

Racial Patterns in Disabled Elderly Persons' Use of Medical Services

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Objective. This study examines the extent that older persons experience patterns of health service use that vary by race.

Methods. Using the 1989 NLTC database, researchers estimate ten binomial logistic regressions of community medical service use by disabled White and Black older persons. Chow tests and Oaxaca decomposition analysis inform why racial differences continue to exist, although most elderly persons have Medicare.

Results. With similar medical conditions, Blacks are less likely to use services, particularly prescription medications and physician services. Use of some medical services is more likely for elderly Black persons who live in rural areas, small cities, and Western states, or who have more IADLs, joint and breathing problems, and broken parts. An Oaxaca decomposition indicates that differences in personal characteristics (e.g., income and health) do not fully explain racial differences in use of prescriptions and physician services.

Discussion. For reasons that are unrelated to financial assets, blacks remain vulnerable in their ability to access services commonly used by older persons. To remedy racial disparities in medical utilization, public policy must expand its focuses beyond health finance issues and consider differences in availability, accessibility, and acceptability.

FOR elderly persons, maintaining health entails the use of a multiplicity of service providers, greater than that for younger adult groups (Ferris & Wyszewianski, 1990). For example, screenings for vision, hearing, dementia, cancer, foot problems, and physical and occupational therapy correspond with a greater incidence of diseases and chronic disabilities. However, access to a diverse spectrum of health and medical care services is not coordinated (Estes, Swan, & Associates, 1993). This lack of coordination suggests that some elderly persons may lack knowledge of available services, face restrictions in the use of services, and/or not meet eligibility criteria for use of services that are important to fully meet their needs. A coordinating or referral mechanism may not exist to ensure that an elderly person moves from a no-care zone, or a care environment with service gaps, to an agency or provider that supplies needed services (Estes, Swan, & Associates, 1993). When older persons experience no-care zones, they are not able to function at maximum capacity (Wallace, 1990a).

Three organizational dimensions are useful in understanding why no-care zones and service gaps in care occur: availability, accessibility, and acceptability (Wallace, 1990a). Structural barriers that result from residential segregation, limited income and health insurance, and geographical distribution of facilities can limit the availability of services. A lack of knowledge about available services can limit accessibility. Patient dissatisfaction and unfavorable doctor-patient interactions can lead to perceptions that care is unacceptable.

Are elderly ethnic minorities more likely to experience no-care zones and service gaps in community-based care commonly used by older persons? We know that minority elderly persons are more likely than White elderly persons to face many of the structural barriers noted above, to lack

knowledge about new medical techniques, and to evaluate medical services as culturally insensitive and/or racially discriminatory (Wallace, 1990b; Whittle, Conigliaro, Good, & Joswiak, 1997). However, no conclusive research ascertains whether minority elderly persons are obtaining a mix of long-term care services that meet their needs (Markides & Wallace, 1996). Further, it is unclear whether they receive other community services (including acute and preventive care) that meet their needs.

In health care systems that lack incentives to deliver a coordinated mix of community services to elderly persons, physicians serve a central role as gatekeepers who identify and certify eligibility for community services. However, there is a historical tradition that enables physicians to select their patients (Rosenbaum, Serrano, Magor, & Stern, 1997). For example, physicians may select patients by refusing to provide services to Medicaid patients or locating their practices in communities where undesirable patients do not reside. Thus, the concentration of minority elderly persons in urban central cities and high probabilities of insurance coverage by Medicaid leads minority elderly persons to face higher risks of a lack of access to physicians. If patients lack access to physicians, they may also lack access to the gatekeepers who assist them in developing variability in the mix of community services obtained (Cohen, Bloom, Simpson, & Parsons, 1997).

When Blacks receive medical care, they receive less care and different care than that received by whites. Lee, Gehlbach, Hosmer, Reti, and Baker (1997) examined this phenomenon while controlling for racial differences in location and insurance status. They analyzed racial differences in procedures used among a zip code and race matched sample of Medicare beneficiaries. Lee and colleagues (1997) found

that Whites received more services than Blacks and Black Medicare beneficiaries were more likely to receive lower cost procedures and services. These findings corroborate those of Escarce, Epstein, Colby, and Schwartz (1993) who report similar patterns of racial differences in medical procedures and diagnostic tests. Among those with Medicare coverage, Black patients with glaucoma have received less treatment than white Medicare beneficiaries (Javitt et al., 1991). These racial differences in the quality of care received may also influence utilization patterns.

While there is an abundant supply of home health agencies, use of home health services is closely tied to whether Medicare supplements, private insurance or financial resources are available. Medicare provides only limited coverage for these services. Further, some home health agencies, primarily for-profit agencies, engage in patient selection by locating in high income areas, not using sliding fee scale payments, and providing only profitable services (Nutter, 1984; Slessinger, Marmor, & Smithy, 1987; Swan & Estes, 1990). These efforts, along with concerns about acceptability of services due to racial prejudice (Wallace, 1990a), place low-income and/or minority persons at risk of a gap in use of home health services.

Access to prescription drugs is closely tied with use of physicians. For both White and Black elderly persons, use of prescription drugs is higher when number of physical health visits in the past year increases and when it is more likely that the same physician was seen on each visit (Fillenbaum et al., 1993). Black elderly persons, particularly Black men, take fewer prescription drugs; this lower utilization is partly explained by differences in physician prescriptions for Black compared to White elderly persons (Fillenbaum et al., 1993).

In this paper I use data from the 1989 National Long Term Care Survey to examine two primary research questions: (a) To what extent do disabled older persons experience patterns of health service use that vary according to race, and (b) Will strategies of changing health care financing options alleviate concerns of whether adequate health care access exists for all disabled older persons. To address these questions, I (i) examine and contrast patterns of health service use and health status for disabled Black and White older persons; (ii) explore the extent that there are racial differences in the use of particular services; (iii) identify the factors that influence utilization of health providers who commonly deliver services to older persons who have chronic disabilities and live at home; and (iv) examine the role of racial differences in health conditions and financial resources as factors influencing racial patterns of community service use.

Background

Lumsdon (1994) suggests that service gaps in long-term care are not a new concern. Always present has been a patient-driven system where patients have sought out and pieced together a fragmented and uncoordinated system of care that includes service duplication and initial treatment at advanced stages of disease. It is this use of a disconnected spectrum of community services by White and Black elderly persons that this paper explores.

Whether race is a factor in older disabled persons' use of community-based long term care is equivocal. Wolinsky and colleagues (1989) document inequities for minority elderly persons. They pool data from the 1976 through 1984 Health Interview Surveys to estimate models of physician contacts and visits, hospital contacts and visits, stratified according to ethnic groups. Wolinsky and associates (1989) compare stratified regressions for five ethnic groups, Puerto Rican, Cuban, Mexican, Black, and Anglo elderly persons. The model's independent variables include predisposing characteristics (gender, marital status, employment status, live alone, age), enabling characteristics (telephone, city residence, supply of medical personnel), and need characteristics (activity limitations, perceived health). They find that health needs are the primary determinants of health services utilization. Yet, the importance of health needs in predicting service use varies according to ethnic group. Thus, the researchers conclude that inequities exist in access to the health care system's physicians and hospitals.

Mui and Burnette (1994) use data from the 1982-84 National Long Term Care Survey to examine long term care service use by African American, Hispanic, and White older disabled persons. They find that race/ethnicity is a significant factor affecting utilization patterns. They examine use of in-home (home health, meals-on-wheels), community social services, and nursing home care. Their models include measures of predisposing characteristics (sex, age), enabling characteristics (income, live alone, nursing home attitudes, use of the three alternative services), need factors (cognitive and ADL impairments, number of illnesses, unmet needs), and dummy variables for race/ethnicity. In these models, Mui and Burnette (1994) find that African American older persons are 18% less likely to use in-home care services and 82% less likely to use nursing homes than non-Hispanic White older persons. No statistically significant racial differences were found in the use of community social services.

Kemper (1992) uses data from the 1982-84 National Long-Term Care Channeling Evaluation to document the factors that influence the use of paid and volunteer home health services, and also informal support services. Included in the regression model are dummy variables for race/ethnicity and variables measuring formal care availability, need (ADL disabilities, incontinence, cognitive/behavior problems), and other demographic characteristics. Kemper's results indicate a statistically significant role of race/ethnicity, with African Americans and Hispanics less likely to use home health services and more likely to use family informal support services.

Wallace, Levy-Storms, Kingston, and Andersen (1998) use data from the nursing home and community-based samples of the 1987 National Medical Expenditure Survey to examine racial patterns of long term care utilization. Their models predict nursing home use, paid home care use (with no nursing home use), and unpaid home care use only (with no nursing home or paid home care use), using measures of predisposing, enabling, and need variables. African Americans are less likely than non-Latino Whites to use nursing homes and paid home care services.

In contrast, Wolinsky and Johnson (1991) examine older persons' use of formal and informal health services, includ-

ing nine measures of utilization. The three informal measures are: bed disability days taken, number of bed disability days, and number of home health services utilized. The formal services are physician contact, physician visits, hospital contacts, and hospital visits. Two additional measures of formal service used are whether the respondent entered the nursing home or died in the last two years of the Longitudinal Study on Aging (LSOA). The independent variables are measures of predisposing characteristics (including measures of multigenerational families, kin and nonkin supports, health worries, health control), and enabling and need characteristics. In addition, six interaction terms of race with health needs are included. Race (Black) was entered in each regression and found insignificant. However, several race interaction terms are significant: Among those with ADLs limiting household activities and upper body limitations, Blacks are more likely to use home health services. Blacks with advanced ADLs are less likely to have a physician contact than Whites with the same limitation. Blacks who need help with basic ADLs have more physician visits than Whites. Hospital contact is more likely for Blacks with ADLs that limit household activities and less likely for Blacks with lower body and upper body limitations.

Miller and colleagues (1996), use data from three national sources (Supplement on Aging [1984], National Long Term Care Survey [1984], and National Medical Expenditure Survey [1987]) to examine the coefficient on a race dummy variable in logistic regression models of use of home-based services, senior centers, and all community services. For comparability among data sets, only those persons who are age 70 or older were studied. The independent variables are measures of predisposing characteristics (family composition and household structure), enabling conditions (income and insurance), and need (health and functional limitations). In all cases, Miller and colleagues (1996) find the coefficients reflecting the log-odds of race statistically insignificant. The authors state that previously documented racial disparities were possibly due to income disparities. Because ethnic minority populations are more likely to have Medicaid coverage and the log-odds ratio for Medicaid was significant, researchers note that they have captured race effects in this variable. Thus, they conclude that because Medicaid enhances access to care, it leads to equality in access. Aday, Fleming, and Anderson (1984) have presented similar documentation of equitable access to health care.

One consistent finding in the literature is that Blacks are less likely to use nursing home services. This conclusion is reached in models that include dummy variable measures of race. Another consistent finding is that race dummy variables are statistically insignificant in models of social and community services. The research that identifies race patterns in the use of physician and hospital services either identifies these differences based on the magnitude of the coefficients in models that are stratified by race/ethnicity or based on the use of race interaction terms. There are contrasting findings regarding race in models of paid in-home care, even in studies that use the same data sources. Race dummy variables are found statistically significant in some studies (i.e., Kemper [1992], Mui & Burnette [1994], and

Wallace, Levy-Storms, Kingston, & Andersen [1998]) and insignificant in others (i.e., Miller et al. [1996] and Wolinsky & Johnson [1991]). However, Wolinsky and Johnson (1991) find significant race interaction effects in paid in-home care models.

Differences in the reported effects of race among researchers who use the same data is an unexpected finding. However, differences in methodological strategies may partly explain these equivocal results. For example, using the 1987 National Medical Expenditure Survey, Miller and colleagues (1996) find a dummy variable measure of race insignificant and Wallace and colleagues (1998) find it significant. One important distinction between the two studies is the age of persons in the study samples. Miller and associates (1996) include persons age 70 and older and Wallace and colleagues (1998) include persons age 65 and older. This sampling difference has significant implications for the study of race. Due to the relatively higher mortality rates of Blacks, particularly Black men, the gender composition of the sample of Black older persons who are age 70 and older is quite different from one that includes persons age 65 and older.

A second methodological strategy that may explain differences in the reported findings is the inclusion of different samples. Miller and colleagues (1996) use a community sample of disabled older persons whereas Wallace and associates (1998) use a sample of institutionalized and noninstitutionalized older persons. Because Blacks are less likely to be institutionalized, this sampling difference may possibly explain why Wallace and colleagues (1998) found race significant and Miller and coworkers (1996) did not.

Previous research, particularly Wolinsky and Johnson (1991), informs that use of a dummy variable that indicates race may not fully explain the relationship between race and service utilization. It is possible that a race dummy variable can be insignificant while a race interaction term may be significant. Whereas research that includes race interaction terms informs how race influences the use of particular services, it is unclear whether these utilization patterns are associated with experiences of no-care zones or service gaps in care and a corresponding inability of elderly persons to function at maximum capacity.

One major limitation for all researchers who want to understand the role of race in affecting health services use is lack of data that explicitly measure culture and experiences of discrimination. These are excluded variables that reflect racial phenomenon and are correlated with included measures. Their exclusion potentially biases the reported coefficients of included variables.

This paper extends the existing literature by examining the factors that influence use of specific community based services. I reexamine patterns in the utilization of community long-term care services, using both bivariate and multivariate analysis strategies. The database for this research is the 1989 National Long Term Care Survey, a database designed to understand the health and formal and informal service use of disabled elderly persons. I present descriptive statistics on the types of community medical services used by disabled elderly persons, providing racial comparisons. I contrast these medical utilization patterns with racial com-

parisons of levels of health and find that Black elderly persons are more likely to report medical conditions and less likely to report medical utilization.

Logistic regressions are presented in models that include race dummy variables and models that are stratified according to race. Chow tests and an Oaxaca decomposition provide further insight into the reasons that there are racial differences. The Chow test examines the role of race interaction variables. The Oaxaca decomposition examines the potential role of culture and discrimination, using a data set that does not include explicit measures of either variable. The paper concludes with a discussion of the implications of these findings for future research and public policy.

METHODS

Data

The data source for this analysis is the National Long Term Care Survey (NLTC), 1989. It is the third wave of a nationally representative data base that identifies survey participants from Medicare rolls and is designed to describe chronically disabled elderly persons. The data are sponsored by the Office of the Assistant Secretary for Planning and Evaluation (U.S. Department of Health & Human Services), the Health Care Financing Administration, and the Bureau of Census (U.S. Department of Commerce). In 1989, the NLTC questioned 5,817 older persons who were (a) interviewed in the 1982 and/or 1984 rounds of the survey; (b) identified in previous survey periods and were not interviewed because they did not meet the age and disability criteria at that time, but met them in 1989; or (c) newly identified in 1989 and met the survey's age and disability criteria in 1989. Respondents met the disability criteria if they had ADL or IADL impairments that were chronic, that is, lasting or expected to last 90 days or longer. Respondents were persons aged 65 and older.

I use a subsample of this data set for this paper's analysis. I include Black and White elderly persons who were living in the community (not institutionalized) during the survey period. This includes a total of 527 Black and 4,007 White disabled elderly persons. Survey respondents provided detailed information on their medical conditions and physical limitations, health insurance, financial status, medical utilization, and informal in-home assistance received from family and friends.

Regression analysis strategy.—To examine the relative influence of health conditions and financial resources on racial patterns of community long-term care services, I estimate several regression models. First, I estimate ten models of community services utilization by elderly persons. Next, each service utilization model is reestimated and includes the independent variables of the previous models and a complete set of interaction terms of race with each independent variable of the model. Finally, each race interaction term is entered in each of the ten regression models sequentially, to examine its independent influence on the regressions.

Each regression model includes at least 26 independent variables. The regression models that include these vari-

ables and also a complete set of interaction terms have a total of 51 independent variables. The sheer size of this set of independent variables potentially raises a concern about possible overfitting of the models. The standard rule of thumb in event history analysis is that there must be at least ten events (the lesser number of persons with or without the condition/service use) per independent variable. If the rule of thumb is met, (a) regression coefficients are less likely to be biased in both positive and negative directions; (b) sample variances are less likely to be biased in both positive and negative directions; and (c) the probability of significance in the wrong direction is reduced (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). At least 260 events are needed for each of the ten basic models of service utilization with 26 independent variables. The ten regression models that also include a 27th variable, that is, an interaction term with race and one of the 26 independent variables, require 270 events. The full interaction models (with 51 independent variables) require 510 events. Tables 3 and 4 report the number of events for each of the regression models. Most of the basic 26 term additive models and models with the single interaction (27th) term meet the rule of ten. The exceptions are emergency room, dental, foot doctor, optometrist, and therapist visits, and also the stratified regression of physician visits for Black elderly persons. These equations are also the ones that do not meet the rule of ten for the full interaction models.

The NLTC (1989) includes fourteen noninstitutionalized, formal community services that disabled elderly persons typically use: paid in-home caregiver, physical therapist, occupational therapist, speech therapist, hearing therapist, mental health professional, dentist, foot doctor, optometrist, chiropractor, emergency room, home visit by a physician, visit to a physician's office, and prescription medicine. Due to inadequate variability in the measures of use of mental health professionals, chiropractors, and home visits by physicians, I do not estimate regressions of these types of service use. To measure use of therapist services, I develop a measure that equals one if any type of therapist services is received.

Our ten regression models include eight models that examine use of specific community services: (a) whether there is at least one compensated family or community caregiver; (b) whether there is use of at least one therapist; (c) whether there is at least one visit to a dentist; (d) whether there is at least one visit to a foot doctor; (e) whether there is at least one visit to an optometrist; (f) whether there is at least one visit to an emergency room; (g) whether there is a visit to a physician's office; and (h) whether prescription medications are bought or obtained. The other two regression models are (i) whether there was a need to see a physician and no visit was made and (ii) whether the elderly person had a usual source of care. All ten regression models are estimated using a binomial logistic regression procedure.

The regression models include measures of medical conditions and disabilities, a measure of household income, health insurance status, regional and rural residence, whether unpaid caregivers provide in-home services, and sociodemographic measures. I describe these variables in more detail in Table 1, with means reported by race.

Table 1. Medical Service Use, Medical Conditions and Sociodemographic Characteristics of Elderly Disabled Persons, by Race (weighted)

Services	White (N = 4,007)	Black (N = 527)
Have compensated family and community caregivers	27.49%	25.47%
Saw at least one therapist in the last month*	4.68%	2.95%
Saw a physical therapist*	3.71%	2.09%
Saw occupational therapist	0.46%	0.22%
Saw a speech therapist	0.13%	0.98%
Saw a hearing therapist	0.53%	0.11%
Saw a mental health professional in the last month	1.18%	0.8%
Received care from a dentist in the last month*	7.62%	3.4%
Received care from a foot doctor in the last month	7.91%	4.6%
Received care from an optometrist in the last month	6.77%	6.06%
Received care from a chiropractor in the last month*	1.84%	0.11%
Received ER care in the last month*	7.26%	4.01%
Doctor visited home in the last month	1.84%	1.53%
Visited a doctor's office in the last month	43.44%	41.21%
Have a regular source of care*	93.09%	88.24%
Did not see doctor but needed to	15.11%	18.98%
Number of prescriptions*	3.00	2.42
Medical Conditions		
Joint**	76.14%	83.51%
Nerve*	4.97%	2.66%
Glaucoma*	9.45%	15.82%
Diabetes*	14.95%	23.17%
Cancer*	6.51%	4.64%
Heart	31.68%	31%
High blood-hypertension*	41.52%	58.78%
Stroke	6.66%	7.93%
Broken bones*	8.19%	6.21%
Breathing disorders	36.63%	33.74%
Cognitive disorders*	14.32%	17.3%
Difficulty eating*	9.29%	11.55%
Difficulty getting out of bed*	26.44%	35.72%
Difficulty getting around	98.05%	96.62%
Difficulty getting dressed*	19.34%	22.56%
Difficulty taking baths	44.33%	39.44%
Difficulty using toilets	23.41%	22.99%
Difficulty with >3 ADLs	31.47%	33.12%
Difficulty with >3 IADLs*	40.78%	43.86%
Number of IADLs	2.46	2.68
High ADL*IADL	1.38	1.51
Sociodemographic Characteristics		
Rural: live in rural area or small town*	56.64%	40.75%
City: live in small city with 50,000–250,000 population*	20.66%	24.90%
Live in the North*	20.56%	14.14%
Live in the West*	19.20%	9.40%
Live in the Midwest*	22.01%	17.05%
Live in the South*	38.23%	59.41%
Household Income from all sources* (in dollars)	\$16,066.27	\$9,156.25
Covered by Medicaid*	13.07%	41.21%
Covered by Medicare only*	17.56%	30.83%
Female	65.11%	64.19%
Married*	45.12%	32.57%
Years of education*	9.87	7.03
Have an uncompensated ADL caregiver*	8.64%	12.58%
Have an uncompensated IADL caregiver*	12.23%	9.89%

*Joint: Rheumatism, Paralysis, & Arthritis; Nerve: Multiple Sclerosis, Cerebral palsy, Epilepsy, Parkinson's; Heart: Heart Attack & Disease; Breath: Bronchitis, Pneumonia, Flue, Emphysema, & Asthma; Cognitive: Alzheimer's & other mental problems.

**Significant at the 0.05 level or better, based on a *t*-test of differences in means.

RESULTS

Health and Medical Care

Table 1 reports the means for various community services used by disabled elderly persons, according to race. The data for the subsample used in this analysis are weighted to produce national cross-sectional estimates of medical use according to race. The patterns of service utilization of Blacks and Whites are similar, with several key exceptions. Disabled White elderly persons are more likely to receive therapist services (particularly those of a physical therapist), as well as dental and chiropractor services. Disabled Black elderly persons are more likely to lack a usual source of care. Disabled White elderly persons obtain more prescriptions and have a greater chance of receiving services in the emergency room than disabled Black elderly persons. In this 1989 data base, bivariate analysis indicates that statistically significant differences exist in the community care of disabled Black and White elderly persons, with Blacks less likely to receive the care.

Medical care services are not consumer goods purchased for the direct satisfaction that they yield. Rather, disabled older persons have consumed them to generate/monitor changes in health conditions, leading to improvements or stabilization of their health status. Are disabled Black elderly persons receiving fewer services because they are less in need of care? Table 1 also reports respondents' medical conditions, according to race. Consistent with reports in previous research, the sample of disabled Black elderly persons report more incidences of medical conditions and disabilities than Whites. Disabled Black elderly persons are significantly more likely to report problems with joints, glaucoma, diabetes, high blood pressure, and cognitive disorders. Disabled White elderly persons are significantly more likely to report neurological problems, cancer, and broken bones. We found no statistically significant differences in reports of heart problems, stroke, or breathing disorders. Disabled Blacks are more likely to have difficulty eating, getting in and out of bed, and getting dressed. A report of three or more limitations in instrumental activities of daily living is more likely for Black elderly persons than White elderly persons.

These data suggest that disabled Black elderly persons should have greater medical utilization than disabled White elderly persons. However, the reported health conditions in Table 1 are associated with lower medical services utilization among disabled Black elderly persons.

Table 2 presents the data in Table 1 in a different way. It reports service use according to medical condition and race. This strategy seeks to control for the influence of reported medical conditions and investigate whether chronically disabled Black and White elderly persons with similar health status have similar monthly use of medical services. For most medical conditions and limitations in activities of daily living, Black elderly persons use significantly fewer prescription drugs than White elderly persons. Table 2 reports a consistent pattern of statistically significant racial differences in therapist services. With one exception (for stroke patients), disabled Black elderly persons are less likely to use therapist services than White elderly persons.

Greater use of the emergency room among disabled

Table 2. Medical Service Use by Health Status And Race, Persons Age 65+ With Chronic Disability 1989 (weighted)^a

Services	Joint		Nerve		Glaucoma		Diabetes		Cancer		Heart		Hypertension	
	White	Black	White	Black	White	Black	White	Black	White	Black	White	Black	White	Black
Paid Caregiver (%)					33.89	18.73								
Therapist (%)	5.28	2.84	9.51	0	3.73	2.44								
Mental Health (%)							2.97	0	1.99	0				
Dentist (%)	7.31	3.18	7.02	10.28										
Foot Doctor (%)	8.06	4.86	10.54	0			10.85	4.41						
Optometrist (%)			7.24	0	15.69	4.82								
Chiropractor (%)	1.84	0.13			2.38	0							1.72	0.18
ER visits (%)	7.84	3.88	9.04	5.13	8.51	1.55					9.38	1.56		
Doctor visit (%)					2.29	0			3.08	0				
Visiting Doctor (%)			48.53	22.33	50.10	30.55								
Regular (%)	93.72	88.22											95.97	91.24
Didn't see doctor - but need to see (%)			16.26	0							19.48	26.16		
Precription (Mean)	3.19	2.49					4.24	3.23			4.43	3.20	3.69	2.91

Services	Stroke		Broken		Breath		Cognitive		Eat ADL ^b		Bed ADL ^c	
	White	Black	White	Black	White	Black	White	Black	White	Black	White	Black
Paid Caregiver (%)							37.36	25.19				
Therapist (%)	8.96	10.73	13.13	5.2	5.38	3.13					7.15	2.58
Mental Health (%)												
Dentist (%)											4.71	2.3
Foot Doctor (%)							11.59	1.6				
Optometrist (%)					7.73	4.94	6.68	0.84	6.43	2.17		
Chiropractor (%)			1.3	0			2.27	0				
ER visits (%)	8.84	4.4										
Doctor visit (%)			1.71	0								
Visiting Doctor (%)												
Regular (%)			93.04	100								
Didn't see doctor- but need to see (%)												
Precription (Mean)					3.60	2.85	3.78	2.49			3.9	2.91

Services	Get ADL ^d		Dress ADL ^e		Bath ADL ^f		Toilet ADL ^g		High ADL ^h		High IADL ⁱ	
	White	Black	White	Black	White	Black	White	Black	White	Black	White	Black
Paid Caregiver (%)							46.56	38.43				
Therapist (%)	4.72	3.06	8.25	3.76					7.61	3.82	5.90	3.36
Mental Health (%)												
Dentist (%)	7.61	3.52			6.07	2.08	6.07	1.57			5.08	1.68
Foot Doctor (%)												
Optometrist (%)					6.58	4.23			6.34	2.73		
Chiropractor (%)	1.87	0.11										
ER visits (%)	7.33	3.76									8.00	3.46
Doctor visit (%)												
Visiting Doctor (%)												
Regular (%)	93.18	88.6										
Didn't see doctor- but need to see (%)					16.43	27.36						
Precription (Mean)	3.01	2.45	3.88	3.03	3.65	2.75	3.76	2.63	3.78	2.90	3.68	2.63

^aTable includes only those coefficients that are statistically significant at the .05 level or better, based on *t*-tests of differences in means.

^bEat ADL: Difficulty eating.

^cBed ADL: Difficulty getting out of bed.

^dGet ADL: Difficulty getting around.

^eDress ADL: Difficulty getting dressed.

^fBath ADL: Difficulty taking baths.

^gToilet ADL: Difficulty using toilets.

^hHigh ADL: Difficulty with <3 ADLs.

ⁱHigh IADL: Difficulty with <3 IADLs.

White elderly persons is a surprising yet consistent pattern. This finding contrasts with research on those aged 65 and younger, where reports suggest that Blacks are significantly more likely to use the emergency room (Thornton & White-Means, 1996; White-Means & Thornton, 1995). In only three instances are there significant racial differences in the use of paid caregivers—glaucoma, cognitive disorders, and toileting ADLs. In those instances White elderly persons are more likely than Black elderly persons to have a paid caregiver. Similarly, statistically significant racial differences occur in reports of a need to see a doctor yet not seeing one among disabled elderly persons with nerve and heart conditions and those with bathing limitations. Only for the later two health states are disabled Black elderly persons more likely not to seek care when they need it.

Examining particular diseases and racial patterns of expected service utilization is also informative. Among glaucoma patients, one would expect significant use of optometrists' services. White elderly glaucoma patients are significantly more likely to visit optometrists than Black elderly glaucoma patients. Diabetes requires frequent monitoring by physicians and podiatrists; yet, Black elderly patients are less likely to visit podiatrists. Hypertension is commonly treated with prescription medications; White elderly patients with this diagnosis have greater use of prescription medicine than their Black counterparts. Recovery from strokes is facilitated by the use of therapists' services; however, White elderly stroke patients are less likely to have therapist visits and more likely to visit the emergency room than Black elderly patients. This racial pattern is possibly related to racial differences in survival from strokes, with White elderly stroke patients being more likely to report an "old" stroke. When elderly patients have cognitive conditions and ADLs, the services of a paid caregiver provide essential support. White elderly patients are more likely than Black elderly patients to have a paid caregiver when they have been diagnosed with a cognitive condition or have difficulty with toileting.

Racial patterns in use of medical services are prevalent among disabled elderly persons with the same medical conditions and disabilities. When statistically significant differences in utilization occur, in most instances, they are associated with Black elderly persons having lower use of medical services. What explains these patterns of medical utilization among chronically disabled older persons? Are they primarily due to differences in financial resources? For this survey sample, the mean household income for disabled White elderly persons is about \$15,211; the mean for disabled Black elderly persons is about \$9,196. While Medicare insures most respondents (97% for Whites and 94% for Blacks), significant differences exist in the other types of insurance coverage acquired by disabled elderly persons. Medicaid insures almost half (41%) of noninstitutionalized disabled Black elderly persons and about 13% of disabled White elderly persons. More than 70% of disabled White elderly persons have private insurance supplements and only 31% of disabled Black elderly persons report such coverage.

Utilization of Community Services

In Table 3 I report the results for the ten regression models, each including a race dummy variable. The race dummy

variable is statistically significant in only one model: prescription medication use. Black elderly persons were significantly (at the .0001 level) less likely to obtain prescriptions.

The regression analysis includes a sample that is smaller than the total sample of Black and White older persons in the data base. This is primarily due to a typical pattern in survey research, where there are missing data on family income (with 1,096 missing) and education (with 338 missing). The typical pattern is for persons at the upper and lower ends of the income distribution to be less likely to report their incomes and education or both. Thus, there are nonrandom and systematic patterns of data loss that we address by list-wise deletion of all observations for which data are missing. Although the list-wise deletion procedure results in a loss of statistical power, it has been found to lead to accurate parameter estimates in cases where no more than 30% of the data are missing (Kromrey & Hines, 1994; Switzer, Roth, & Switzer, 1998). The regressions presented in this paper meet this criteria.

Health conditions were the primary determinants of use of community services in each of the ten regression models reported in Table 3. The only health condition that was insignificant in each of the ten regression models was stroke. The variable, cognitive problems, was significant in only one regression model, where respondents needed to see a physician but did not. The presence of cognitive problems increased the likelihood that a physician was not seen. Those who were more likely to have a usual source of care were elderly persons with high ADLs, and heart and hypertension problems. Use of the emergency room was more likely when elderly persons had diabetes, heart problems, broken parts, or breathing problems. Physician visits were more likely for those with joint, heart, and breathing problems and for those with diabetes, hypertension, and broken parts. In addition to those with cognitive problems, those with joint, heart, and breathing problems had higher probabilities of not seeing a physician although one was needed. The only health conditions that did not influence use of prescriptions were cognitive problems, stroke, and broken parts. Only one statistically significant health condition, the interaction term of high ADLs with number of IADLs, was negatively related with the probability of prescription medication use.

Having a paid caregiver was more likely for elderly persons with high ADLs or IADLs, yet somewhat less likely for those with both high ADLs and IADLs. The only health condition that significantly affected the probability of use of a dentist was the number of IADLs; with more IADLs there was a lower probability of a dental visit. Those with joint problems and diabetes were more likely to visit a foot doctor. Hypertension and the joint presence of high ADLs and IADLs decreased the likelihood of a visit to an optometrist, while glaucoma, joint problems, and diabetes increased the likelihood of a visit. Therapist visits were more likely among those with high ADLs and broken parts.

It is also interesting to note the role of the enabling factors income and insurance as factors affecting the likelihood of using community services. Income was positively associated with the likelihood of a usual source of care and physician, dental, and foot doctor visits. Higher income de-

Table 3. Logistic Regression Models of Community Medical Service Utilization Among Disabled Elderly Persons (SE)

Variable	Usual Source of Care (Yes/No)	ER Visit (Yes/No)	Physician Visits (Yes/No)	Didn't See Physician, But Needed One (Yes/No)	Prescriptions (Yes/No)
Cognitive	-.30 (.22)	.25 (.19)	-.05 (.11)	1.10 (.16)***	-.05 (.15)
High ADL	.69 (.34)**	-.07 (.27)	.05 (.15)	.20 (.23)	.68 (.20)***
IADL	.06 (.05) ^c	-.03 (.05)	.03 (.03) ^c	.04 (.04)	.15 (.03)***
High ADL* IADL	-.06 (.08) ^d	.11 (.07)	-.03 (.04) ^{b,d}	-.05 (.07)	-.13 (.05) ^{b***}
Joint	-.10 (.18)	.15 (.18)	.20 (.09) ^{c***}	.76 (.18)***	.45 (.11)***
Glaucoma	.09 (.25)	-.18 (.23)	.18 (.12) ^{b,d}	.07 (.18)	.57 (.17)***
Diabetes	.34 (.23)	.41 (.17)**	.26 (.10)***	.12 (.14)	1.13 (.17)***
Heart	.92 (.20)***	.39 (.14) ^{b,d***}	.46 (.08)***	.49 (.11)***	1.07 (.12)***
Hypertension	.64 (.16)***	.05 (.14)	.32 (.07) ^{a,c***}	.13 (.11) ^b	1.04 (.10)***
Stroke	-.13 (.34)	-.02 (.26)	-.005 (.15)	-.12 (.26)	.004 (.22)
Broken	-.03 (.31)	.42 (.22)*	.26 (.14)*	.25 (.20)	.03 (.19)
Breath	.26 (.16)	.32 (.14)**	.37 (.07)***	.64 (.11)***	.24 (.10) ^{b,d***}
Rural	.03 (.19) ^c	-.001 (.18)	-.02 (.09)	-.24 (.14) ^{d*}	.03 (.12) ^c
City	-.05 (.22)	.23 (.21) ^{a,c}	-.02 (.11)	-.06 (.17)	.01 (.14) ^c
North	-.29 (.21)	-.02 (.20) ^c	-.09 (.10)	-.55 (.18)***	-.24 (.13)*
West	-.13 (.21)	.29 (.18)	.09 (.10)	-.08 (.15)	-.38 (.13) ^{c***}
Midwest	-.04 (.20)	-.02 (.19)	-.04 (.10) ^d	-.17 (.15)	-.18 (.13)
Income	.00002 (9E-6) ^{a,c***}	-.10E-6 (7E-6)	7.9E-6 (3E-6)**	-.00003 (7E-6)***	6E-6 (5E-6)
Medicaid	-.45 (.21)**	-.31 (.20)	.14 (.10)	-.46 (.17)***	.12 (.14)
Medicare Only	-1.32 (.17)***	-.08 (.19)	-.30 (.10)	-.08 (.16)	-.54 (.12)***
Female	.48 (.17) ^{a,c***}	.15 (.16)	.18 (.09) ^{a,c***}	-.10 (.13)	.33 (.11)***
Married	.23 (.17) ^{b,d}	.21 (.16)	.11 (.08)	.06 (.13)	.35 (.11)***
Education	.03 (.02) ^d	.02 (.02)	-.003 (.01)	-.007 (.02)	.03 (.01) ^{b**}
Unpaid ADL Caregiver	.36 (.32)	-.10 (.24)	-.05 (.13)	.11 (.22)	-.03 (.18)
Unpaid IADL Caregiver	-.06 (.23)	.04 (.21)	-.12 (.11)	.11 (.16) ^d	.03 (.15) ^a
Black	-.17 (.21)	-.31 (.25)	-.10 (.12)	-.09 (.18)	-.68 (.15)***
N	3,365	3,365	3,365	3,365	3,365
Events	3,113	243	1,457	437	2,635

Variable	Paid Caregiver (Yes/No)	Dentist (Yes/No)	Foot Doctor (Yes/No)	Optometrist (Yes/No)	Therapist (Yes/No)
Cognitive	.11 (.37)	.27 (.22)	.25 (.19)	-.14 (.23)	.20 (.23)
High ADL	1.95 (.16)***	-.42 (.30)	.29 (.27)	.40 (.28) ^b	.91 (.30)***
IADL	.37 (.03)***	-.17 (.06)***	.06 (.05) ^a	.04 (.05) ^c	.10 (.07)
High ADL* IADL	-.33 (.04) ^{b***}	.10 (.08)	-.03 (.07)	-.17 (.07) ^{b***}	-.08 (.08)
Joint	.04 (.11) ^{a,c}	-.01 (.17)	.39 (.20)**	.34 (.18)*	.15 (.23)
Glaucoma	.22 (.14)	-.03 (.24)	.07 (.22)	.89 (.18) ^{b,d***}	-.23 (.30)
Diabetes	.11 (.12)	-.24 (.22)	.47 (.17)***	.34 (.18)**	.09 (.22)
Heart	.26 (.09)***	.18 (.16)	.04 (.15)	.02 (.15)	-.08 (.18)
Hypertension	-.13 (.09) ⁵¹	.09 (.15)	-.22 (.15)	-.44 (.15)***	.11 (.18)
Stroke	.03 (.16)	-.23 (.35)	.20 (.26)	.15 (.30)	.35 (.28)
Broken	.28 (.15)*	.32 (.25) ^a	.09 (.24) ^c	.06 (.26) ^c	1.13 (.22)***
Breath	.10 (.09)	-.03 (.15) ^a	-.05 (.15) ^c	.17 (.15) ^c	.24 (.17)
Rural	-.13 (.11)	-.38 (.17)**	-.33 (.17)**	-.07 (.18)	-.02 (.21)
City	-.02 (.13)	-.21 (.21) ^a	-.15 (.20)	.06 (.21) ^c	-.12 (.26)
North	.12 (.12)	.63 (.20)***	1.31 (.18)***	-.07 (.20)	.41 (.24)*
West	.34 (.12)***	.58 (.20)***	.41 (.21)**	.04 (.20) ^{a,c}	.46 (.23)**
Midwest	.35 (.11) ^{a***}	.38 (.20) ^{d*}	.17 (.22)	.001 (.19)	.17 (.24)
Income	-.00001 (4E-6)***	.00002 (6E-6)***	.00001 (6E-6)**	-.24E-6 (7E-6)	1.9E-6 (7E-6)
Medicaid	.33 (.12)	-.38 (.26)	.32 (.20)	-.05 (.21)	-.17 (.26)
Medicare Only	-.08 (.12)	-.45 (.24)*	-.09 (.22)	-.21 (.22)	-.38 (.28)
Female	.29 (.11)***	.26 (.17) ^d	.55 (.18)***	.44 (.18)**	.04 (.20) ^{b,d}
Married	-.56 (.10)***	.21 (.16)	.09 (.16)	-.05 (.17)	.32 (.20)
Education	.10 (.01)***	.10 (.02)***	.06 (.02)***	.05 (.02)**	.11 (.03)***
Unpaid ADL Caregiver	-1.29 (.17)***	.10 (.29)	.02 (.24)	-.20 (.29)	-.04 (.27)
Unpaid IADL Caregiver	-.59 (.14) ^{b,d***}	.18 (.29)	.17 (.21)	.003 (.22)	.10 (.26)
Black	-.11 (.14)	.09 (.29)	-.09 (.25)	.09 (.24)	.07 (.32)
N	3,365	3,365	3,365	3,365	3,365
Events	954	221	229	219	154

^aPositive and significant as individual variable.
^bNegative and significant as individual variable.
^cPositive and significant as group variable.
^dNegative and significant as group variable.
*, **, *** significant at the .10, .05 and .01 levels, respectively.

creased the probability of not seeing a physician when one was needed and having a paid caregiver. Insurance coverage by Medicaid increased the likelihood of having a paid caregiver, yet decreased the likelihood of having a usual source of care and not seeing a physician when one needs to visit. Those who were insured by Medicare only were less likely to have a usual source of care, use prescription medications, and visit a dentist.

Somewhat surprising is the finding that the variables unpaid ADL and IADL caregivers were only statistically significant in the paid caregiver regression model. The results suggest that both unpaid ADL caregivers and unpaid IADL caregivers are substitutes for paid caregivers and thus decrease the likelihood of having a paid caregiver. Although rural residents are less likely to visit the dentist or foot doctor, they are more likely to see a physician when one is needed.

Based on the findings of the above models, it is tempting to conclude that race does not influence the use of community medical services, with the exception of prescription medication use. To further explore the role of race in influencing community medical services utilization, we perform a Chow test and also explore the interactive effect of race. The Chow test (a chi-square test of differences in intercepts and slopes) assesses whether every independent variable in the regression model affects Black and White elderly persons differently (Chow, 1960). That is, it tests for the stability of the regression coefficients and whether they are not the same for Black and White older persons. The Chow test is a very stringent test of the role of race because race must be found to interact significantly with every independent variable in the model in order to accept the hypothesis of the test. The full interaction model (on which the Chow test is based) and models that test for the interactive effect of race with respect to a subset of the independent variables, assume that models which include race dummy variables only may produce biased estimates for all coefficients. This is because they exclude significant variables (race interaction terms) that are correlated with the variables that are included in the model. Furthermore, when the correct specification of the regression model is one that includes interaction terms, the estimated variance of the regression coefficients in the models with only race dummy variables will be lower than those in the models with interaction terms.

The Chow test uses the entire sample of Black elderly persons and a reduced (random) sample of White elderly persons. This sample size adjustment is required due to the discrepancy in sample sizes for Blacks and Whites; the sample of White elderly persons is approximately seven times that of Blacks. To perform the test of differences without adjusting for sample size differences would muddle the information provided by the test. A chi-square test, performed on two samples of equivalent size, neutralizes the systematic bias that is involved in the study design. Otherwise, when regression analyses are performed on the combined samples of Whites and Blacks, the results for the combined sample will mirror those of the subsample population that is disproportionately larger, that is, the White sample (White-Means, 1995). The chi-square test assesses differences in use of services by a representative 33% sample of White elderly persons ($n = 800$) and the sample of Black elderly

persons. The test statistic is the difference in $-2 \times \log$ -likelihood ratio for the regression that pools the Black and reduced White sample (assuming the two racial groups are the same) and the same statistic for a regression that assumes the intercepts and slopes for the two groups are different.

In the chi-square test of differences for our regression models, there is not a statistically significant difference in community service utilization by Blacks and Whites. The critical value of the test statistic for our model was 124.34. I obtained values of 25.56, 37.86, 27.4, 31.94, 23.9, 52.68, 25.17, 58.19, 31.58, and 32.78 for the models of: (a) whether there is at least one compensated family or community caregiver; (b) whether there is a visit to a physician's office; (c) whether there was a need to see a physician and no visit was made; (d) whether there is at least one visit to a dentist; (e) whether there is at least one visit to a foot doctor; (f) whether there is at least one visit to an optometrist; (g) whether there is use of at least one therapist; (h) whether the elderly person had a usual source of care; (i) whether there is at least one visit to an emergency room; and (j) whether prescription medications are bought or obtained, respectively. Thus, we were unable to support the hypothesis that every factor examined in the regression model affected service utilization by Black and White elderly persons differently.

Although the chi-square tests of differences did not indicate significant interactive effects of race for all variables in the model, some individual variables had significant race interaction terms. Table 3 reports the results of the regression analyses when race interaction terms are entered for every independent variable of the model. A superscript (c) indicates that in such a model, the interaction term was positive and significant. Thus, being Black increases the probability of utilizing that particular service. A superscript (d) indicates that the interaction term was negative and significant, with Blacks having a lower probability of service utilization. Table 3 also reports the results of regression analyses when each interaction term is entered separately and all others are excluded. These results are provided for the reader's information, to compare with results found in the full interaction model. A superscript (a) indicates that in such a model, the interaction term was positive and significant. A superscript (b) indicates that in such a model, the interaction term was negative and significant.

The interactive models provide new and valuable information about the role of race in affecting service utilization. First, some interaction terms are significant when entered individually and remain significant when all other interaction terms are added to the regression models. Other interaction terms are not significant when entered individually, yet are significant when all other interaction terms are added. A third case is the interaction term that is significant when entered individually and insignificant when all other interaction terms are added. In the third case it is difficult to argue that the identified relationship is not spurious and simply reflecting a biased coefficient and standard error estimate (due to its correlation with another interaction term that should be included in the model). Thus, the discussion of results will primarily delineate the first two cases of significant interactive effects, that is, those with superscripts c or d.

In the usual source of care model, seven race interaction terms have significant effects. These are IADL, High ADL×IADL, rural, income, female, married, and education. Black older persons who have more IADLs, live in rural areas, have higher incomes and who are female are more likely than their White counterparts to have a usual source of care. The joint presence of high ADLs and IADLs, more years of formal education, and having a spouse lead Black older persons to have lower probabilities of having a usual source of care than their White counterparts. Black elderly persons who have heart conditions are less likely to have an emergency room visit than their White counterparts; those who live in small cities in the North are more likely to have an emergency room visit than their White counterparts. Black elderly women with more IADLs, joint problems, and hypertension are more likely to have physician visits. However, Black elderly persons with glaucoma, who live in the Midwest, and have the joint presence of high ADLs and IADLs are less likely to have physician visits. Living in a rural area and having an unpaid IADL caregiver leads Black elderly persons to have a higher probability of seeing a physician when needed compared with their White counterparts.

In contrast to White elderly persons, Black elderly persons with breathing problems are less likely to have prescription medications; those who live in rural areas and small cities in the West are more likely to have prescription medications. Black elderly persons who have joint problems are more likely to have a paid caregiver and those with an unpaid IADL caregiver are less likely to have a paid caregiver, compared with their White counterparts. Black women who live in the Midwest are less likely to have dental visits. However, Blacks with broken parts or breathing problems are more likely to visit foot doctors. IADLs, broken parts, breathing problems, and living in small cities in the West increase the likelihood that Black elderly persons visit the optometrist. Yet, Blacks who have glaucoma are less likely than their White counterparts to visit the optometrist. Finally, the interactive models indicate that Black elderly women are less likely than White elderly women to see a therapist.

Another observation is important to note, although not reported in Table 3: When the regression models for physician and optometrist visits include all interaction terms, the race dummy variable is significant and negative, with Black elderly persons less likely to have visits than their White counterparts.

To what extent are racial differences in utilization of medical services due to differences in average characteristics of Black and White elderly persons? To explore this question, I use a standard technique of labor economists and demographers, the Oaxaca decomposition. This technique typically is used to assess discrimination in labor market earnings (Oaxaca, 1973). I applied this technique to gain greater understanding of the factors underlying racial patterns in medical use among elderly persons. The technique assumes that we can explain racial differences in the probability of medical utilization as outcomes that occur due to racial differences in the average characteristics of Blacks and Whites (e.g., differences in income and insurance), and

due to factors excluded from the regression model. In labor economic and demographic research, a key unmeasured excluded variable is discrimination. Thus, labor economists and demographers usually attribute variation in labor market outcomes that is not explained by differences in average characteristics of Blacks and Whites to discrimination. In medical markets, the experience of discrimination is one of several key factors that researchers exclude in regression models of medical utilization.

Based on an Oaxaca decomposition technique, we find the answer to the question of whether racial differences in utilization of medical services are due to differences in average characteristics of Black and White elderly persons by calculating three probabilities: (a) the probability that White elderly persons will use a service, (b) the probability that Black elderly persons will use a service, and (c) the probability that White elderly persons will use a service (given a level of health and demographic characteristics that represent those of the average Black elderly person). The difference in the first and third probabilities informs about the portion of the racial difference in medical use that is due to racial differences in characteristics. The difference in the second and third probabilities is the unexplained portion of the racial difference in medical service use. The unexplained racial difference may be due to unmeasured dimensions of availability, accessibility, and acceptability, such as discrimination, cultural preferences for different types of care, skepticism about scientific medicine, and differences in physical proximity and transportation services.

Stratified logistic regression models were performed for (1) the use of prescription medicines and (2) physician visits. These regressions were used in the Oaxaca decomposition analysis because in the previous regression analysis for prescription medicines and physician visits, the race dummy variable was found negative and significant, suggesting that belonging to the racial group, Black, has an independent influence on the use of community medical services. The regressions are reported in Table 4. Based on these regressions, the predicted probability that an elderly person has at least one prescription is 83.1% for White elderly and 80.2% for Black elderly persons. We first compare the probability that White elderly persons will use prescriptions (given their own demographic characteristics) with the probability that White elderly persons will use prescriptions (given the demographic characteristics of Black elderly persons). The probabilities are 83.1% and 86.4%, respectively, with a difference in the probabilities of -3.3% . This result indicates that differences in the characteristics of Black and White elderly persons should lead Whites to have a probability of use of prescription medicine that is 3.3% lower than that of Blacks. The difference in the probability that White elderly persons will use prescriptions (given the demographic characteristics of Black elderly persons) and the probability that Black elderly persons will use prescriptions (given their own demographic characteristics) is 6.2% . This result reflects the unexplained difference in use of prescriptions that is accounted for by racial differences in availability, accessibility, and acceptability. Thus, White elderly persons who have demographic characteristics that characterize the typical Black elderly person should experience a probability of

Table 4. Logistic Regression Models of Physician and Prescription Utilization Among Disabled Elderly Persons (SE)^a

Variable	Physician Visits (Yes/No) White Elderly Persons	Physician Visits (Yes/No) Black Elderly Persons	Prescriptions (Yes/No) White Elderly Persons	Prescriptions (Yes/No) Black Elderly Persons
Cognitive	-.01 (.12)	-.44 (.32)	-.01 (.16)	-.26 (.35)
High ADL	.02 (.15)	.48 (.46)	.63 (.22)***	1.12 (.56)**
IADL	.004 (.03)	.24 (.08)***	.15 (.04)***	.19 (.09)**
High ADL*IADL	-.0003 (.04)	-.31 (.11)***	-.10 (.05)	-.31 (.13)**
Joint	.16 (.10)	.77 (.33)**	.49 (.11)***	.25 (.35)
Glaucoma	.30 (.13)**	-.70 (.32)**	.56 (.19)***	.51 (.40)
Diabetes	.30 (.11)***	.05 (.26)	1.21 (.20)***	.99 (.35)***
Heart	.46 (.08)***	.52 (.24)**	1.12 (.13)***	.84 (.30)***
Hypertension	.28 (.08)***	.84 (.24)***	1.10 (.11)***	.98 (.26)***
Stroke	.05 (.16)	-.24 (.44)	-.07 (.25)	.23 (.56)
Broken	.23 (.14)	.70 (.50)	-.04 (.20)	.75 (.73)
Breath	.40 (.08)***	.18 (.25)	.32 (.11)***	-.40 (.29)
Rural	-.06 (.10)	.08 (.31)	-.10 (.13)	.87 (.35)**
City	-.07 (.12)	.30 (.32)	-.13 (.16)	.70 (.35)**
North	-.08 (.11)	-.03 (.40)	-.28 (.14)	.31 (.44)
West	.13 (.11)	-.20 (.44)	-.44 (.14)***	.45 (.48)
Midwest	.02 (.10)	-.69 (.37)*	-.19 (.13)	.14 (.40)
Income	7.5 E-6 (3.5E-6)**	3.8E-6 (1.6E-5)	4.7E-6 (4.7E-6)	1.4 E-6 (1.8 E-5)
Medicaid	.15 (.11)	.05 (.29)	.13 (.16)	.08 (.33)
Medicare Only	-.30 (.11)***	-.16 (.32)	-.54 (.13)***	-.57 (.34)*
Female	.12 (.09)	.80 (.26)***	.32 (.12)***	.32 (.28)
Married	.11 (.09)	-.01 (.27)	.35 (.12)***	.45 (.30)
Education	-.004 (.01)	-53.008 (.03)	.05 (.01)***	-.02 (.04)
Unpaid ADL Caregiver	-.02 (.14)	-.05 (.38)	-.09 (.20)	.46 (.47)
Unpaid IADL Caregiver	-.13 (.12)	.14 (.38)	-.06 (.16)	.75 (.48)
N	2,950	415	2,950	415
Events	1,283	174	2,238	297
X ²	143.35***	66.004***	470.42***	83.99***
-2LogL	3,896.09	498.44	2,541.94	411.52

^aWe report significance at the .05 level or higher for the white sample, due to the relatively larger sample size of whites compared to blacks.

*, **, *** significant at the .10, .05, and .01 levels, respectively.

prescription use that is 6.2% *higher* than Black elderly persons who have the same characteristics.

The Oaxaca decomposition also was performed using the logistic regression model of visits to a doctor. Similar to the results for the prescription medication model, the difference in the predicted probability of visits to the physician was 3.1%, with White elderly persons having a higher probability of physician use. From the Oaxaca decomposition we find that racial differences in characteristics of White and Black elderly persons should lead Whites to have a .05% *lower* probability of visits to a physician. Unexplained racial differences in use of physicians lead the probability of physician use to be 3.12% *higher* for White elderly persons, compared with Black elderly persons. Thus, almost 100% of the racial difference in use of physician services is due to racial differences in availability, accessibility, and acceptability.

DISCUSSION

Black elderly persons remain vulnerable in their ability to obtain health care services commonly used by disabled older persons. Several key findings from this research support this conclusion. First, we know that with similar medical conditions, Black older persons are less likely to use services. Second, relying solely on the finding of a statistically significant race dummy variable as an indicator of racial differences in utilization of community services by disabled

elderly persons, I conclude that Blacks are less likely to have prescription medicines, visit physicians, or visit optometrists. Third, race interacts with some health conditions, geographical location, income, sex, education, marital status, and the use of unpaid IADL caregivers, or both. This interaction decreases the likelihood that Black older persons use some health care services and increases the likelihood that they will use other health care services. Finally, the Oaxaca decomposition indicates that race is not reducible to a measure of socioeconomic status. Differences in personal characteristics of Black and White elderly persons do not fully explain racial differences in the use of medical services. The observed racial differences in personal characteristics should lead disabled White elderly persons to have a lower probability of use of prescription medicines and physician services than disabled Black elderly persons. However, disabled White elderly persons have a higher probability of use of both services.

This paper addresses racial patterns of medical utilization by community-dwelling elderly patients. Use of institutional care is not examined. Wallace and associates (1998) document that Black elderly persons are less likely to be admitted to nursing homes. Thus, many community-dwelling Black elderly persons have poorer health than community-dwelling White elderly persons (Table 1). One would think that this noninstitutional bias in the sample of community-dwelling Black elderly persons would be associated with

greater use of community services. However, this did not occur. Thus, I investigate whether the observed racial patterns are due to racial differences in sociodemographic characteristics and/or availability, accessibility, and acceptability of services.

By using the methodological strategy of comprehensive race interaction terms (i.e., measures that interact race with income and insurance, as well as interact it with other personal characteristics of disabled elderly persons), I provide some interesting and unexpected findings about racial differences in predictors of medical service use. Although some personal characteristics are associated with a lower probability that Black older persons will use medical services, I also find that some personal characteristics enhance the ability of disabled older Black persons to obtain medical services. For example, living in rural areas and small cities increases the likelihood that older Black persons will have prescriptions. Living in a rural area increases the likelihood that older Black persons have a usual source of care and small city residence increases the likelihood that older Black persons will visit optometrists. Residence in the West also facilitates greater use of medical services by disabled older Black persons. Women as a group are more likely to have a usual source of care and to visit physicians. The interactive model indicates that disabled Black women are more likely than their White counterparts to have these types of visits. Black elderly persons have greater probabilities of medical service utilization when they have IADLs, joint and breathing problems, and broken parts.

My results exploring the role of race in influencing use of paid in-home care are similar to those of Wolinsky and Johnson (1991). I do not find a statistically significant coefficient for the race dummy variable in this model. However, I find significant interactive effects. Black elderly persons who have joint problems are more likely to have a paid in-home caregiver than their White counterparts. However, if an unpaid IADL caregiver provides services in the home, Black elderly persons are less likely than White elderly persons to have a paid in-home caregiver. This finding underscores the importance of including race interaction terms to obtain a comprehensive understanding of the role of race in affecting medical service utilization among disabled elderly persons.

One intriguing finding was the role of rural residence for Black elderly persons, compared with White elderly persons. With greater service availability in urban areas, I predict that elderly persons who live in rural areas will have less use of services. Consistent with this prediction, I documented that rural residents were less likely to visit the dentist or foot doctor than their urban counterparts. However, rural residents were more likely to see a physician when one was needed. The interactive results also indicate that among the services that rural Black elderly persons are more likely to obtain are services of a usual source of care and prescription drugs. They are more likely to receive these services than their urban counterparts and White elderly persons who live in urban and rural areas. Rural Black elderly persons also are less likely than rural White elderly persons to report that they didn't see a physician, but needed one. Black elderly persons who live in rural areas are no more

likely than their urban counterparts to have a paid caregiver or receive services from a dentist, foot doctor, optometrist, therapist, emergency room, or a physician. More study is needed of the context of care in rural areas and small cities to understand the strategies that are leading Black elderly persons in rural areas to have better access to care than White elderly persons and Black elderly persons who live in large urban areas.

The Oaxaca decomposition results indicate that racial differences in health care access also occur due to factors typically excluded from our standard regression models of medical utilization. These include life course discrimination, receipt of culturally insensitive medical care, residential segregation and its implications for convenient use of medical facilities, and information gaps about how different races perceive disease patterns and healing. If researchers do not consider these additional factors, disabled Black elderly persons may continue to face relatively more constraints in their use of health care services, particularly physician services and prescription medications.

To some extent it is difficult to disentangle the independent and interactive effects of discrimination, culture, perceptions of racism, geographic segregation, and physical proximity of medical facilities as they contribute to explaining a large part of the racial difference in medical services use by disabled elderly persons. The role that discrimination and racism play in the use of medical services is currently a topic of investigation, primarily in studies that use small area (city and county) data. Wallace's (1990b, 1990c) research indicates that racial differences in elderly Black persons' use of medical care are not primarily due to cultural factors. Rather, residential segregation and racial discrimination in the medical care system explain them, as well as the class factors associated with the profit motive of the health care system. The closure, relocation, and flight of hospitals and medical providers from low income neighborhoods where elderly Black persons live have led to racial disparities in access to care. In addition, racial differences in the intensity of care and profit-centered motives to minimize the number of Medicaid patients treated account for further racial disparities in care (Charatz-Litt, 1992). In a case study of metropolitan elderly persons in Missouri, Wallace (1990a) found that racial prejudice was one factor that made in-home services undesirable even for older persons with severe health problems. Cultural differences and cultural insensitivity may influence medical treatment when there is poor communication between providers and patients about descriptions of pain, folk medicine, traditions, and views of wellness or illness (Watson, 1994).

The research results presented in this paper use national data and remind us that although we are in an era when we repeatedly hear that discrimination no longer exists nor needs a remedy, it may nonetheless contribute significantly to racial differences in the use of a vital necessity of life. At a minimum, this study suggests that ethnogeriatric curricula in health professional schools and race conscious efforts in planning and provision of medical services are two proactive strategies to mitigate racial differences in the receipt of medical services that are commonly used by disabled older persons (Brangman, 1995; Wallace, 1990c).

Public policy that focuses on enhancing health insurance coverage will provide a remedy for increasing the probability of use of prescription medications. Enhanced insurance-financed access to prescription drugs is currently promoted by Senator Kennedy and the Democratic party. They propose a \$200 deductible and a 20% copayment by elderly persons for their prescription medications, thus establishing a Medicare prescription drug benefit. The regression results clearly illustrate the benefits of such a policy change. In the prescription drug model that includes the race dummy variable (Table 3) and in the stratified models (Table 4) I note that those insured solely by Medicare are less likely to use prescription medications than those insured by Medicaid or Medicare and private insurance supplements. A Medicare prescription drug benefit would provide those covered by Medicare only with coverage comparable to Medicaid and private insurance supplements.

Our results also illustrate that there are race-specific policy implications of such a policy change. In the stratified prescription drug models (Table 4), coverage by Medicare only is statistically significant for both Black and White older persons, with coverage decreasing the probability of prescription drug use. However, Black older persons are more likely (31%) than White older persons (18%) to have coverage by Medicare only. Thus, this insurance policy change disproportionately benefits Black older persons, those who are currently less likely to use prescription medicines.

In contrast, the Breaux-Thomas Medicare Reform Proposal introduces some policy changes that may disproportionately disadvantage White older persons. In addition to providing a new benefit package, reformed Medicare would include higher copayments on some services, higher deductibles on Part B service use, and premium protection for low income elderly persons. Many older persons may perceive higher deductibles and copayments as reductions in Medicare coverage. The significant Medicare-only coefficient in the stratified physician visit regression for White older persons only suggests that these changes may decrease use of physician services among White older persons only. In addition, because Black older persons have significantly less income than White older persons (Table 1), a race-specific policy implication of the Breaux-Thomas Premium Support Program is that Black older persons will be more likely to receive this enhanced benefit.

Similar to the Balanced Budget Act of 1997, the Breaux-Thomas Medicare Reform Proposal emphasizes competition among health plans (especially HMOs) for Medicare beneficiaries. States are moving forward in their implementation of managed long-term care due to budget shortfalls and an average 12% growth rates of the Medicaid program, projected insolvency of the federal Medicare program, and a projected increase of 23% in the population aged 85 and older. According to the research findings, these policy changes may also have race-specific implications. The Kaiser Commission on the Future of Medicaid's review of more than 100 published studies in the literature indicated that it is not possible to conclude whether managed care has maintained a balance of containing cost and providing quality health care services (Kaiser Family Foundation's Commission, 1995).

Managed care may increase access to care among underserved Black elderly persons through its integration of care delivery and financing. Alternatively, it may facilitate the continuance of historical discrimination and lead to new forms of discrimination against elderly patients who are more costly to treat, that is, community-dwelling disabled Black elderly persons (Rosenbaum et al., 1997). A third alternative is that managed care may decrease overutilization of services by disabled White elderly persons and have no effect on utilization by Blacks.

From the Oaxaca decomposition analysis we learn that disabled White elderly persons have greater access to medical services and (given their personal characteristics) should use less services than Blacks. It is possible to interpret this greater access by Whites as overutilization that managed care may correct. Due to their greater dependency on Medicaid (Table 1), Black elderly persons will face a higher risk of reduced health care access if managed care facilitates historical discrimination; and a higher probability of enhanced health care access if managed care facilitates coordination of service use.

The central finding of this research is that race matters in the use of community services among disabled older persons and in the implications of health policy changes. The general consensus in the literature is that when a race dummy variable is significant, we know that race has an important and unique role in influencing the use of community services. This article also shows that even when a race dummy variable is not significant, race matters. There are often racial differences in the predictors of the use of medical services. Further, these persistent racial differences are likely (at least partly) a function of unmeasured racism. Thus, public policy that focuses solely on health finance may not remedy the existing racial disparities in health levels, a key factor affecting both the cost of health care and the overall quality of life in our nation.

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References

- Aday, L. A., Fleming, G. V., & Anderson, R. M. (1984). *Access to medical care in the United States: Who has it, Who doesn't*. Chicago: Pluribus Press.
- Brangman, S. (1995). African-American elders: Implications for health care providers. *Clinics in Geriatric Medicine*, 11, 15-23.
- Charatz-Litt. (1992). A chronicle of racism: The effects of the white medical community on black health. *Journal of the National Medical Association*, 84, 717-725.
- Chow, G. C. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica*, 28, 591-605.

- Cohen, R., Bloom, B., Simpson, G., & Parsons, P. E. (1997). Access to health care, part 3: Older adults. *Vital and Health Statistics, Series 10: Data from the National Health Survey, No. 198*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.
- Escarce, J., Epstein, K., Colby, D., & Schwartz, J. S. (1993). Racial differences in the elderly's use of medical procedures and diagnostic tests. *American Journal of Public Health, 83*, 948-954.
- Estes, C., Swan, J., & Associates. (1993). *The long term care crisis: Elders trapped in the no-care zone*. Newbury Park, CA: Sage Publications.
- Ferris, A., & Wyszewianski, L. (1990). Quality of ambulatory care for the elderly: Formulating evaluation criteria. *Health Care Financing Review, 12*(1), 31-38.
- Fillenbaum, G., Hanlon, J., Corder, E., Ziqubu-Page, T., Wall, Jr., W., & Brock, D. (1993). Prescription and nonprescription drug use among black and white community-residing elderly. *American Journal of Public Health, 83*, 1577-1582.
- Javitt, J. C., McBean, A., Nicholson, G., Babish, J., Warren, J., & Krakauer, H. (1991). Undertreatment of glaucoma among black Americans. *New England Journal of Medicine, 325*, 1418-1422.
- Kaiser Family Foundation's Commission. (1995). *Medicaid and managed care: Lessons from literature*. Kaiser Family Foundation's Commission.
- Kemper, P. (1992). The use of formal and informal home care by the disabled elderly. *Health Services Research, 27*, 421-451.
- Kromrey, J., & Hines, C. (1994). Nonrandomly missing data in multiple regression: An empirical comparison of common missing-data treatments. *Educational and Psychological Measurement, 54*, 573-593.
- Lee, A., Gehlbach, S., Hosmer, D., Reti, M., & Baker, C. (1997). Medicare treatment differences for blacks and whites. *Medical Care, 35*, 1173-1189.
- Lumsdon, K. (1994). Crash course: Piecing together the continuum of care. *Hospitals and Health Networks, 68*(22), 26-28.
- Markides, M., & Wallace, S. (1996). Health and long-term care needs of ethnic minority elders. In J. Romeis, R. Coe, & J. Morley (Eds.), *Applying Health Services Research to Long Term Care*. New York, NY: Springer Publishers.
- Miller, B., Campbell, R., Davis, L., Furner, S., Giachello, A., Prohaska, T., Kaufman, J., Li, M., & Perez, C. (1996). Minority use of community long term care services: A comparative analysis. *Journal of Gerontology: Social Sciences, 51B*, S70-S81.
- Mui, A., & Burnette, D. (1994). Long term care service use by frail elders: Is ethnicity a factor? *The Gerontologist, 34*, 190-198.
- Nutter, D. (1984). Access to care and the evolution of corporate, for-profit medicine. *New England Journal of Medicine, 31*, 917-919.
- Oaxaca, R. (1973, October). Male-female wage differentials in urban labor markets. *International Economic Review, 14*, 693-709.
- Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology, 49*, 1373-1379.
- Rosenbaum, S., Serrano, R., Magor, M., & Stern, G. (1997). Civil rights in a changing health care system. *Health Affairs, 16*(1), 90-105.
- Slessinger, M., Marmor, T. R., & Smithey, R. (1987). Nonprofit and for-profit medical care: Shifting roles and implications for health policy. *Journal of Health Politics, Policy and Law, 12*, 427-457.
- Swan, J. H., & Estes, C. L. (1990). Changes in aged populations served by home health agencies. *Journal of Aging and Health, 2*, 373-394.
- Switzer III, F., Roth, P., & Switzer, D. (1998). Systematic data loss in HRM settings: A Monte Carlo analysis. *Journal of Management, 24*, 763-774.
- Thornton, M., & White-Means, S. (1996). Racial and ethnic patterns of hospital emergency room use. In M. Lillie-Blanton, W. Leigh, & A. Alfaro-Correa (Eds.), *Achieving equitable access: Studies of health care issues affecting Hispanics and African-Americans*. Washington, DC: Joint Center for Political and Economic Studies.
- Wallace, S. (1990a). The No-Care Zone: Availability, accessibility, and acceptability in community-based long-term care. *The Gerontologist, 30*, 254-261.
- Wallace, S. (1990b). The political economy of health care for elderly blacks. *International Journal of Health Services, 20*, 665-680.
- Wallace, S. (1990c). Race versus class in the health care of African-American elderly. *Social Problems, 37*, 517-534.
- Wallace, S., Levy-Storms, L., Kingston, R., & Andersen, R. (1998). The persistence of race and ethnicity in the use of long-term care. *Journal of Gerontology: Social Sciences, 53B*, S104-S112.
- Watson, S. (1994). Minority access and health reform: A civil right to health care. *The Journal of Law, Medicine, and Ethics, 22*, 127-137.
- White-Means, S. (1995). Conceptualizing race in economic models of medical utilization: A case study of community-based elders and the emergency room. *Health Services Research, 30*, 207-223.
- White-Means, S., & Thornton, M. (1995). What cost savings could be realized by shifting patterns of use from hospital emergency rooms to primary care sites? *American Economic Review, 85*, 138-142.
- Whittle, J., Conigliaro, J., Good, C., & Joswiak, M. (1997). Do patient preferences contribute to racial differences in cardiovascular procedure use. *Journal of General Internal Medicine, 12*(5), 267-273.
- Wolinsky, F., Aguirre, B., Fann, L.-J., Keith, V., Arnold, C., Niederhauer, J., & Dietrich, K. (1989). Ethnic differences in the demand for physician and hospital utilization among older adults in major American cities: Conspicuous evidence of considerable inequalities. *Milbank Quarterly, 67*, 412-448.
- Wolinsky, F., & Johnson, R. (1991). The use of health services by older adults. *Journal of Gerontology: Social Sciences, 46*, S345-S357.

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