

Access to Care among Rural Minorities: Older Adults



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Executive Summary

Key Findings about the elderly population:

- Approximately 7.71 million adults aged 65 and older lived in rural America in 1997 –1998. “Rural” is defined as counties that are not in a metropolitan statistical area. Nearly all of these non-metro older adults were white (6.8 million, 91%). African Americans accounted for 6% of the non-metro older adults (430,000 persons), followed by Hispanics at 2% (154,000 persons) and older adults of other races at 1% (101,000 persons).
- Non-metro African American and Hispanic elders were severely handicapped in education, income and health status compared to white adults.
 - Over three quarters of non-metro African Americans (76%) and Hispanic (81%) elders have less than a high school education
 - Over three quarters of African American (77%) and Hispanic elders (76%) have a total household income of less than \$20,000
 - Over half of African American elders (52%) and 44% of Hispanic elders describe their health as poor or fair
- A greater proportion of non-metro than metropolitan elders report limitations in their ability to carry out activities of daily living (44% versus 37%). More than half of non-metro African American elders (55%) and 46% of Hispanic elders reported functional limitations.
- Government programs (Medicare and Medicaid) are the principal source of insurance for non-metro minority elders.
 - While 76% of non-metro white elders reported having private insurance, only 34% of African Americans, 33% of Hispanics, and 57% of elders of other races do so.
 - Conversely, the proportion of elder relying on Medicare alone was highest among minorities: 39% of non-metro African American elders, 29% of Hispanic elders and 28% of elders of other race have Medicare alone, versus 18% among whites.
 - The proportion of elders receiving Medicaid was highest among Hispanics (33%), followed by African Americans (26%) and whites (6%).

About older adults’ physician use:

- On average, 25% of older adults report having seen a physician during the previous two weeks.
- Poor health status, functional limitations and current acute illness all increase the probability of a recent visit.
- While poor health status increases the likelihood of a visit, the size of this increase is only about half as large in non-metro areas. For example, the probability that a low income African American elder living in a metropolitan area will visit a physician increases from 23.7% to 33.9% when health status is poor, a difference of 10.2%. If that same elder

person lives in a non-metro area, the probability increase from 22.7% to 27.1%, a difference of only 4.4%.

- Race alone did not significantly affect whether a non-metro older person would have seen a physician during the past two weeks. However, the greater prevalence of risk factors such as poverty and limited education among nonwhite older adults still implies that minority groups are at risk for inadequate health care use.

Recommendations for Further Research

Research on non-metro, minority elderly populations is scarce. Needed research directions include:

- Defining access barriers experienced by non-metro elderly in poor health.
- Defining access barriers experienced by near-poor African-American elderly.
- Developing and testing programs to reduce or delay the progression of functional limitations in the non-metro older adult population.

Programmatic Recommendations

- Programs that encourage, support or reward health care providers for practicing in non-metro areas must be maintained, to ensure that disparities in utilization found among non-metro elders in poor health do not continue or increase.
- Health services organizations currently serving poor and minority populations, such as community health centers and state Medicaid agencies, should pay particular attention to the problems of the near-poor African American elderly.
- The Health Resources and Services Administration, through its non-metro outreach and non-metro networks grant programs, should foster coalitions linking health care providers with voluntary community-based organizations to increase support services to elderly non-metro populations. For example, local organization can help by providing transportation services or arranging home visits.

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Chapter One

Introduction

Previous Research on the Non-metro Elderly

Several studies have examined the role of race and non-metro residence among health care utilization among persons 65 years of age and older, generally concluding that race and rurality effects were not present in this age group. Previous work suggested:

- No differences in utilization based on race or non-metro residence, after controlling for functional limitations (Mentnech, Ross, Park & Brenner, 1995; 1992 data).
- No differences in mortality based on race, although supplemental insurance reduced mortality (Doescher, Franks, Banthin and Clancy, 2000; 1987 data).
- No differences in emergency department use by race after need factors (self reported health status, comorbidity, age, education, whether living alone) were taken into consideration (Shah, Rathouz and Chin, 2001; 1993 data. Non-metro residence was not explored in this study)
- Declines in disability and functional health status among older adults were lower among African American and Hispanics than among whites. Distance to care (the only measure approaching non-metro residence) was not significant (Porell and Miltiades, 2001).

Focus of this report

The analysis presented here examines health status and health services use (measured as physician visits) among poor and minority older adults in non-metro areas. All information presented in this report comes from an analysis of the 1997 and 1998 National Health Interview Surveys. Details concerning data elements and methods are presented in the Appendix, "Method, Data Sources and Detailed Tables." Findings and conclusions are presented as follows:

- Chapter Two provides basic demographic descriptions of non-metro versus metropolitan older adults, presenting information relevant to risk factors, race, non-metro residence, resources and health status.
- Chapter Three presents factors affecting whether a non-metro older adult will have seen a physician in the weeks before the survey.
- Chapter Four offers conclusions and recommendations.

Chapter Two

Characteristics of Non-Metro Older Adults

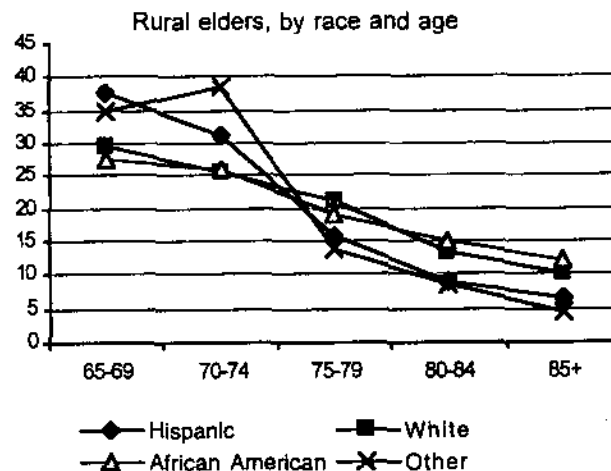
Size of the non-metro older population

Approximately 7.51 million adults aged 65 and older were living independently in non-metro America when the 1997 and 1998 NHIS was conducted (Table A-1).¹ The NHIS considers communities and areas to be “non-metro” or rural if they are not within a metropolitan statistical area. Nearly all of these non-metro older persons were white (6.8 million, 90.9%). African Americans accounted for 5.8% of the non-metro elderly (430,000 persons), followed by Hispanics at 2.0% (154,000 persons) and persons of other race² at 1.3% (101,000 persons).

The non-metro population contained a slightly higher percentage of persons aged 80 or older than the urban population, 23.7% versus 22.6%. The rural African American population contained the greatest proportion of octogenarians and above. More than a quarter of non-metro African American elders were 80 or older (27.1%), followed by white elders (23.8%), Hispanics (15.3%) and persons of other race (12.8%; see chart at right and Table A-2).

Characteristics of non-metro minorities

African American and Hispanic older adults in non-metro areas were severely handicapped in education, income and health status compared to white adults. (See Table, top of next page.)



Education: Over three quarters of non-metro minority elders did not complete high school. Non-metro African American elders averaged 8.6 years of education and Hispanic elders, 6.7 years, versus 11.3 years for older whites (See Table A-2). Older adults who experienced limitations in their ability to carry out activities of daily living, and thus were more likely to need medical care, had even lower levels of education, averaging 8.1 years among non-metro African Americans and 6.1 years among non-metro Hispanics, compared to 10.7 years among non-metro whites (Table A-3).

Income: Nationally, two of every five older persons lived in a household with an annual income below \$20,000, which was 189% of the Federal poverty level for a 2-person family in 1997. It would have been desirable to characterize older adults by poverty status. However, a

¹ Persons in institutional settings are not included in the NHIS sampling frame.

² Native American, Asian / Pacific Islander, other.

Percentage of Older Adult Population with Selected Characteristics

	Total	Metro	Non-metro
Less than high school education			
Total, All races	34.8%	32.6%	42.2%
White	30.5%	27.5%	39.3%
African American	57.6%	54.0%	75.6%
Hispanic	68.5%	67.3%	80.6%
Other	40.1%	39.5%	44.2%
Income below \$20,000			
Total, All races	40.7%	37.4%	51.6%
White	37.9%	34.0%	49.5%
African American	60.9%	57.5%	77.3%
Hispanic	57.1%	55.1%	76.4%
Other	35.1%	34.5%	39.1%
Self-reported health status was poor or fair			
Total, All races	26.7%	25.2%	31.9%
White	24.6%	22.6%	30.3%
African American	41.5%	39.4%	52.3%
Hispanic	38.7%	38.2%	43.8%
Other	25.4%	23.8%	36.5%

high proportion of all NHIS records for older adults, 7,407 out of 23,331 observations or nearly a third, were missing the NHIS-calculated poverty value. As a result, this report uses low-income as a surrogate for poverty.

Among non-metro elders and, in particularly, non-metro minority elders, a significantly greater proportion of persons lived in low income families. Over half of all non-metro elderly had a total household income below \$20,000. More than three quarters of non-metro African American and Hispanic elders had incomes below this level.

Health: Non-metro minority elders, in addition to being less educated and poorer than their white or metropolitan counterparts, also reported poorer health. Over half of all non-metro African American older adults (52.3%) described their own health as “poor” or “fair,” as did 43.8% of non-metro Hispanics.

Functional limitations among non-metro older adults

Just over a third (38.6%) of older adults nationwide reported functional limitations in activities of daily living. Functional limitations included work limitations, the need for personal assistance with eating, bathing, dressing, and getting around inside the house, and the need for personal assistance with routine needs such as household chores, doing necessary business, shopping, or running errands. Older adults living in non-metro areas were more likely than those in urban areas to report experiencing limitations in daily activities (43.8% in non-metro versus 36.9% in metropolitan areas, $p < 0.0001$). The proportion of non-metro older adults with

functional limitations was highest among African Americans (54.5%), followed by Hispanics (45.7%), whites (43.5%) and older adults of other race (32.1%; see Table A-3).

Older adults who reported functional limitations were older than their counterparts (mean ages 75.9 versus 72.8 years, respectively; $p < 0.0001$) and had slightly lower educational attainment, 10.9 versus 12.1 years ($p < 0.0001$). Older adults with some functional limitation made over twice as many health care visits during the preceding year, an estimated 13.4 visits, as older adults without such limitations, 7.0 visits ($p < 0.0001$).

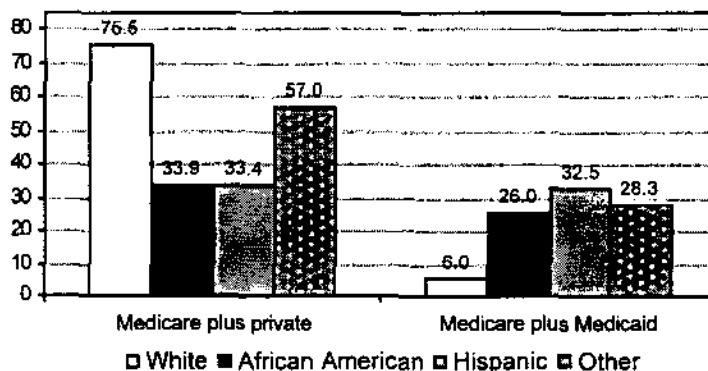
Health Insurance

Nationally, only 1.02% of older adults, an estimated 49,000 persons, totally lacked health insurance during the year they were interviewed (Table A-3). Lack of insurance coverage was more common in urban areas, where 1.1% of older adults were not covered, than in non-metro areas (0.7%; $p < .001$). Across the nation as a whole, African-Americans, Hispanics, and those of other races were statistically more likely to be uninsured. So few rural elders were uninsured, however, that reliable estimates could not be calculated for each minority group.

Types of insurance coverage among older adults differed. Four categories of insurance were created for analytic purposes: private insurance, which included all elders reporting private insurance, generally as a supplement to Medicare; Medicaid, which included both Medicaid alone and Medicaid supplementing Medicare, but excluded any persons with private insurance; Medicare or other government insurance (military, veterans) alone; and uninsured.

Rural white elders were much more likely to report having private insurance than were minority elders, as shown in the chart below and detailed in Table A-3. Conversely, the proportion whose Medicare coverage was supplemented by private insurance was higher among minority elders. Medicare alone, not supplemented by either private insurance or Medicaid, was more common among non-metro African Americans (38.8%), Hispanics (29.0%) and persons of other race (28.3%) than among whites (18.1%).

Supplements to Medicare among rural elders



Physician visits

Across the 1997 and 1998 surveys, an average of 24.9% of older adults visited a health care provider in the 2 weeks preceding their interview (Tables A-4 and A-5). Elderly women were more likely than elderly men to report a health care visit in the two weeks preceding their interview: 25.4% versus 24.1%, respectively ($p = 0.0252$, Table A-5). Visit rates were lower in non-metro than in metropolitan areas (23.8% versus 25.2%) ($p = 0.0501$).

In metropolitan locations, whether an older adult reported a health care encounters in the preceding two weeks did not differ by race. Thus, 25.5% of white older adults, 25.0% of African Americans, 23.4% of Hispanics, and 23.3% of other older adults reported having at least one healthcare visit. In non-metro locations, racial differences are more pronounced but do not attain statistical significance. In non-metro areas, 23.9% of white older adults, 26.4% of African Americans, 21.8% of Hispanics, and 13.7% of other older adults reported a medical care encounter in the last two weeks ($p = 0.06$).

The effects of other characteristics on whether an older adult would have seen a physician recently are illustrated in Table A-5. Self-described poor health, the presence of functional limitations, and current experience of an acute illness all increased the probability of a recent healthcare visit. Persons insured by Medicaid were most likely to report a recent physician visit (28.3%), followed by persons with private insurance (25.8%) and persons with Medicare or other federal government insurance alone (22.0%). Older persons without insurance were least likely to have seen a physician (8.7%).

Chapter Three

Factors Affecting Physician Visits Among Older Adults

Brief description of method

Many personal and financial characteristics affect whether an older person has recently visited a health care provider. Personal characteristics include perceived health status, limitations in activities of daily living and the presence of acute illness, as well as race and where the person lives. Financial considerations include household income and whether the person has supplemental insurance in addition to Medicare. To determine the effects of race and rural residence while controlling for other characteristics, multivariate techniques were used. The analysis focused on identifying factors that significantly influenced whether the older individual surveyed had visited a physician during the two weeks prior to the survey. Details about methods and statistical outcomes are provided in the Appendix.

The following factors affected physician utilization among older adults (See Table A-6):

- Race/ethnicity
- Residence (metropolitan / non-metropolitan)
- Income (below \$20,000 versus \$20,000 and higher). As noted earlier, income and family size were used as a proxy for poverty because the NHIS field for poverty status was missing in nearly a third of all records. In 1998, the Federal definition of poverty was \$10,850 for a family of two.³
- Family size (number of persons)
- Insurance type
- Health status
- Presence of current conditions (acute, chronic, well)
- Limited in activities
- Education
- Interaction of residence and health status
- Interaction of race/ethnicity and income

Consistent factors: Insurance, Limitations, Conditions and Education

When the analysis was completed, some characteristics of older persons affected the likelihood that they would have seen a health care provider in the past two weeks in a straightforward manner: change in the factor was associated with a change in the probability of a physician visit, and this change was consistent regardless of the person's other characteristics. These are referred to as "consistent" factors because their effects are uniform across other individual characteristics in the model. Five consistent factors were identified: the number of

³ *Federal Register*, Vol. 63, No. 36, February 24, 1998, pp. 9235-9238.

persons in the household, insurance coverage, experience of limitations, current conditions, and education.

Household size. Holding all other factors in the model equal, each additional person in the household slightly reduced the odds that an older person would have seen a physician recently (OR 0.93, CI 0.90 - .997). Reasons for this decrease are unclear. Increased family size at a given income level may reduce the money available to be spent for each person, thus reducing physician visits. Alternatively, the additional support available to the older person when more family members are present may result in reduced illness or better self-care.

Insurance: Other things held equal, older persons covered by private insurance or by Medicaid were slightly more likely to have seen a physician recently. (See Table on the next page and Table A-7 in Appendix.) The odds that an older person dependent on Medicare or other government insurance would have seen a physician recently, all other considerations held equal, were 0.84 (CI 0.77 – 0.92) those of an older person with private insurance. An older person without private insurance had only half the chance of seeing a physician recently as did a person with private insurance (OR 0.41, CI 0.24 – 0.68).

Limitations. As would be anticipated, older persons who were limited in their ability to carry out functional activities of daily living were more than twice as likely to have seen a physician recently than were their less impaired peers. Nearly a third of elders with limitations (32.3%) had seen a physician recently.

Presence of Acute Conditions. Older persons were asked whether they suffered from any chronic diseases (such as diabetes, arthritis), whether they had had a recent acute illness (colds, flu), or whether they were completely well. Nearly half (46.8%) of older adults with a recent acute illness had seen a physician. Elders with chronic conditions were not significantly more likely to report a recent physician visit than were elders who described themselves as well.

Education. Older adults who had not completed high school, all things held equal, were more likely than their better-educated counterparts to have seen a physician recently. The difference is small (22.0% of adults with less than a higher school education had seen a physician during the past two weeks versus 20.3% of other older adults), but is consistent across other risk factors.

Probability of a physician visit in the past two weeks, by characteristics of the older adult*

Consistent Factors. These factors had effects that were the same regardless of other characteristics of the person, such as race and income

Factor	% with visit
Insurance	
Any private insurance	22.0%
Any Medicaid, but not private	21.5%
Medicare, military or other government only	19.1%
Uninsured	10.3%
Limitations	
Yes	32.3%
No	14.1%
Conditions	
Chronic	22.0%
Acute	46.8%
Well	22.0%
Education	
High school graduate	20.3%
Less than high school	22.0%

Interactive Factors: Race, income and residence had complex effects, shown here

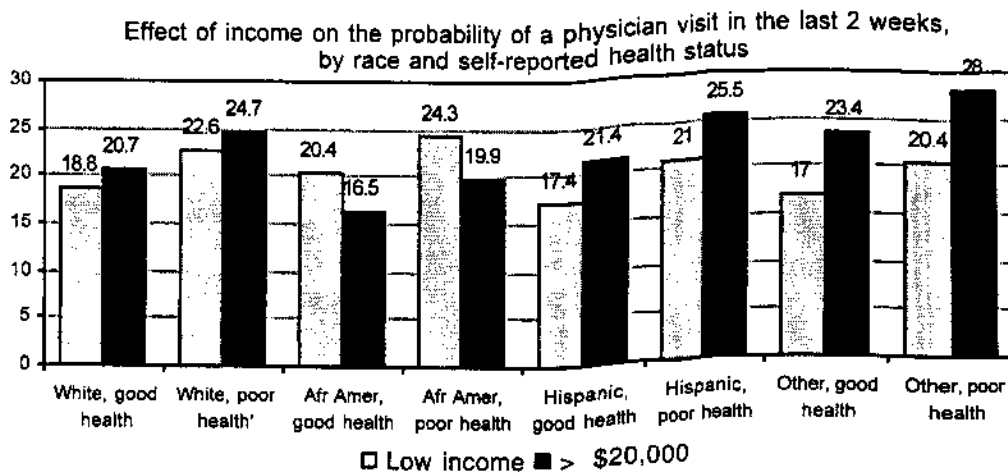
Household income above \$20,000	Metropolitan	Metropolitan	Non-metro	Non-metro
Health Status	Good to excellent	Poor to fair	Good to excellent	Poor to fair
Race/ethnicity				
White	24.8%	34.3%	23.0%	27.4%
African American	19.1%	28.1%	18.3%	22.1%
Hispanic	24.8%	35.2%	23.7%	28.3%
Other	27.1%	38.0%	26.0%	30.8%
Household income less than \$20,000				
Race/ethnicity				
White	22.0%	31.7%	21.0%	25.2%
African American	23.7%	33.9%	22.7%	27.1%
Hispanic	20.4%	29.7%	19.5%	23.4%
Other	20.1%	29.4%	19.2%	23.2%

* Probabilities are based on logistic regression models. This means that each probability shown above is adjusted for all of the other characteristics of the person.

Interactive factors: Race/ethnicity, rural residence, income and health status

The effects of several variables were not straightforward, but varied according to other characteristics of the older person.⁴ Race/ethnicity and non-metro residence are major concerns of this report; however, a uniform “race effect” or “rural effect” was not found. The manner in which race/ethnicity and non-metro residence affected older adults’ physician utilization differed according to the person’s income and health status. This interaction is presented in the table on the previous page and described here.

Race/ethnicity and household income: In general, persons with lower income (less than \$20,000) made fewer physician visits. However, the effects of low income were different among rural African American elders. The chart below shows how different income levels affect the probability that an older person will have visited a physician within the past two weeks, by race and self-reported health status. For all groups except African Americans, low-income elders were a few percentage points less likely to have seen a physician than are high income elders. African American low-income elders, however, were *more* likely to have made a physician visit than those in households with an income of \$20,000 or more. Given that the analysis controlled for factors such supplemental health insurance, the reasons for this difference are not immediately clear.

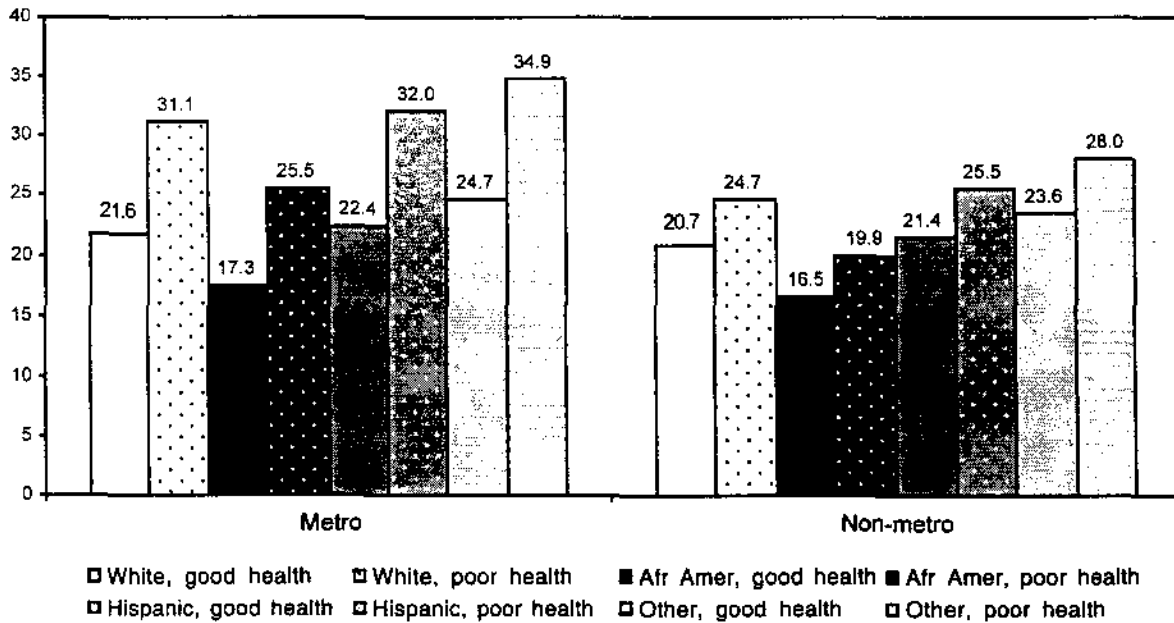


⁴ Interaction terms are not necessarily intuitive. A significant beta coefficient for an interaction means that the effects of the main covariates (the terms used to create the interaction) are not additive on a log scale; the effects of the covariates in the interaction must be adjusted from their sum by the value of the interaction beta coefficient.

Non-metro residence and health status: Across all races, places of residence, and other personal characteristics considered in the model, being in poor health increased the probability that an older person would have seen a physician during the past two weeks. However, the size of the increase was less in rural than in urban areas. The chart below presents this difference graphically.

Among elders living in metropolitan areas, being in poor versus good health led to increases in the probability of a physician visit that ranged from 8.2% among Hispanics to 10.2% among elders of “other” race. Among non-metro older adults, however, the increases were only half as large, ranging from 3.4% among African Americans to 4.4% among elders of “other” race. In practical terms, the effect of poor health on physician use was halved among persons living in rural areas.

Probability of a recent physician visit, by race, health status, and residence



Chapter Four

Conclusions and Policy Implications

The Condition of Non-metro, Minority Elders

Minority older adults living in non-metro areas constitute a high-need population. Several factors associated with higher needs for care are disproportionately present among non-metro minorities:

- Non-metro African American and Hispanic elders were severely handicapped in education, income and health status compared to white adults.
 - Over three quarters of non-metro African Americans (76%) and Hispanic (81%) elders have less than a high school education
 - Over three quarters of African American (77%) and Hispanic elders (76%) have a total household income of less than \$20,000
 - Over half of African American elders (52%) and 44% of Hispanic elders describe their health as poor or fair
- A greater proportion of non-metro than metropolitan elders report limitations in their ability to carry out activities of daily living (44% versus 37%). More than half of non-metro African American elders (55%) and 46% of Hispanic elders reported functional limitations.
- Government programs (Medicare and Medicaid) are the principal source of insurance for non-metro minority elders.
 - While 76% of non-metro white elders reported having private insurance, only 34% of African Americans, 33% of Hispanics, and 57% of elders of other races do so.
 - Conversely, the proportion of elder relying on Medicare alone was highest among minorities: 39% of non-metro African American elders, 29% of Hispanic elders and 28% of elders of other race have Medicare alone, versus 18% among whites.
 - The proportion of elders receiving Medicaid was highest among Hispanics (33%), followed by African Americans (26%) and whites (6%).
- Race alone did not significantly affect whether a non-metro older person would have seen a physician during the past two weeks. However, the greater prevalence of risk factors such as poverty and limited education among nonwhite older adults still implies that minority groups are at risk for inadequate health care use.

Recommendations for Further Research

Research on non-metro, minority elderly populations is scarce. Needed research directions include:

Defining access barriers experienced by non-metro elderly in poor health.

Elders who report that they are in poor health generally were more likely to record a recent physician visit. However, the differences between poor and good health are significantly lower in non-metro areas, across all races.

Defining access barriers experienced by near-poor African-American elderly.

African American elders with family incomes above \$20,000 were significantly less likely than poorer elders or elders of other race to report physician visits, even controlling for insurance status, current conditions, and other factors. Given the concentration of non-metro African Americans in the South, differences may be associated with availability of providers, availability of public transportation, or cultural patterns, such as differing self-definitions of health or differing perceptions of symptoms that should lead to professional care. More research is needed to elucidate the source of differences and appropriate infrastructure or educational interventions.

Developing and testing programs to reduce or delay the progression of functional limitations in the non-metro older adult population.

Limitations in ability to carry out daily activities affect non-metro elders more than their urban counterparts, and non-metro African Americans are particularly disadvantaged. Programs designed to decrease functional limitations and maintain activities of daily living in older adults have proven to reduce health care costs, allow aging in place and provide a higher quality of life. However, many such programs have been modeled in limited settings (e.g., Brill, Probst et al, 1997) or in urban locales. Research is needed to identify non-metro models that overcome barriers of distance and isolation implicit in non-metro residence, as well as models particularly targeted at non-metro African Americans. Low education levels must be considered when planning outreach or education activities among non-metro elders.

Programmatic Recommendations

Programmatic recommendations pertinent to non-metro older adults address the issues of funding and provider eligibility:

Programs that encourage, support or reward health care providers for practicing in non-metro areas must be maintained.

Across all races and all levels of function and health, non-metro older adults were less likely to report a recent visit to a health care provider than were their urban peers. This disparity may lead to delay in accessing health care services and an eventual increase in disability. Federal programs such as the National Health Service Corps, the Indian Health Service, and the J-1 Visa program, as well as complementary state programs, are needed to improve provider availability for non-metro elderly.

Indian Health Service, and the J-1 Visa program, as well as complementary state programs, are needed to improve provider availability for non-metro elderly.

Health services organizations currently serving poor and minority populations should pay particular attention to the problems of the near-poor elderly.

The analysis in the preceding report suggests that low-income non-metro elders, either because of lack of transportation or through inability to meet the financial burdens of care, are less likely to visit a health care provider than their more well to do counterparts. Examples of possible activities include:

- Outreach efforts by Community Health Centers (CHCs) and Rural Health Clinics (RHCs). Sliding fee scales used by CHCs and RHCs may assist non-metro near-poor and minority adults overcome financial access barriers.
- State agencies should actively promote Medicaid enrollment for eligible citizens in non-metro areas. Many non-metro elderly remain unaware of these government programs. Outreach efforts should be active and continuous, and should be sensitive to language and educational barriers.

Linking of limited resources.

The Health Resources and Services Administration, through its non-metro outreach and non-metro networks grant programs, should foster coalitions linking health care providers with voluntary community-based organizations. Working with local community resources can help to increase access to health care providers by providing transportation services, scheduling appointments, or arranging home visits. Several studies indicate successful use of community initiated volunteer programs can increase access to health care for older adults in non-metro areas.

Appendix

Method, Data Sources and Detailed Tables

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Method and Data Sources

Study Design

A cross-sectional analysis of data from the combined 1997 and 1998 National Health Interview Surveys (NHIS) was used to explore the interrelationship of rural residence and race on health care access, measured by health insurance, and health care utilization, measured as reported health care encounters. The population of interest was older adults, defined as persons greater than age 64.

Data Source

The NHIS is an annual survey conducted for the National Center for Health Statistics by the U.S. Bureau of the Census and is the principal source of information on the health of the civilian, noninstitutionalized household population of the United States. It uses a complex sample design involving stratification, clustering, and multistage sampling. In both 1997 and 1998, the Hispanic and African American populations were oversampled. NHIS files include weights for each person that reflect design, ratio, nonresponse, and post-stratification adjustments.

The 1997 NHIS consisted of 39,832 households with 103,447 people in 40,623 families; the 1998 NHIS had 38,209 households with 98,785 people in 38,773 families. The combined sample size for the Person-Level Files is 202,262. The total response rate for the NHIS in 1997 was 91.8%; in 1998 it was 90.0%.

The data used to analyze older adults came from the 1997 and 1998 NHIS Person-Level Files. These files were concatenated and the survey sampling weights adjusted to half their original size to convert two years of data to the equivalent of data for a single year. Slight differences in the surveys from 1997 and 1998 required some manipulation of the 1997 data to get comparable values for person-level health insurance status (insured/not insured/missing).

There are six sections in the Family Core, which is the source for the Person-level variables. These six sections are the Health Status and Limitation of Activity Section; the Injury Section; the Health Care Access and Utilization Section; the Health Insurance Section; the Socio-demographic Section; and the Income and Assets Section.

The *Health Status and Limitation of Activity Section* contains respondent-assessed disabilities, disability-associated conditions, and overall health status for all family members. For activity limitations, respondents were asked questions about work limitations, the need for personal assistance with personal care needs such as eating, bathing, dressing, getting around inside the home, and the need for personal assistance with routine needs such as everyday household chores, and doing necessary business, shopping or running errands. Only if any such limitations were identified were respondents asked to specify the health condition(s) causing the limitation(s) and how long they had each condition. For adults, the fixed response categories for conditions or health problems were broad: vision/problem seeing; hearing problem; arthritis/rheumatism; back or neck problem; fractures, bone/joint injury; other injury; heart problem; stroke problem; hypertension/high blood pressure; diabetes; lung/breathing problem;

cancer; birth defect; mental retardation; other developmental problem; senility; depression/anxiety/emotional problem; weight problem; and other impairment. Each condition was classified as chronic, not chronic, or unknown if chronic. Conditions that cannot be cured once acquired, such as heart disease, diabetes, birth defects, amputations, and senility, were considered chronic. Conditions related to pregnancy were always considered not chronic. Additionally, conditions must have been present at least three months to be considered chronic.

The *Injury Section*, not used for this report, contains information about medically attended injuries and poisonings that occurred to any member of the family within a three-month period. Both injuries and poisonings were episode-based, with each episode consisting of at least one injury or poisoning. Injuries were classified according to the nature of-injury codes 800-959 or 990-999 of the Ninth Revision of the International Classification of Diseases (ICD-9-CM).

The *Health Care Access and Utilization Sections* from the 1997 and 1998 NHIS are identical and contain information-addressing access to health care and utilization of services. This section has three parts: Access to Care; Hospitalization; and Health Care Contacts. Home care and office visits were distinguished beginning in 1997 and there were separate questions for both. Also beginning in 1997, respondents were asked about care from all types of medical doctors such as dermatologists, psychiatrists, ophthalmologists, general practitioners, nurses, physical therapists, and chiropractors. Respondents were also asked about 10 or more visits to doctors or other health care professionals in the last 12 months.

The *Health Insurance Section* covers type of health care coverage (Medicare, Medicaid, military/VA, CHAMPUS/TRICARE/CHAPM-VA, state-sponsored health plan, other government program, Indian Health Service, or private insurance), private insurance characteristics, periods of time without health insurance and reasons for no health insurance, and out-of-pocket costs in the last year.

The *Socio-demographic Section* collected information on place of birth, citizenship status, and years of education for all family members regardless of age. Adults were also asked if they were working in the week before the interview, and if not, their main reason for not working. For those who were working, additional questions inquired about the number of hours worked, how many months they worked in the previous year, how much they earned in the last year, and whether their employer provided health insurance.

The *Income and Assets Section* contains information regarding income sources and total combined family income and home tenure status. Specifically, respondents were asked if their income came from wages and salary, Social Security or Railroad Retirement, other pensions, Supplemental Security Income, Welfare/Temporary Assistance to Needy Families, interest from saving or other bank accounts, dividends from stocks or mutual funds, rental income, royalties, estates, or trusts, child support payments, alimony, Worker's Compensation, and Unemployment Compensation. A detailed poverty indicator used information from the U.S. Bureau of the Census on 1997 poverty thresholds. The poverty indicator was a ratio of the 1997 income value to the poverty threshold, given the family's overall size as well as the number of children aged 17 and under in the family. The resulting ratio, ordered into 14 gradients, applies to each family in the survey. However, the poverty variable was blank for 7,407 of 23,331 records (31%) among elderly respondents and therefore was not used in this analysis.

The principal variable of interest was rural residence. The NHIS measure of rurality was used. The NHIS defines any place of residence outside of a Metropolitan Statistical Area (MSA) as "rural."

Non-informative responses were not used in the analysis. Non-informative responses include those coded to reflect "Don't Know," "Not in universe", "Not ascertained", "Refused", and all missing responses. Exclusion of non-informative answers changes the base for calculating the percentages in each cross-classification cell, so sample sizes are the maximum possible number of responses that could be used and not necessarily the actual number used.

Analysis began with series of descriptive tables including the important demographic variables and covariates. The principal outcome explored as a measure of access was physician visits in the last twelve months, expressed as a binary variable (yes/no).

The weighted and unweighted populations included in the analyses are shown in Table A-1. All population estimates and estimates of the proportions with accompanying standard errors and all logistic regressions were done with SAS-callable SUDAAN 8 and SAS 8.1. Use of this technique guarantees both unbiased point estimates and valid variance estimation. Because the NHIS sample survey design does not oversample persons who live in rural areas, some sample sizes are small for rural minorities. The NHIS documentation does not specify a minimum numeric value for valid point estimates, but some of the rural minority sample sizes are small enough for concern (fewer than 30 observations per year, or less than 60 observations in the combined data).

Table A-1. Weighted and unweighted sample sizes of all elderly adults, by gender, race/ethnicity and residence, 1997 & 1998 NHIS Data

Elderly Adults (65+)**	White	African American	Hispanic	Other	Total
Metropolitan					
Male	5,675 8,524,556	793 849,995	809 639,359	208 283,952	7485 10,297,862
Female	7,870 11,708,980	1,313 1,308,494	1,127 890,156	297 401,223	10,607 14,308,852
Total	13,545 20,233,536	2,106 2,158,489	1,936 1,529,515	505 685,175	18,092 24,606,714
Non-metro					
Male	1,937 2,952,492	154 170,325	106 70,013	29 43,835	2,226 3,236,664
Female	2,573 3,873,745	251 260,020	126 78,707	43 57,168	2,993 4,269,639
Total	4,510 6,826,236	405 430,345	232 148,719	72 101,003	5,219 7,506,302

**Figures from the combined 1997 & 1998 NHIS Person-Level Files calculated in SAS-Callable SUDAAN 8.

Table A-2. Summary characteristics for adults 65 years old or over by race/ethnicity and metropolitan and rural locations, 1997 & 1998 NHIS Data

Metropolitan	Total	White	African American	Hispanic	Other
Unweighted observations	18,092	13,545	2,106	1,936	505
Weighted National Estimate	24,606,714	20,233,536	2,158,489	1,529,515	685,175
Age (% in category):					
65-69	30.1	28.9	35.5	36.4	37.2
70-74	26.3	26.1	25.6	28.2	28.2
75-79	21.1	21.5	18.8	18.7	19.3
80-84	13.6	14.3	12.4	9.1	7.6
85+	9.0	9.3	7.7	7.7	7.7
Education (years)	11.8	12.3	10.4	8.3	11.0
Family Size (persons)	2.0	1.9	2.1	2.5	3.0
Number of Physician Visits	9.6	9.6	9.7	9.4	9.1
Number of Conditions (mean)	0.66	0.63	0.87	0.79	0.52
Insurance					
Any private insurance	66.9	73	43.7	30.5	40.5
Any Medicaid but not private	6.8	3.9	15.9	24.7	24.2
Medicare, military, or govt.	25.1	22.4	38.8	40.0	29.6
Uninsured (%)	1.1	0.65	1.6	4.9	5.6*
Non-metropolitan					
Unweighted observations	5,219	5,219	5,219	5,219	5,219
Weighted National Estimate	7,506,302	7,506,302	7,506,302	7,506,302	7,506,302
Age (% in category):					
65-69	29.8	29.6	27.6	37.8	35.0
70-74	25.8	25.5	26.1	31	38.5
75-79	20.8	21.1	19.1	15.8	13.8*
80-84	13.4	13.5	14.9	8.7	8.3*
85+	10.2	10.3	12.2	6.6	4.4*
Education (years)	11.1	11.3	8.6	6.7	11.2
Family Size (persons)	1.8	1.8	2.1	2.2	2.2
Number of Physician Visits	9.1	9.1	10.4	6.6	5.6
Number of Conditions (mean)	0.81	0.79	1.1	0.89	0.66
Insurance					
Any private insurance	72.0	75.5	33.9	33.4	57.0
Any Medicaid but not private	7.7	6.0	26.0	32.5	7.5*
Medicare, military, or govt.	19.6	18.1	38.8	29.0	28.3
Uninsured (%)	0.66*	0.43*	1.3*	5.1*	7.2*

*Based on < 30 observations

Unweighted and weighted sample sizes calculated using the 1997 & 1998, NHIS Person-Level Data in SAS-Callable SUDAAN 7.5.6. Means and percentages calculated using the 1997 & 1998 NHIS Person-Level Data in SAS 8.1

Table A-3. Summary characteristics for elderly adults 65 years old or over by race/ethnicity and limited/not limited status, in metropolitan and rural locations, 1997 & 1998 NHIS data

Urban	Limited				Not Limited			
	White	African American	Hispanic	Other	White	African American	Hispanic	Other
Unweighted observations	4,977	996	791	139	8,895	1,179	1,214	372
Weighted <i>National Estimate</i>	7,434,340	1,011,256	607,802	189,498	13,321,035	1,219,684	975,622	504,380
Age (mean in years)	76.1	74.8	74.9	74.5	73.0	71.9	71.6	72.0
Education (mean in years)	13.9	12.0	7.3	11.2	14.5	13.6	11.5	13.5
Family Size (mean number of persons)	1.8	2.0	2.5	2.7	1.9	2.2	2.6	3.1
Number of Physician Visits	13.9	13.1	14.8	17.1	7.2	6.9	6.0	5.9
Number of Conditions (mean per respondent)	1.7	1.9	2.0	1.8	0	0	0	0
Percent Uninsured	0.3	0.4	3.1	3.0	0.5	2.5	5.8	5.5
Rural								
Unweighted observations	1,972	234	110	22	2,647	184	127	52
Weighted <i>National Estimate</i>	3,024,237	241,389	68,011	31,381	3,979,337	203,987	85,631	72,978
Age (mean in years)	76.0	76.3	72.9	72.8	72.7	72.5	72.0	71.6
Education (mean in years)	13.6	10.5	5.5	10.5	13.9	12.9	8.1	13.9
Family Size (mean number of persons)	1.7	2.1	2.3	2.1	1.8	2.2	2.2	2.2
Number of Physician Visits	12.2	11.4	10.4	5.0	6.7	9.2	3.4	6.0
Number of Conditions (mean per respondent)	1.8	2.1	2.0	2.0	0	0	0	0
Percent Uninsured	0.2	1.1	3.6	0.0	0.5	2.1	6.2	4.7

Unweighted and weighted sample sizes calculated using the 1997 & 1998 NHIS Person-Level Data in SAS-Callable SUDAAN 7.5.6 All means and percentages calculated using the 1997 & 1998 NHIS Person-Level Data in SAS V8

* Unweighted sample size is less than 6

Table A-4. Weighted and unweighted sample sizes of all elderly adults by number of visits to a physician in the last year by Race/Ethnicity and Non-Rural and Rural Residence, 1997 & 1998 Data

	Total	White	African American	Hispanic	Other
Total, all US	23,110 <i>31,829,725</i>	17,906 <i>26,830,581</i>	2,486 <i>2,564,828</i>	2,156 <i>1,669,592</i>	562 <i>764,725</i>
At least one visit	5,712 <i>7,931,794</i>	4,468 <i>6,726,715</i>	628 <i>646,999</i>	490 <i>389,093</i>	126 <i>168,987</i>
No visit	17,398 <i>23,897,931</i>	13,438 <i>20,103,866</i>	1,858 <i>1,917,829</i>	1,666 <i>1,280,499</i>	436 <i>595,738</i>
Metropolitan					
Total	17,918 <i>24,361,373</i>	13,414 <i>20,032,071</i>	2,086 <i>2,140,363</i>	1,926 <i>1,522,308</i>	492 <i>666,631</i>
At least one visit	4,478 <i>6,150,478</i>	3,397 <i>5,103,219</i>	524 <i>534,752</i>	441 <i>356,950</i>	116 <i>155,558</i>
No visit	13,440 <i>18,210,895</i>	10,017 <i>14,928,853</i>	1,562 <i>1,605,611</i>	1,485 <i>1,165,358</i>	376 <i>511,074</i>
Non-metropolitan					
Total	5,192 <i>7,468,352</i>	4,492 <i>6,798,510</i>	400 <i>424,465</i>	230 <i>147,284</i>	70 <i>98,094</i>
At least one visit	1,234 <i>1,781,316</i>	1,071 <i>1,623,497</i>	104 <i>112,247</i>	49 <i>32,143</i>	10 <i>13,430</i>
No visit	3,958 <i>5,687,036</i>	3,421 <i>5,175,013</i>	296 <i>312,218</i>	181 <i>115,141</i>	60 <i>84,664</i>

Table A-5 Percentage of all elderly adults with at least one physician visit in past two weeks.

Characteristic	Visits	No Visits
Total	24.8	75.2
Sex		
Male	24.1	75.9
Female	25.4	74.6
Region		
Northeast	23.8	76.2
Midwest	24.9	75.1
South	24.8	75.2
West	26.1	73.9
Race		
Caucasian	25.0	75.0
African-American	25.2	74.8
Hispanic	23.3	76.7
Other	22.0	78.0
Household income < \$20,000		
Yes	25.9	74.2
No	25.1	75.0
Residence		
Non-Rural	25.2	74.9
Rural	23.8	76.2
High School Grad?		
Yes	25.2	74.8
No	25.3	74.7
Insurance		
Any private	25.8	75.1
Any Medicaid but not private	28.3	71.7
Medicare, military, or other government only	22.0	78.0
Uninsured	8.7	91.3
Limited?		
Yes	32.8	67.3
No	19.9	80.1
Condition		
Yes	32.8	67.2
No	20.0	80.0
Health (Self-Reported)		
Good-to-Excellent	21.7	78.3
Poor/Fair	33.5	66.5

Multivariate Analysis

Analytic approach

Covariates used in the analysis for elderly adults were sex (male or female), race (non-Hispanic white; non-Hispanic black; Hispanic; and other), limitation of normal activities (such as walking, climbing, standing, sitting, stooping, grasping, carrying, pushing, going out to shop, attend movies or sporting events, visit friends, attend clubs and meetings, go to parties, or to relax at home reading, watching TV, sewing, or listening to music), region (Northeast, Midwest, South, and West), level of education (high school graduate or non-high school graduate), rurality (rural or non-rural, where rural is defined as “non-MSA” and non-rural locations range in population from 5,000,000 or more to under 250,000), insurance (four categories: private insurance, which included all elders reporting private insurance, generally as a supplement to Medicare; Medicaid, which included both Medicaid alone and Medicaid supplementing Medicare, but excluded any persons with private insurance; Medicare or other government insurance (military, veterans) alone; and uninsured), income (below \$20,000 versus \$20,000 and above), family size (number of persons), self-reported health status (good-to-excellent or poor/fair), and age in years.

The algorithm used to build each separate model was to start with a model that included all covariates of interest, including specific pre-identified two- and three-way interactions. Then, starting with the highest order interactions, statistically insignificant interactions were deleted one at a time ($\alpha = 0.01$), then main effects ($\alpha = 0.05$). The final model in each case has only statistically significant main effects and main effects associated with an interaction term, with the exceptions described already.

The model-building process for older adults using visits to a physician in the last two weeks as the outcome started with the following list of covariates and interactions. Each was selected based on its possible or suspected association with the outcome.

Variables:

- Sex (male or female)
- Race/ethnicity (white, black, Hispanic, other)
- Rurality (metropolitan / non-metro)
- Income (below \$20,000/higher)
- Family size
- Insurance (four categories, including uninsured)
- Education (high school graduate versus less)
- Region
- Health (good-to-excellent or poor/fair)
- Limitation in activities (yes / no)
- Age

Two way interactions:

- Rurality and sex
- Rurality and race/ethnicity
- Rurality and income

- Rurality and high school graduate
- Rurality and region
- Rurality and limited activity
- Rurality and health
- Rurality and age
- Rurality and insurance
- Sex and age
- Income and insurance
- Education and income status
- Race and income
- Race and education
- Education and insurance

Three way interactions:

- Rurality, education, and income
- Rurality, income, and insurance
- Rurality, sex, and age
- Rurality, race, and income
- Rurality, race, and education
- Rurality, high school graduate, and insurance

The final model, after iteratively deleting non-statistically significant covariates from the model, contained the following covariates, including two significant interactions:

- Race/ethnicity
- Income
- Family size
- Insurance
- Rurality
- Education
- Condition status (A/C/W)
- Health status
- Limitation
- Rurality
- Rurality and health
- Race/ethnicity and income

The logistic regression was set up to predict the probability of a visit to a physician in the last 2 weeks, so a negative beta coefficient reflects a decreased probability of such a visit (See Table A-6). Odds ratios derived from the beta coefficients are shown in Table A-7. A significant beta coefficient for an interaction means that the effects of the main covariates are not additive on a log scale; that is, the sum of the effects of the covariates in the interaction is adjusted by the value of the interaction beta coefficient.

Table A-6. Logistic Regression predicting a physician visit in the previous two weeks, person 65 and older, beta coefficients

Covariates	Beta coefficient	SE Beta	p-value
Intercept	-1.2654	0.05223	<0.0001
Combined race/ethnicity recode			
Hispanic	-0.0937	0.0895	0.2955
White	0	0	0
African American	0.0966	0.0818	0.2383
Other	-0.1269	0.2054	0.5371
Family income			
\$20,000 or more	0.1160	0.0478	0.0158
Below \$20,000	0	0	0
Family size			
Each additional family member	-0.0686	0.0196	0.0005
Insurance coverage			
Any private insurance	0	0	0
Any Medicaid but not private	-0.0333	0.0706	0.0000
Medicare, military, or other government only	-0.1744	0.0461	0.6377
Uninsured	-0.9071	0.2610	0.0016
Residence			
Non-rural	0	0	0
Rural	-0.0572	0.0529	0.2800
Limitations			
Yes	0.5484	0.0393	0.0000
No	0	0	0
Health			
Good to excellent	0	0	0
Poor/fair	0.4920	0.0493	0.0000
Education			
Not a HS graduate	-0.1024	0.0411	0.0133
HS graduate	0	0	0
Health and rurality			
Good to excellent, non-rural	0	0	0
Good to excellent, rural	0	0	0
Poor to fair, non-rural	0	0	0
Poor to fair, rural	-0.2651	0.0904	0.0035
Race/ethnicity and household income			
Hispanic and \$20,000 or more	0.1375	0.1437	0.3392
Hispanic and less then \$20,000	0	0	0
White and \$20,000 or more	0	0	0
White and less then \$20,000	0	0	0
Black and \$20,000 or more	-0.3747	0.1133	0.0010
Black and less then \$20,000	0	0	0
Other and \$20,000 or more	0.2975	0.2397	0.2154
Other and less then \$20,000	0	0	0

References

- Doescher MP, Franks P, Banthin JS, Clancy CM. Supplemental insurance and mortality in elderly Americans. Findings from a national cohort. *Arch Fam Med* 2000; 9(3):251-7.
- Mentnech R, Ross W, Park Y, Benner S. An analysis of utilization and access from the NHIS: 1984-92. *Health Care Financ Rev* 1995; 17(2):51-9.
- Porell FW, Miltiades HB. Access to care and functional status change among aged Medicare beneficiaries. *J Gerontol B Psychol Sci Soc Sci*. 2001; 56(2):S69-83.
- Shah MN, Rathouz PJ, Chin MH. Emergency department utilization by noninstitutionalized elders. *Acad Emerg Med*. 2001; 8(3):267-73.