immunization rates in rural areas have been found to be higher than rates for children in central cities, and comparable to rates for children in other metropolitan areas (OTA, 1990; Slifkin et al., 1997a). Two studies that looked at racial differences in immunization rates in rural areas reported conflicting results. Analyses of rural children in the 1993 NHIS found that 2-year-old immunization rates did not vary significantly when white, non-Hispanic children were compared to children of other races (Lowrey et al., 1998), a finding supported in Mississippi by Feldman and colleagues (1994). In contrast, analyses using 1991 National Maternal and Infant Health Survey (NMIHS) data for children residing in rural areas found that black, Hispanic and other non-white children were significantly less likely to be up-to-date on their immunizations than were white, non-Hispanic children (Lowrey et al., 1998). However, in multivariate models, these differences were all explained by other demographic factors, such as the family's income level.

There were few articles identified in the literature that looked at adult immunization across geographic areas and racial groups. In a study of older adults in a single state, the likelihood of immunization receipt was not found to be related to rural residence (Petersen et al., 1999).

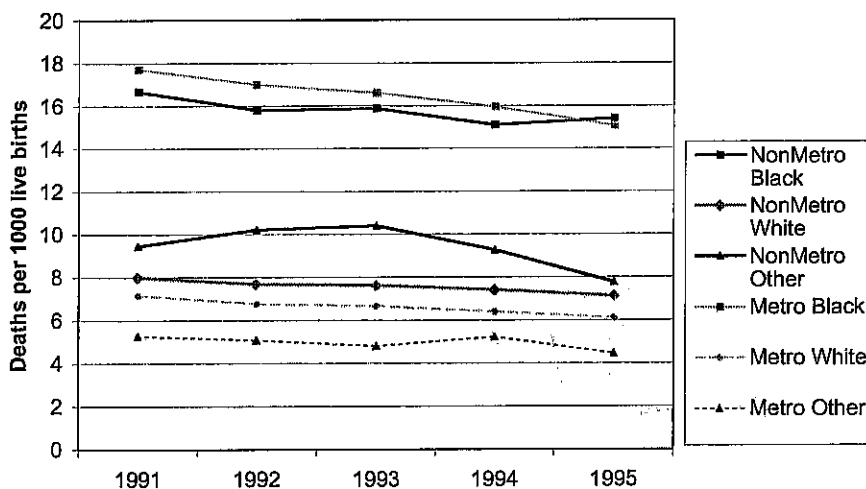
Data Analysis

Literature addressing the question of whether a larger gap in health status between whites and minority populations exists in rural areas is extremely sparse. To understand whether there is a distinct rural component to differences in health status and access between racial and ethnic populations, and to try to replicate the information distributed by the OASH, analyses were conducted using secondary databases on site at the North Carolina Rural Health Research and Policy Analysis Center, stratifying on rural or urban residence. Data sources used include the 1994 NHIS, the Immunization Supplement to the 1994 NHIS, the Medicare Current Beneficiary Survey (MCBS), and the National Center for Health Statistics 1991-1995 Compressed Mortality Files. Although these data sources usually allow for categorization of respondents as "white" or "black", other minority groups are collapsed into a single "other" category, either because a particular race/ethnic group is not specified, or because the number of sampled individuals in specific racial/ethnic groups is too small to allow for statistically valid results.

Infant Mortality: National infant mortality rates for blacks are substantially higher than for either whites or individuals that fall into the "other" category. During the first half of this decade, blacks living in urban areas had higher rates of infant mortality than rural blacks (Figure 1). In 1995 the rate for rural blacks was slightly higher (15.4 deaths per thousand live births compared with 15.1 for urban blacks), but it is not known whether this represents the beginning of a new trend. Rural individuals who are categorized as "other" races (non-black and non-white), while having lower infant mortality rates than blacks (7.8 deaths per 1000 live births), still have substantially higher rates than their urban counterparts (4.5 deaths).

Cancer Screening and Management: The MCBS contains information on two measures of access to cancer screening — the percent of female Medicare beneficiaries who have received mammograms, and the percent who have had a Pap test during the last year. Rural non-whites have a significantly lower rate of receiving mam-

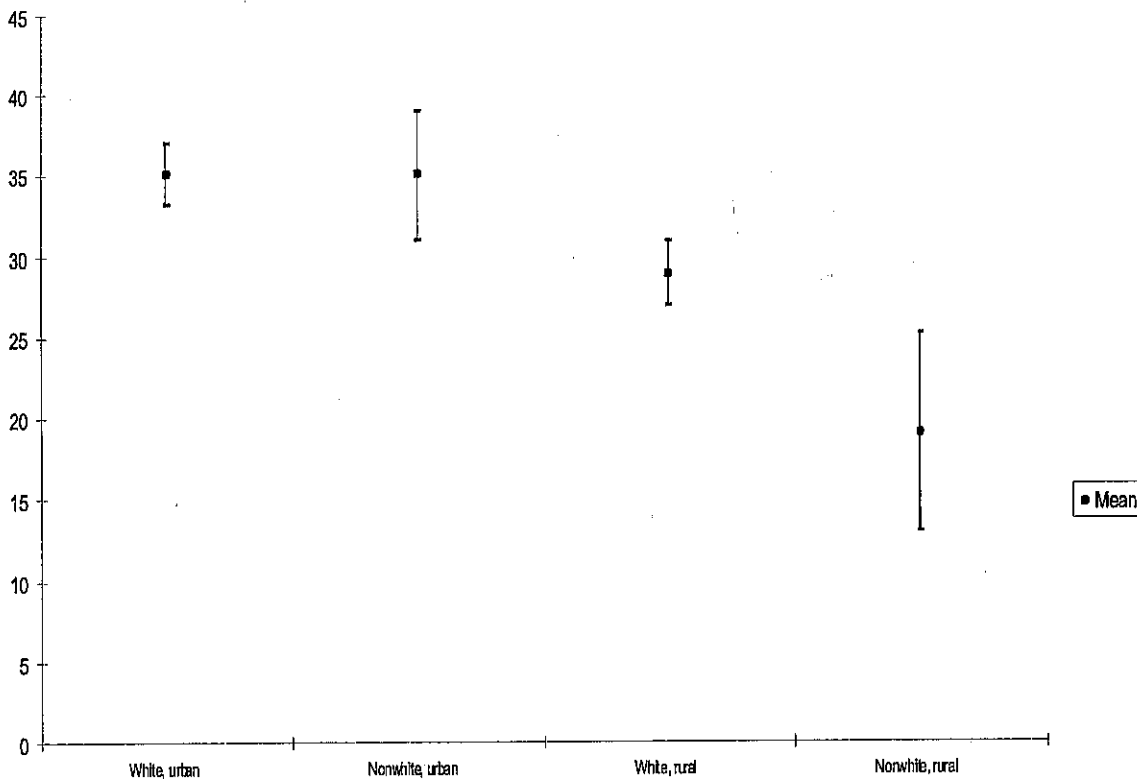
Figure 1
Infant Mortality by Race by Metro/NonMetro Status, 1991-1995



mograms than all other groups of individuals (19%) (Figure 2); rural whites fare slightly better (29%), but still trail both urban non-whites and whites (35%). The percent of non-white rural female Medicare beneficiaries who have received

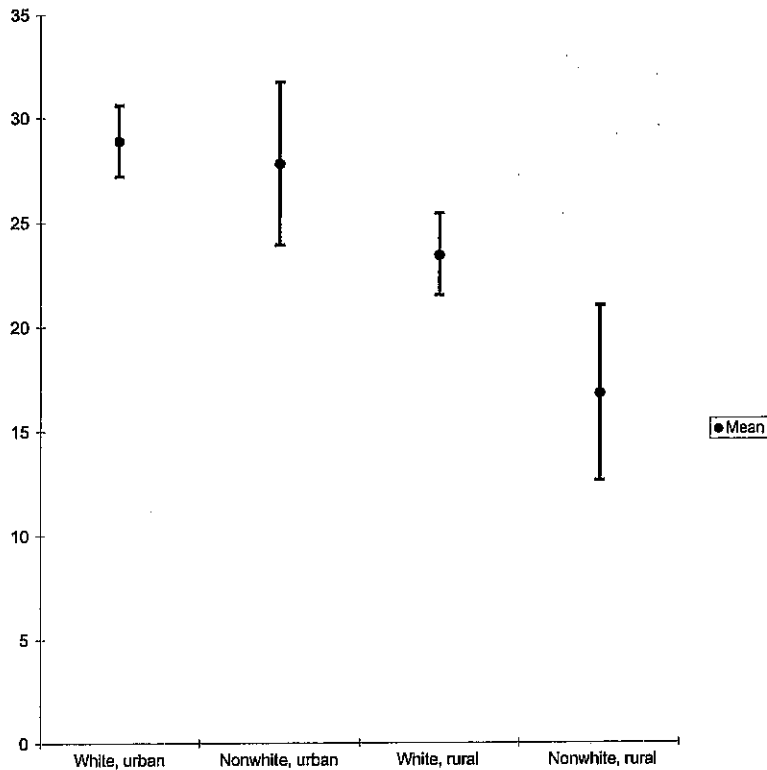
a Pap test (17%) is also significantly lower than the rates for both rural whites (23%) and urban women of all races (29% for urban whites and 28% for urban non-whites (Figure 3).

Figure 2
Percentage of Medicare Beneficiaries Who Have Received a Mammogram, Mean and 95% Confidence Interval



Source: 1993 Medicare Current Beneficiary Survey

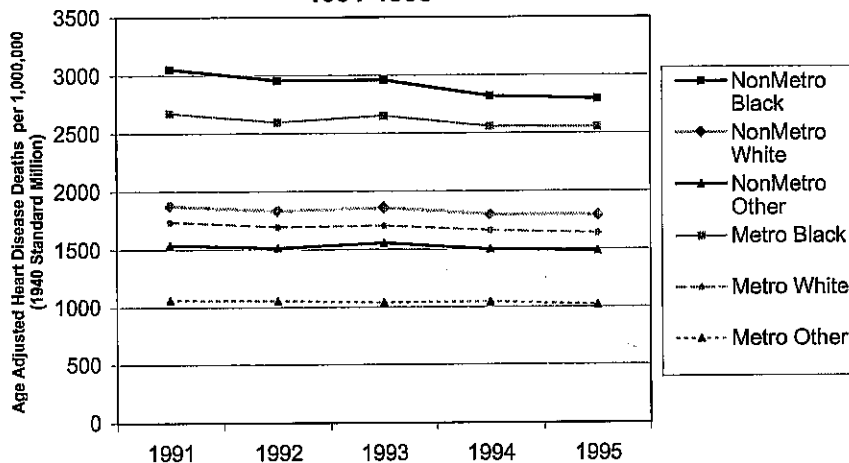
Figure 3
Percent of Female Medicare Beneficiaries who have Received a Pap Test, Mean and 95% Confidence Interval



Cardiovascular Disease: Secondary data on the incidence of cardiovascular disease were not available. However, death rates from heart disease were available. As shown in Figure 4, the rural black population has a higher age-adjusted death rate from heart disease than urban blacks, rural whites, or individuals in the “other” category. In

addition, the gap between rural blacks and urban blacks is greater in all five years than the gap between rural whites and urban whites. Although as a group, individuals who fall into the “other race” category have low rates of heart disease death, there is a large gap across place of residence, with much higher rates among rural residents.

Figure 4
Heart Disease Deaths by Race by Metro/NonMetro Status 1991-1995



Diabetes: Secondary data were available to consider both the prevalence of diabetes and the mortality rate from this disease. Simple frequencies of data from the Conditions File of the 1994 NHIS show that the national rate of diabetes is significantly higher for blacks than for whites and those individuals classified as “other” (Table 1). In addition, the rate of diabetes among rural blacks is significantly higher than the rate for blacks that live in urban areas and all other racial groups regardless of residence.

The age-adjusted death rates from diabetes show patterns that are similar to the rates of disease reported in the NHIS, with the exception of rates for individuals who fall into the “other” category (Figure 5). The death rate is highest for rural blacks, closely followed by urban blacks and rural “other” race individuals. Of notable exception to the pattern observed for disease prevalence are individuals classified as metropolitan-dwelling “other,” who have the lowest death

rates, but not the lowest disease prevalence. It is quite possible that the large differences in death rates for individuals in the “other” category stem from the fact that the racial groups that are represented in these categories vary geographically. The rural “other” group may include larger proportions of American Indians, who have high rates of diabetes, and the urban “other” category may capture the health experience of individuals of Asian descent.

HIV Infection: Although data were not available to analyze the comparative HIV infection rates across races in urban and rural areas, data do exist on AIDS death rates. As shown in Figure 6, age-adjusted AIDS death rates for blacks are much higher in urban areas. It is important to note that differences in AIDS death rates across groups can result from both differential HIV infection rates and differential access to and compliance with treatment.

Table 1
Percent of the Population with Diabetes, by Race, 1994 NHIS, weighted

	MSA (95% Confidence Interval)	Non-MSA (95% Confidence Interval)	Total U.S. (95% Confidence Interval)
White	1.93 (1.81; 2.04)	2.31 (2.09; 2.51)	2.03 (1.92; 2.12)
Black	3.61 (3.21; 4.00)	5.34 (4.24; 6.43)	3.88 (3.50; 4.25)
Other	2.64 (2.18; 3.10)	2.86 (1.65; 4.06)	2.67 (2.24; 3.10)
Total	2.19 (2.08; 2.30)	2.55 (2.34; 2.76)	2.28 (2.18; 2.37)

Figure 5
Diabetes Deaths by Race by Metro/NonMetro Status 1991-1995

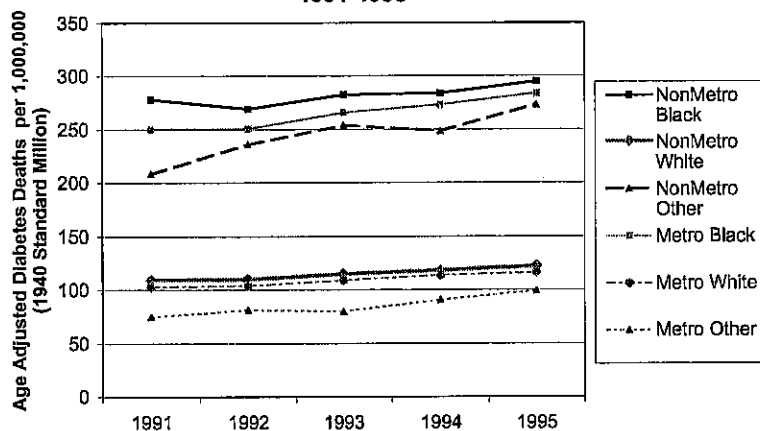


Figure 6
AIDS Deaths by Race by Metro/NonMetro Status
1991-1995

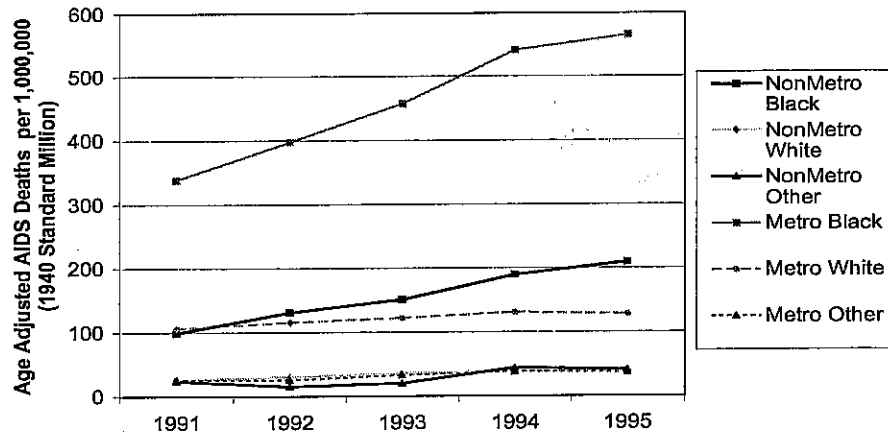


Table 2
Parental report of children with all shots, by race, 1994 NHIS Immunization Supplement, weighted

	MSA Rate (95% Confidence Interval)	Non-MSA Rate (95% Confidence Interval)	Total Rate (95% Confidence Interval)
White	88.09 (87.1; 89.0)	86.97 (85.1; 88.8)	87.84 (86.9; 88.6)
Black	83.86 (81.7; 85.9)	85.19 (79.9; 90.4)	84.04 (82.0; 86.0)
Other	82.06 (79.5; 84.6)	86.49 (79.9; 93.0)	82.54 (80.1; 84.9)
Total	86.54 (85.7; 87.3)	86.74 (85.0; 88.4)	86.57 (85.8; 87.3)

Child and Adult Immunizations: Childhood immunization rates can be compared across urban and rural counties for racial groups by using the 1994 NHIS Immunization Supplement. As can be seen in Table 2, there are no significant differences in parental reporting of immunization coverage between racial groups in rural areas and across geographic categories. While the point estimate of the percent of black and other children who have received all immunizations is slightly greater for rural as compared to their urban-dwelling counterparts, the differences are not statistically significant.

The only readily available source of secondary data that can be used to assess immunization coverage rates for adults is the MCBS. As Figure 7 shows, rural non-whites are significantly less likely than rural whites to have received a pneumonia shot, and the gap between these racial groups is substantially greater than the gap between urban whites and urban non-whites.

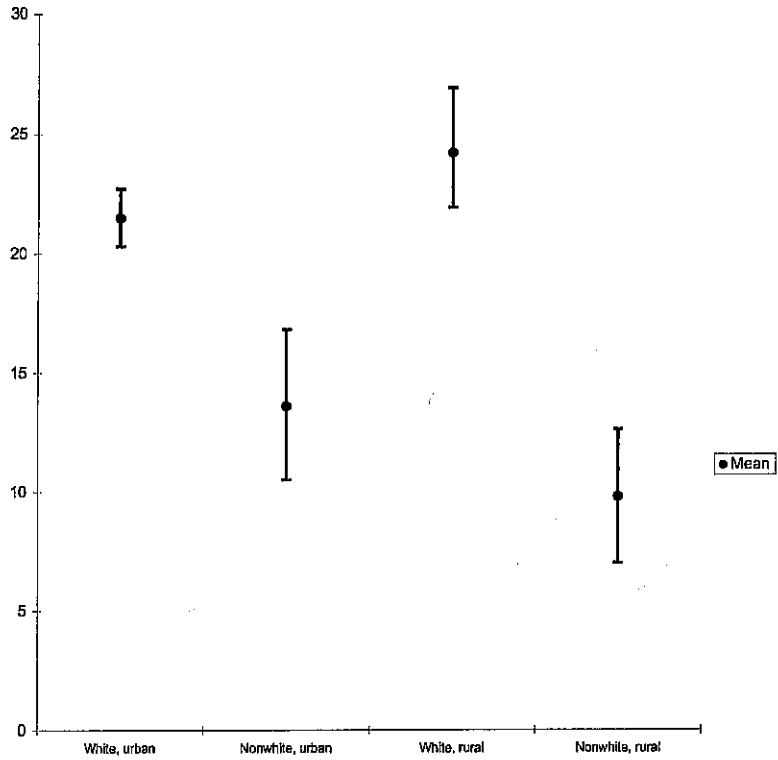
Rural non-whites also appear to have pneumonia shot rates that are lower than urban non-whites, although this finding is not statistically significant. As can be seen in the figure, the confidence intervals around the point estimates are quite large (due to the small sample size) so it cannot be determined whether the lack of statistical significance indicates there is no true difference or simply insufficient power in the sample to detect a true difference.

In contrast, place of residence does not appear to be a contributing factor within racial groups as to whether or not a Medicare beneficiary receives an influenza shot (Figure 8). Although non-whites have significantly lower rates of immunization compared to whites, rates across urban and rural residents are similar.

Data Limitations

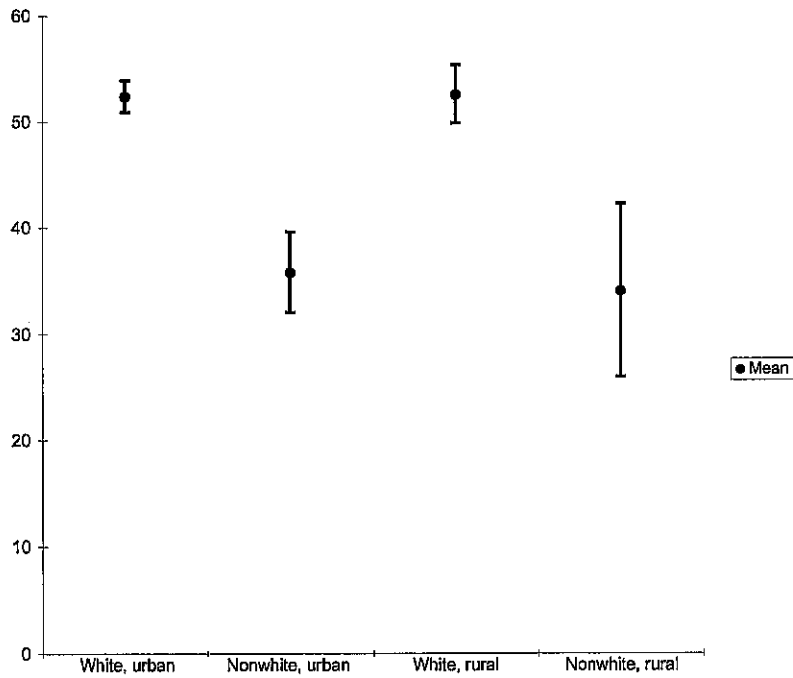
To increase understanding of whether the gap in health status between racial and ethnic

Figure 7
Percent of Medicare Recipients Who Have Received a Pneumonia Shot, Mean and 95% Confidence Interval



Source: 1993 Medicare Current Beneficiary Survey

Figure 8
Percent of Medicare Beneficiaries who Received a Flu Shot, Mean and 95% Confidence Intervals



Source: 1993 Medicare Current Beneficiary Survey

groups is in some way different in rural areas, analyses must directly address this issue, either by stratification by race/ethnicity and residence in descriptive statistics or by inclusion of a race/ethnicity and residence interaction term in regression analyses. Although the changing demographics of rural areas suggest that the need for this type of analysis is growing, analyses of this sort have been rarely conducted to date.

Unfortunately, the lack of research that specifically considers the interaction of race and place as factors affecting health care receipt and health status is in part due to the fact that the ability to study health disparities across urban and rural racial and ethnic populations at a national level is limited. The reasons for this lack of research fall into two major categories: what data are collected, and what data are released to researchers. Discussion of the constraining effect of confidentiality requirements on the conduct of rural health research can be found elsewhere (Schur et al., 1998; Slifkin et al., 1997b) and will not be repeated here. Confidentiality restrictions affect the conduct of all rural health research, and are not specific to minority issues.

Rural residents are often under-represented in national surveys, due to the higher survey costs associated with reaching individuals who reside outside of cities (Schur et al, 1998). The problems introduced by small sample sizes are compounded when the analysis focuses on a sub-population of rural residents, such as a specific minority group. As analysis cells become smaller, the standard error associated with any statistics increases, decreasing the researcher's ability to know whether insignificant findings reflect the lack of a true difference in the population, or simply the fact that the sample size was too small to detect a statistically meaningful difference (Stearns et al., 1997).

The problem of small cell sizes becomes particularly acute when the researcher is interested only in those members of a sub-population who have a particular health condition. Table 3 shows examples of cell sizes from the Conditions File² of the 1994 NHIS (US DHHS, National Center for Health Statistics, 1994). While 22,429 of 89,199 respondents reside in nonmetropolitan counties, only 1,716 of these individuals are black, 345 are Indian American, and 332 are coded as belonging to some other minority group (or are listed as "unknown").

Table 3
Cell Sizes in Conditions File, 1994 NHIS

	All persons			Persons with diabetes		
	MSA	Non-MSA	Total	MSA	Non-MSA	Total
White	51,795	20,036	71,831	1,016	458	1,474
Black	10,382	1,716	12,098	417	99	516
Indian American	680	345	1,025	14	12	26
Other	2,925	223	3,148	85	3	88
Unknown	988	109	1,097	24	2	26

Table 4
Cell Sizes in Immunization Supplement, 1994 NHIS

	All Children			Children with all Shots		
	MSA	Non-MSA	Total	MSA	Non-MSA	Total
White	4,342	1,380	5,722	3,869	1,216	5,085
Black	1,205	173	1,378	1,015	150	1,165
Indian American	55	36	91	51	32	83
Other	544	37	581	451	31	482
Unknown	279	36	315	222	32	254

² The Conditions File contains information on a subset of individuals in the NHIS who meet certain criteria for having a chronic condition.

When the sample is further sub-sampled, to consider only individuals with a diagnosis of diabetes, there are only 99 individuals in the "nonmetropolitan and black" cell. The same problems of small cell sizes can be seen for minority children in the NHIS Immunization Supplement (Table 4).

Although small cell sizes reflect in part the under-representation of rural populations, they also reflect the reality of the minority presence in rural areas. In many rural areas of the U.S., when the minority population is further sub-sampled by a specific disease or condition, there are not enough cases to allow for statistical analyses. This fact is made clear in maps contained in the "Atlas of United States Mortality," where in condition-specific maps, Health Service Areas with sparse data are marked with cross-hatches (Pickle et al., 1996). For maps specific to black individuals, almost all Health Service Areas are not cross-hatched.³

Conclusions

Rural minorities are even furthered disadvantaged than their urban counterparts in certain health areas. Analyses of the limited number of health status and health care indicators that are available for the six health areas in the President's initiative suggest that in addition to the known national disparities between whites and other races, rural minorities appear to be further disadvantaged regarding cancer screening and management, cardiovascular disease, and diabetes (although 1980 data do not show diabetes to be a particular rural minority problem, more recent data find important differences across race and

place). The differential in both the prevalence and death rate from diabetes is the greatest, and also one of the most troubling, as this is a highly prevalent disease whose incidence is increasing. Findings in the literature and data analysis conducted here do not point to a rural-specific differential regarding minority rates of HIV infection, infant mortality or immunization receipt.

The question that these analyses are not able to address is why the gap in health status between whites and minorities is greater in rural areas, and why rural minorities fare worse than their urban counterparts. It is possible that factors such as higher levels of poverty in rural areas, and specifically among rural minorities, may cause this difference. It is also possible that historical access problems in rural areas, such as lack of provider availability and accessibility are magnified for minority populations due to cultural or some other currently unmeasured barrier.

Further research is needed to understand the mechanisms that result in poorer access and outcomes for rural minorities. Without this understanding, it will be difficult to design programs and policies that will be effective in reducing the gap between rural and urban racial and ethnic groups. Although such research can currently be conducted for specific minority populations in small geographic areas, national surveys will need to be enhanced if they are to facilitate statistical analysis of sub-groups in rural areas.

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³ Staff of the NC Rural Health Research Program tried to create meaningful maps of urban/rural differences for minorities in the six health areas. Even after aggregating five years of mortality data, the small number of condition-specific deaths in rural counties led to unstable, and therefore misleading, counts.

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