

Understanding Disparities in the Use of Medicare Services

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Unexpectedly, the use of health care services has been found to differ substantially across subgroups of a population covered by health insurance. In the Medicare program, persons at risk of poor health tend to use fewer of the types of services that healthier persons use to improve health and prevent disease. Relatively little is known about why patterns of health care among the elderly differ by race and socioeconomic status (SES).¹ That disparities occur so persistently in a program such as Medicare, which was expected to equalize access to care, indicates that there are limitations to what health insurance alone can do to assure equal access to health care. The challenge is to determine what our society can do to ameliorate disparities in health care.

Health policy experts from an earlier era can provide some insight into the dilemma of disparities in health care. Two books, published half a century ago, contain papers by members of the New York Academy of Medicine on social medicine,² a term intended to evoke the complex interrelationships between health and society. Social medicine was defined in one paper as “medical science in relation to groups of human beings.”³ Underlying the concept of social medicine was the belief that medical science ought to approach health, not just in terms of treating a patient’s illness, but also in terms of the whole of an individual’s life and society. The multitude of factors that influence health status and health care led

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one member of the Academy to observe that the problem of medical care is “more complex than it is taken to be.”⁴ One paper noted that social security and welfare programs do not change the existing social and economic order but mitigate the hardships created by it, noting (with considerable prescience) that health insurance “does not guarantee health to the insured wage earner nor yet does it make public health measures superfluous.”⁵ To understand the influence of poverty, education, and occupation on health, members of the Academy advocated an expansion of medical school curricula to include knowledge from the social sciences. As one writer stated, “Medicine’s recognition of the part the social sciences play in the total health, either of the individual or of groups, will constitute a milestone in human progress.”⁶

Approaching health care from the perspective of social medicine remains an elusive task. A recent paper highlighted the continuing tensions between public health advocates and medicine, and the lack of agreement about the best approaches for effective health care.⁷ One aspect of social medicine, however, that is generally agreed upon is the need for greater cultural sensitivity and appreciation of racial and ethnic diversity. As this paper illustrates, however, disparities in health care are also associated with SES within all racial and ethnic groups.

Although the need for a social medicine perspective is widely accepted today, some recognized experts who have studied health disparities in recent years, point to a set of facts that seem to indicate that health care plays a relatively minor role in health inequalities, and that solutions to disparities in health lie in an arena outside of the health care delivery system.⁸ Their arguments include the following:

First, after Great Britain introduced the National Health Service (NHS) in 1948, inequalities in health did not diminish. Second, large declines in mortality in the United States can be traced to public health measures, such as ensuring clean water, which have led to a decrease in infectious diseases. Third, the greatest impact of medical care is in the case of acute care needs. Many “high-tech” procedures, such as coronary artery bypass surgery, radiation, chemotherapy, kidney dialysis, and organ transplantation, have been most effective in saving the limited number of patients with life-threatening illnesses who would otherwise die without these procedures. Fourth, disparities in health are not directly related to the health care delivery system. Rather, there is a strong association between disparities in health and disparities in the distribution of income. Countries such as the United States have relatively high inequalities in income and in health, while countries such as Costa Rica, Japan, and Sweden have relatively low inequalities in income and in health. Fifth,

social capital—networks in a community of families, schools, and other organizations and institutions that provide support to members of the community and enhance mutual respect and trust—is one of the most significant factors affecting health and tends to be least developed in poorer communities.

The study described in this Article does not refute these facts. However, the Medicare experience shows that inequalities in health care can persist even among insured populations. Moreover, we are not convinced that medical care's greatest impact is on treating life-threatening illnesses. On the contrary, we believe that the analyses presented here suggest the need for a greater emphasis on medical care targeted toward health monitoring and disease prevention, especially among vulnerable subgroups of the population in order to prevent life-threatening illnesses and disability.

This Article focuses on disparities by race and SES in the use of health promotion services, including immunizations and various cancer screening tests, and what might be done to improve patterns of utilization. Disparities by race in the use of cancer screening services are of particular concern because of the higher cancer death rates of blacks as compared to other racial and ethnic groups in the United States.⁹ Black women, in particular, are more likely than white women to have advanced-stage breast cancer when first diagnosed, and to die of the disease, even though the incidence of breast cancer is lower among black women than white women.¹⁰

This study does not attempt to analyze the impact of disparities in the use of health promotion services, although there is a large and varied literature on the benefits of certain preventive and screening services. It seems likely that the greater use of preventive and screening services by elderly whites is reflected, at least in part, in their more favorable health outcomes. However, the literature is often complex and explores the benefits from different perspectives. For example, some studies have analyzed the increase in life expectancy from a particular immunization or cancer screening service. In general, these studies report a relatively small increase in life expectancy from using any one preventive service. In one study, the gain in life expectancy for influenza immunization (distributed across the U.S. population) was estimated at one week; similarly, the gain in life expectancy for pneumococcal immunization was estimated at one week.¹¹ From another perspective, studies have analyzed the impact of mammography screening on the stage of breast cancer at the time of diagnosis. One study reports that screening helps to explain the black-white differences in stage of cancer at diagnosis,¹² which clearly supports recommendations for early detection and community education to

improve survival rates among black women.¹³

The major purpose of this Article is to discuss new analyses of patterns of use of preventive services. Before discussing the new findings, the Article summarizes previous studies about disparities in Medicare utilization and plausible explanations for these disparities. Then it describes the new analyses, which test two hypotheses about the use of preventive services. For example, it tests the hypothesis that women who use mammography are more likely than non-users of mammography to receive influenza immunizations. Along a similar line of inquiry into health behaviors, it tests the relationships between smoking habits and the use of preventive services, analyzing, for example, whether men who quit smoking are more likely than men who currently smoke to have prostate examinations. These questions were explored because the findings could have implications and provide clues for ways to ameliorate disparities in health care.

The Article is divided into three parts. Part I summarizes what is known about Medicare utilization patterns and the health of the elderly. Part II discusses the two hypotheses that were tested concerning the factors associated with disparities in utilization. Part III considers the implications of the new findings.

I. OVERVIEW OF DISPARITIES

Prior to Medicare, access to health care was a major concern for people age sixty-five and older.¹⁴ Analyses showed that elderly blacks, and those with the lowest incomes, received fewer physician visits and were admitted to the hospital at a lower rate than elderly whites and those with the highest incomes.¹⁵ Only about 50% of the group age sixty-five and older, most of whom were no longer actively employed, had hospital insurance.¹⁶ It was expected that Medicare would eliminate barriers to health care for all of the elderly. After Medicare was implemented, the rate of physician visits and hospital admissions for blacks and the poor approached the rate for whites and higher-income groups;¹⁷ by the mid-1980s, hospitalization rates for blacks began to exceed the rates for whites.¹⁸ In the 1980s, however, more detailed data became available after Medicare introduced new payment policies that required hospitals and physicians to send in information about patients' diagnoses and procedures. The new information showed substantial disparities by race and SES in the use of many services performed in the hospital and in ambulatory care settings.¹⁹

The data shown in this section were derived from several sources. Utilization patterns were derived from the ongoing data system Medicare maintains for administrative purposes, known as "administrative data." The

administrative data are comprised of several types of files, including enrollment files and bills sent in for payment. Hospital admission rates are based on hospital discharge bills; rates of physicians' services, such as office visits or colonoscopy, are based on physicians' bills. Although an effort is underway to update race and ethnicity codes, at this time utilization patterns can be drawn reliably only for black and white enrollees. Medicare's administrative data do not contain information about the health of the enrollees or about their SES. To analyze the effects of SES on the use of Medicare services, Medicare enrollment files were linked to data on medium income at the zip code level derived from the 1990 U.S. Census. Data were also drawn from an ongoing survey known as the Medicare Current Beneficiary Survey (MCBS), which collects socio-economic and health information from a sample of beneficiaries. In addition, data were derived from information published by the National Center for Health Statistics and the National Cancer Institute.

A. Medicare Utilization Patterns

The administrative data in this section reflect the experience of enrollees receiving services in the fee-for-service sector (about 86% of the total in 1998). Similar information is not currently available for enrollees in HMOs.

Three distinct utilization patterns can be identified from the Medicare administrative data.²⁰ First, compared to white beneficiaries, blacks use fewer preventive and health promotion services (such as influenza immunizations and physician office visits). Second, blacks receive fewer tests (such as colonoscopy and cardiac catheterization) to diagnose illness, and undergo fewer common surgical procedures (such as coronary artery bypass surgery and hip replacement) to treat disease. Third, blacks have higher rates of use of certain procedures associated with poor outcomes of chronic conditions—"last resort" procedures—(such as amputation of all or part of the lower limb). Furthermore, these same three patterns tend to occur for white or black persons with lower SES, compared to those with higher SES.

The disparities in utilization patterns are often striking. The first pattern, the use of health promotion services, is illustrated in Table 1 by rates of physician office and ophthalmology visits.

In 1990, the rate of physician office visits was 4,996 visits per 1,000 white enrollees and 4,379 visits per 1,000 black enrollees, resulting in a black:white rate ratio of 0.88, or 12% fewer visits for blacks compared to whites; in 1998, the black:white ratio registered 0.81. Ophthalmology visits in both 1990 and 1998 were lower for blacks than whites, resulting in a

black:white ratio each year of 0.88. In contrast, in both 1990 and 1998 physician visits to hospitalized patients were substantially higher for blacks than whites; the black:white ratio registered 1.22 in 1990 and 1.41 in 1998. The rapid acceleration in the black:white ratio of physician hospital visits mirrors the trend of higher hospital admission rates for blacks compared to whites.

The second pattern, involving the use of tests and surgical procedures to monitor and improve health, is also illustrated in Table 1. In 1990, disparities by race in the use of tests and common surgical procedures are indicated by the black:white ratios for sigmoidoscopy (0.57), colonoscopy (0.84), cataract removal (0.80), and carotid endarterectomy (0.28). As shown, these ratios changed very little by 1998.

Table 1. Use of Selected Medicare Services for Enrollees Age 65 and Older, By Race, and Ratio of the Rates, 1990 and 1998

Medicare Services	1990 (rates per 1,000)			1998 (rates per 1,000)		
	White	Black	Ratio (B:W)	White	Black	Ratio (B:W)
<i>Visits</i>						
Physician's Office	4,996	4,379	0.88	6,553	5,281	0.81
Physician's Visits to Hospitalized Patients	3,237	3,943	1.22	2,912	4,112	1.41
Ophthalmology Visits	710	622	0.88	790	695	0.88
<i>Tests</i>						
Sigmoidoscopy	47.8	27.1	0.57	33.8	21.1	0.62
Colonoscopy	35.2	29.6	0.84	69.5	58.5	0.84
<i>Surgical Procedures</i>						
Cataract Removal	40.7	32.7	0.80	63.0	43.6	0.69
Carotid Endarterectomy	1.66	0.47	0.28	3.98	1.35	0.34
Treatment of Retinal Lesions	7.08	11.43	1.61	11.09	17.47	1.57
Amputation of All or Part of a Lower Limb	1.7	5.7	3.43	1.9	6.9	3.68

Source: PAUL EGGERS, HEALTH CARE FIN. ADMIN., MONITORING THE IMPACT OF MEDICARE PHYSICIAN PAYMENT REFORM ON UTILIZATION AND ACCESS (2000).

Finally, Table 1 illustrates the third pattern, the greater use among black beneficiaries of procedures associated with poor outcomes of chronic disease. The black:white ratio for procedures to treat retinal lesions was 1.61 in 1990 and 1.57 in 1998; the black:white ratio for amputations of all or part of the lower limb was 3.43 in 1990 and 3.68 in 1998.

In 1993, Medicare began to cover influenza immunizations. During the first year of coverage, the black:white ratio was only 0.47. However, over time, the ratio improved only slightly, reaching 0.53 in 1997 (table 2).

In 1991, Medicare began to cover mammography every two years. For the period 1992-93 the black:white ratio was 0.74; this ratio went up and

down slightly over time, registering 0.76 for the period 1997-98 (table 3).

Table 2. Influenza Immunization Rates for Medicare Enrollees Age 65 and Older, By Race, 1993-1997

Year	White (per 100)	Black (per 100)	Ratio (Black/White)
1993	36.5	17.3	0.47
1994	41.9	20.6	0.49
1995	43.2	21.6	0.50
1996	45.5	23.4	0.51
1997	46.1	24.3	0.53

Source: Health Care Financing Administration, Office of Information Services, National Claims History and Denominator File (2000) (unpublished data developed by the Office of Strategic Planning and the Office of Clinical Standards and Quality, on file with authors).

Table 3. Biennial Mammography Rates for Female Medicare Enrollees Age 65 and Older, By Race, 1992-1998

Period	White (per 100)	Black (per 100)	Ratio (Black/White)
1992-1993	38.2	28.1	0.74
1994-1995	40.4	30.9	0.77
1996-1997	42.5	33.7	0.79
1997-1998	46.1	35.1	0.76

Source: Health Care Financing Administration, Office of Information Services, National Claims History and Denominator File (2000) (unpublished data developed by the Office of Strategic Planning and the Office of Clinical Standards and Quality, on file with authors).

For both black and white beneficiaries, income also is associated with the use of services (table 4). For example, in 1993 the number of ambulatory physician visits per black beneficiary was 8.0 visits per year for those with incomes greater than \$20,500 and 7.1 visits for those with incomes less than \$13,101. The corresponding figures for white beneficiaries were 9.0 visits and 7.3 visits. Similarly, the percent of black women obtaining a mammogram ranged from 20.4% for those with highest incomes to 16% for those with lowest incomes. For white women, the corresponding figures were 31% and 20.8%. The opposite pattern is shown to occur for rates of emergency room visits and amputations of all or part of the lower limb, which generally increased as income declines. For example, between the highest and lowest income groups, the rate of amputations per 1,000 black beneficiaries per year increased from 5.8 to 7.0 surgeries, and the rate per 1,000 white beneficiaries increased from 1.5 to 2.2 surgeries. These patterns of Medicare utilization by income are of particular concern because, as shown next, there are also substantial disparities in the health of the elderly by income.

B. Health Status Of The Elderly

Every major health measure indicates that health status is worse for

Table 4. Rates for Selected Medicare Services, By Race and Income, 1993

Race and Income	Ambulatory Physician Visits (per person)	Emergency Room Physician Visits (per 100)	Mammography (per 100)	Amputation of Lower Limb (per 1000)
<i>White</i>				
Total (All Incomes)	8.1	35.0	26.0	1.9
\$20,501 and over	9.0	29.6	31.0	1.5
\$16,301 to \$20,500	8.3	34.6	27.2	1.8
\$13,101 to \$16,300	7.6	36.8	24.1	2.1
Less than \$13,101	7.3	39.9	20.8	2.2
<i>Black</i>				
Total (All Incomes)	7.2	50.6	17.1	6.7
\$20,501 and over	8.0	44.2	20.4	5.8
\$16,301 to \$20,500	7.4	45.8	19.9	5.9
\$13,101 to \$16,300	7.7	52.2	21.1	6.1
Less than \$13,101	7.1	51.6	16.0	7.0
<i>Ratio (Black/White)</i>				
Total	0.89	1.45	0.66	3.54
Income Adjusted	0.93	1.37	0.75	3.30

Source for amputations data: Marian E. Gornick et al., *Effects of Race and Income on Mortality and Use of Services Among Medicare Beneficiaries*, 335 NEW ENG. J. MED. 791 (1996). For other data: HEALTH CARE FIN. ADMIN., MONITORING THE IMPACT OF MEDICARE PHYSICIAN PAYMENT REFORM ON UTILIZATION AND ACCESS (1995) (HCFA pub. No. 03358).

elderly blacks compared to elderly whites.²¹ For example, although life expectancy has increased over time for both blacks and whites, in 1998 life expectancy at age sixty-five for white men was 1.8 years greater than for black men; and for white women, life expectancy was 1.9 years greater than for black women.²² However, in 1950, black men and women at age sixty-five had life expectancies that were similar to their white counterparts,²³ clearly indicating that in the second half of the twentieth century, gains in health have been slower for blacks. Other major measures of disparities in health are total death rates and death rates by cause (table 5).

In 1998, for all causes combined, the death rate for blacks (5,551 deaths per 100,000) was 8.4% higher than the death rate for whites (5,122). Death rates for blacks were higher than for whites for four of the six leading causes of death (heart disease, malignant neoplasms, cerebrovascular disease, and diabetes).

There is an increased emphasis in the nation on prevention and early detection of cancer to reduce the burden of this disease. Early detection of cancer by ongoing patient monitoring and cancer-screening tests is especially important because patients treated for early-stage cancer (cancer localized in the primary site) have the best outcomes. As shown in Table 6, there are differences by race in stage of cancer at the time of diagnosis and in five-year survival rates.

Table 5. Deaths per 100,000 Population for All Causes and for Six Leading Causes of Death, Age 65 and Older, By Race, U.S., 1998

Cause of Death	White	Black
All Causes	5,122	5,551
Diseases of the Heart	1,774	1,893
Malignant Neoplasms	1,115	1,285
Cerebrovascular Diseases	404	455
Chronic Obstructive Pulmonary Diseases	300	176
Pneumonia and Influenza	246	217
Diabetes Mellitus	132	261

Source: Sherry L. Murphy, *Deaths: Final Data for 1998*, in NAT'L VITAL STAT. REP., July 24, 2000, at 30, 34 tbl.8.

For the period 1986-93, the percent of blacks with localized cancer, when first diagnosed, was lower than the percent of whites with localized cancer, for every major cancer site; similarly, five-year survival rates were lower for blacks than whites for every major cancer site.

Table 6. Percent of Patients of All Ages with Localized Cancer at Time of Diagnosis, and Five-Year Survival Rates for Patients Diagnosed at Ages 65-74, By Race, 1986-93

Cancer Site	White		Black	
	Localized Cancer at Diagnosis (%)	Five-year Survival (%) (Age at Diagnosis 65-74 years)	Localized Cancer at Diagnosis (%)	Five-year Survival (%) (Age at Diagnosis 65-74 years)
All Sites	—	58.8	—	44.7
Colon and Rectum	38	64.4	32	51.9
Lung and Bronchus	15	13.7	13	10.0
Breast	60	87.6	49	73.2
Corpus and Uterus	75	85.3	51	47.3
Prostate	59	93.6	54	80.0
Urinary Bladder	74	82.6	57	60.9

Source: SEER CANCER STATISTICS REVIEW, 1973-1994, NAT'L CANCER INST., NAT'L INST. OF HEALTH (Lynn A. Gloeckler Ries et al. eds., 1997) (NIH pub. No. 97-2789).

C. Socioeconomic Status

There are also disparities by SES in the health of the elderly, as shown in four measures of health from the 1996 MCBS (table 7). Compared to blacks, whites rated their health better and reported less diabetes, hypertension, and disability. On these same four measures, high-income whites rated their health better and reported less morbidity and disability

Table 7. Percent of Medicare Enrollees Reporting Selected Health Status Measures, Age 65 and Older, By Race and Income, 1996

Health Status Measure	White (%)	Black (%)
<i>Rates Health Fair or Poor</i>		
Total (All Incomes)	25	42
\$25,000 or Lower	30	43
\$25,001 or Higher	16	29
<i>Has Diabetes</i>		
Total (All Incomes)	13	25
\$25,000 or Lower	15	24
\$25,001 or Higher	12	27
<i>Has Hypertension</i>		
Total (All Incomes)	49	66
\$25,000 or Lower	51	66
\$25,001 or Higher	45	70
<i>Limited in ADL* or IADL†</i>		
Total (All Incomes)	43	53
\$25,000 or Lower	50	55
\$25,001 or Higher	29	33

* ADL: Activities of Daily Living; † IADL: Instrumental ADL

Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1996) (data on file with authors).

than low-income whites. For example, health was rated as only fair or poor by 16% of whites with high incomes compared to 30% of whites with low incomes. Similarly, fewer high-income whites reported that they had diabetes or hypertension than low-income whites. Among blacks, health was rated as only fair or poor by 29% of those with high incomes compared to 43% of those with low incomes; however, for diabetes and hypertension, the associations between income and health were inconsistent. Inconsistencies in the association between income and health for blacks have been found by others,²⁴ and may be explained by a number of factors, including greater intergenerational changes in income among blacks. For example, early childhood health care (a time when blacks were poorer) may be reflected in the health of older persons (a time when more blacks are better off economically).

But for blacks and whites there is a notable consistency in the relationships between income and disability. As shown in Table 7, a smaller proportion of blacks and whites with high incomes experienced limitations in activities of daily living compared to their counterparts with low incomes.

D. Potential Causes and Explanations

The relatively poor health outcomes among minorities and the low-income elderly enrolled in Medicare raise concerns about the appropriateness and effectiveness of the health care provided to vulnerable

subgroups of the population. Little is known about the causes and explanations for disparities in the Medicare population. Studies have shown, however, that differences in risk factors such as diabetes and blood pressure explain very little of the excess mortality of blacks,²⁵ and that differences in patient characteristics cannot explain differences between blacks and whites in the use of certain elective procedures.²⁶ The distinct patterns of utilization for different types of services suggest that there are likely to be a multitude of pathways through which disparities occur, involving characteristics both of the beneficiaries and the health care system. For example, health promotion services (such as ambulatory physician visits, immunizations, and mammography) are often self-initiated by beneficiaries, although physicians and other health care providers play an important part in recommending preventive services. It may be that high-income and better-educated people are more likely to initiate the use of preventive services because they understand their value, and because the services are provided in safe and comfortable environments. But the use of common surgical procedures is generally a result of a referral to a specialist for evaluation and treatment. It may be that physicians are less likely to refer persons at the low end of the social and economic scale for services such as colonoscopy and cerebrovascular procedures because they believe that such patients may not follow orders, are likely to break appointments, or cannot afford to pay for the service. These, however, are only conjectures, and require further study.

II. NEW ANALYSES

New analyses were undertaken based on the rationale that individuals often self-initiate the use of preventive services; and physicians and other health care providers also make recommendations to their patients to schedule various preventive services. A reasonable conjecture is that some beneficiaries focus more than others on a number of actions to promote and maintain health, such as getting mammograms, Pap smears, and influenza immunizations, and have healthy behaviors, such as exercise and good nutrition. Similarly, it is likely that some providers emphasize prevention more than others, such as recommending immunizations and cancer screening tests.

It seems plausible that a behavior such as smoking correlates with the use of health promotion services. Medicare beneficiaries age sixty-five and older were teenagers (an age when smoking is most likely to begin) more than forty years ago, before the Surgeon General's report on smoking in the 1960s. However, thirty-five years or more have elapsed, and the health hazards of smoking have been widely publicized. Many former smokers,

interested in healthy behaviors, no longer smoke. Because quitting smoking involves a conscious effort to prevent disease, and is often difficult, it seems reasonable that Medicare beneficiaries who quit smoking will tend to use more preventive services than beneficiaries who are current smokers.

With regard to women, it seems plausible that women who are knowledgeable and concerned about early detection of women's diseases will focus on an array of services, including mammography and Pap smears. Similarly, physicians who are concerned with women's health issues (gynecologists in particular) are likely to recommend mammography and Pap smears. Thus, we expect to find that women who get mammograms are more likely than non-users of mammography to get Pap smears.

In essence, it seems plausible that certain characteristics of the beneficiaries, reflecting factors such as knowledge about health promotion, influence behaviors relating to prevention. Health care providers also influence behaviors relating to prevention. Moreover, we expect to find that these behaviors are exhibited not as an isolated event, such as getting an influenza immunization, but are consistent across an array of preventive and screening services covered by Medicare, including mammography, Pap smears, and prostate examinations. It also seems plausible that if people have altered their smoking habits and quit, they will be more likely to use preventive services than current smokers. Although the present study does not attempt to analyze the many other behaviors that impact health, such as exercise and weight control, exploring the relationships between smoking behavior and the use of preventive services is likely to provide additional insight into health behaviors.

To determine if this line of reasoning helps to explain disparities in the use of Medicare services, we have focused on two hypotheses about behaviors for groups of beneficiaries differing by race, income, and education. We analyzed combinations of services and behaviors such as obtaining both a mammogram and an influenza immunization; a mammogram and a Pap smear; an influenza immunization and a prostate exam; and quitting smoking and a prostate exam. We tested the following two hypotheses:

Hypothesis One: Beneficiaries who use any one preventive service, such as mammography, tend to use a second preventive service, such as influenza immunizations. This will be true for blacks and whites, high-income and low-income groups, and high school graduates and non-graduates.

Hypothesis Two: Beneficiaries who quit smoking also tend to use preventive services. This will be true for blacks and whites, high-income and low-income groups, and high school graduates and non-graduates.

A. Methods

1. Data Source. The Medicare Current Beneficiary Survey of 1998, an in-person household survey with a sample size of nearly 18,000 persons age sixty-five and older, was used for the following analyses.²⁷ The survey collected information on social and economic variables (including household income and educational attainment), health status, and the use of a number of services. Four racial groups were used to classify beneficiaries: white, black, American Indian, and Asian/Pacific Islander. Information was also collected about ethnicity. This study is confined to white and black beneficiaries to assure adequate sample sizes. All respondents were questioned about their use in the past year of influenza immunizations, pneumococcal immunizations, and eye exams. Women were also asked about mammography and Pap smears, and men were asked about prostate exams (either digital rectal exams or Prostate Specific Antigen (PSA) tests). Two questions on smoking were used in the survey: "Have you ever smoked?" and, if the answer was yes, "Do you smoke now?"

Although persons under age sixty-five who are disabled or who have end-stage renal disease may be covered by Medicare, this study was confined to those age sixty-five and older. Moreover, this study includes only non-institutionalized persons.

The analyses reported here, including responses on race, household income, and educational achievement, are based on survey responses. The MCBS can be linked to Medicare claims information, but in this study only survey responses were used. Thus, rates of influenza immunization are based on what respondents reported. Sample responses were weighted to the total Medicare population, and results were tested for statistical significance.

Different data sources can produce different findings, particularly surveys and administrative data. Variations can occur for several reasons, including recall biases by survey respondents, missing bills from administrative data, different populations, and different time frames. For example, the utilization data reported in Tables 1-4 are primarily from administrative data and include information for persons living in the community and in institutions, who received services in the fee-for-service sector only, whereas the information reported next, from the MCBS, include only those living in the community, who received services in both the fee-for-service and managed care sectors. Also, the mammography rates

reported above from Medicare administrative data are two-year rates, whereas the survey asks women if they have received a mammogram in the past twelve months.

2. *Analyses.* Hypothesis One was tested by tabulating responses about the use of influenza immunizations, pneumococcal immunizations, and eye exams. For women, responses were tabulated for the use of mammography and Pap smears; and for men, responses were tabulated for the use of prostate exams (digital rectal, PSA, or both). All data were broken out by race, income, and education. Hypothesis Two was tested by tabulating responses about the use of the preventive services according to lifetime smoking status and according to present smoking status. For ease of presentation, only a few of the findings are illustrated in this Article. However, they fully represent all of the analyses we performed.

3. *Statistical Significance.* Tests for statistical significance were performed using the unweighted sample. For Tables 12, 13, and 15, chi-square tests were computed separately for whites and blacks and for both income groups, to test for statistical significance between having one preventive service and a second preventive service. All differences shown in the tables were significant ($p < 0.05$), except for high-income black women in Table 12—the exception very likely due to the small sample size for high-income black women. For both Tables 14 and 16, chi-square tests were performed to test for differences between smoking status and use of a preventive service. Tests were not significant for Tables 14A and 16A (Lifetime Smoking Status) but were significant for Tables 14B and 16B (Present Smoking Status) ($p=0.001$). For Table 17, chi-square tests were performed to test for differences between blacks and whites in both income groups and in both educational groups. All tests were significant ($p \leq 0.02$).

B. Results

1. *Sociodemographics.* As shown in Table 8, of all Medicare beneficiaries age sixty-five and older in 1998, 2.5 million were black (7.8% of the total) and 28 million were white (88.1% of the total). The remaining 4.1% of the total included Asian/Pacific Islanders (1.8%), American Indians (0.6%), other, and unknown.

Blacks and whites differed substantially by household income and education. Among whites, 18 million people (64%) had incomes of \$25,000 or less, and the remaining 10 million people (36%) had incomes greater than \$25,000; among blacks, 2.2 million people (88%) had incomes of \$25,000 or less, and the remaining 300,000 people (12%) had incomes that exceeded \$25,000.

Table 8. Distribution of Medicare Beneficiaries Age 65 and Older, and Percent Who Completed High School, By Race and Income, 1998

	White		Black	
	Low Income*	High Income†	Low Income*	High Income†
Beneficiaries (millions)	18.0	10.0	2.2	0.3
Completed High School	58%	85%	33%	75%

* Low income = \$25,000 or less; † High income = More than \$25,000.

Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

Income and educational attainment are strongly related. Among whites, only 58% in the low-income group (\$25,000 or less) completed high school, while 85% in the high-income group (more than \$25,000) completed high school. Among blacks, the corresponding percentages were 33% and 75%, respectively. Although income and educational attainment are strongly related for both blacks and whites, the relatively small proportion of high-income blacks results in a large overall difference in the percent of blacks (38%) and whites (68%) who had completed high school. The disparities by race in income and educational attainment underscore the importance of examining differences in utilization patterns between blacks and whites by income or educational levels.

2. *Use of Preventive Services and Smoking Status.* As Medicare administrative data illustrate (tables 1-4), race and income are associated with the use of preventive services. Responses from women in the 1998 MCBS show similar associations (table 9). More high-income white women

Table 9. Percent of Women Age 65 and Older Who Reported Receiving a Mammogram, an Influenza Immunization, and a Pap Smear in the Past Year, By Race and Income, 1998

	White		Black	
	% of High Income Women*	% of Low Income Women†	% of High Income Women*	% of Low Income Women†
Mammogram	60	42	55	43
Influenza Immunization	74	68	62	51
Pap Smear	46	30	36	30

* High income = More than \$25,000; † Low income = \$25,000 or less.

Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

than high-income black women received mammograms, influenza immunizations, and Pap smears. The same was true for low-income women with regard to influenza immunizations. In each racial group, the proportion receiving mammograms, influenza immunizations, and Pap smears was higher among women financially more secure.

Among men, race and income are also associated with getting an

influenza immunization and with screening for prostate disease (digital rectal and/or PSA test), as shown in Table 10.

Table 10. Percent of Men Age 65 and Older Who Reported Receiving a Prostate Examination and an Influenza Immunization, By Race and Income, 1998

	White		Black	
	% of High Income Men*	% of Low Income Men†	% of High Income Men*	% of Low Income Men†
Prostate Exam	74	60	70	50
Influenza Immunization	75	69	52	49

* High income = More than \$25,000; † Low income = \$25,000 or less.
 Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

Interestingly, with regard to smoking among women age sixty-five and older (table 11), more high-income women smoked sometime in their lifetime than low-income women (49% and 42%, respectively). Smoking behavior has changed significantly among women, with only 9% of high-income women and 11% of low-income women currently smoking.

Table 11 also reveals that among men, the same proportion of high-income and low-income men (80%) smoked sometime during their life. Similar to women, smoking among men has dropped significantly. In 1998, 12% of high-income and 16% of low-income men were current smokers.

Table 11. Percent of Women and Men Age 65 and Older Who Reported They Had Smoked Sometime in Their Lifetime and Percent Who Currently Smoke, By Income, 1998

	Women (Black and White)		Men (Black and White)	
	% of High Income Women*	% of Low Income Women†	% of High Income Men*	% of Low Income Men†
Have Ever Smoked	49	42	80	80
Currently Smoke	9	11	12	16

* High income = More than \$25,000; † Low income = \$25,000 or less.
 Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

3. *Testing Hypothesis One for Women.* The relationship between the use of mammography and the use of influenza immunization lends substantial support to Hypothesis One. Table 12 shows that among high-income white women who had a mammogram, 80% also had an influenza immunization, but that among high-income white women without a mammogram, only 65% had an influenza immunization. Similarly, among low-income white women who had a mammogram, 77% also had an influenza immunization whereas among low-income white women without a mammogram, only 61% had an influenza immunization. For black women, the association was most evident for low-income women: among those who had a

Table 12. Percent of High-Income and Low-Income Women Age 65 and Older Obtaining an Influenza Immunization, By Mammography Status and Race, 1998

	High Income*		Low Income†	
	% with Influenza Immunization		% with Influenza Immunization	
	White	Black	White	Black
<i>Mammogram Status</i>				
Had Mammogram	80	66	77	60
Did Not Have Mammogram	65	57	61	44

* High income = More than \$25,000; † Low income = \$25,000 or less.
 Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

mammogram, 60% had an influenza immunization, whereas among those who did not have a mammogram, 44% had an influenza immunization.

Hypothesis One is further confirmed by the striking relationships between getting a mammogram and getting a Pap smear for women of both races and both income groups (table 13). Of the high-income white women who had a mammogram, 66% had a Pap smear, but of the high-income white women without a mammogram, only 15% had a Pap smear. Similarly, of the high-income black women who had a mammogram, 59% had a Pap smear, but of the high-income black women without a mammogram, only 9% had a Pap smear. The relationship between getting a mammogram and getting a Pap smear is similarly striking for low-income women. Of low-income women without a mammogram, only 9% of black and white women, got a Pap smear, while of their low-income counterparts who got a mammogram, 58% of both black and white women also got a Pap smear.

Table 13. Percent of High-Income and Low-Income Women Age 65 and Older Obtaining a Pap Smear, By Mammography Status and Race, 1998

	High Income*		Low Income†	
	% with Pap Smear		% with Pap Smear	
	White	Black	White	Black
<i>Mammogram Status</i>				
Had Mammogram	66	59	58	58
Did Not Have Mammogram	15	9	9	9

* High income = More than \$25,000; † Low income = \$25,000 or less.
 Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

4. *Testing Hypothesis Two for Women.* Hypothesis Two is confirmed by the consistent relationships between smoking habits and use of mammography (both races combined, table 14). Lifetime smoking status (part A of the table) has very little relationship with the percent of women who get mammograms. For high-income women, among those who have smoked,

58% had a mammogram, and among those who never smoked, a similar proportion, 61%, had a mammogram. For low-income women, among those who have smoked, 42% had a mammogram, and among those who never smoked, 42% had a mammogram.

In dramatic contrast, present smoking status (part B of the table) is strongly associated with the use of mammography. Among high-income women who quit smoking, 62% had a mammogram, while among high-income women who currently smoke, only 42% had a mammogram. Among low-income women who quit smoking, 45% had a mammogram whereas among low-income women who currently smoke, only 34% had a mammogram.

Table 14. Percent of Women Age 65 and Older Obtaining a Mammogram, By Lifetime and Present Smoking Status, and Income, 1998

	A. Lifetime Smoking Status % with Mammogram		B. Present Smoking Status % with Mammogram	
	Have Smoked	Never Smoked	Quit Smoking	Currently Smokes
<i>Income</i>				
High Income*	58	61	62	42
Low Income†	42	42	45	34

* High income = More than \$25,000; † Low income = \$25,000 or less.
Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

5. *Testing Hypotheses One and Two for Men.* The relationships between having a prostate screening test and having an influenza immunization (table 15) are similar to those noted earlier between having a mammogram and having an influenza immunization. For both income groups, among men of both races who had a prostate examination, a higher proportion had an influenza immunization compared to men without a prostate exam. The association is particularly evident for black men. Among high-income black men who had a prostate exam, 58% had an influenza immunization, while among those without a prostate exam,

Table 15. Percent of High-Income and Low-Income Men Age 65 and Older Obtaining An Influenza Immunization, By Prostate Exam Status and Race, 1998

	High Income*		Low Income†	
	% with Influenza Immunization		% with Influenza Immunization	
	White	Black	White	Black
<i>Prostate Exam Status</i>				
Had Prostate Exam	80	58	75	62
Did Not Have Prostate Exam	63	37	61	36

* High income = More than \$25,000; † Low income = \$25,000 or less.
Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

only 37% had an influenza immunization. Corresponding figures for low-income black men were 62% and 36%, respectively.

Hypothesis Two is further confirmed by the relationships for men between lifetime smoking status, and present smoking status and the use of prostate screening tests (table 16). Lifetime smoking status among men is not related to use of prostate tests (part A), just as lifetime smoking status among women is not related to the use of mammograms. For high-income men who have smoked, 74% had a prostate screening test. Among those who never smoked, 74% had a prostate screening test. Similarly, for low-income men, lifetime smoking status had no association with prostate screening. Fifty-eight percent who had smoked and 59% of those who had never smoked had a prostate screening test.

But present smoking status is strongly associated with having a prostate screening exam (part B). Among high-income men who quit smoking 76% had a prostate screening test, while among high-income men who currently smoke, 62% had a prostate exam. Among low-income men who quit smoking, 62% had a prostate exam, while among low-income men who currently smoke, only 45% had a prostate exam.

Table 16. Percent of Men Age 65 and Older Obtaining a Prostate Exam, By Lifetime and Present Smoking Status, and Income, 1998

	A. Lifetime Smoking Status % with Prostate Exam		B. Present Smoking Status % with Prostate Exam	
	Have Smoked	Never Smoked	Quit Smoking	Currently Smokes
<i>Income</i>				
High Income*	74	74	76	62
Low Income†	58	59	62	45

* High income = More than \$25,000; † Low income = \$25,000 or less.

Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

As noted earlier, women were asked about the use of five preventive services: influenza immunizations, pneumococcal immunizations, mammograms, Pap smears, and eye exams. Men were asked about four: influenza immunizations, pneumococcal immunizations, prostate cancer screening tests by either digital rectal exam or the PSA test, and eye exams. To summarize the use of preventive services in 1998 by race, income, and education, men and women were grouped according to whether they were low users (0-2 preventive services) or high users (more than two preventive services). As shown in Table 17, race, income, and education are all associated with patterns of use. Among high-income men, 43% of black men were high users, and 63% of white men were high users. The percentages fell for low-income men: Thirty-eight percent of black men

were high users, and 52% of white men were high users. Similar patterns are found for women: Among high-income women, 57% of black women were high users, and 68% of white women were high users. Again, the percentages fell for low-income groups. For both blacks and whites, education is strongly associated with the use of preventive services. For example, among black men who graduated from high school, 46% were high users of preventive services, while among black men with less than a high school education, only 35% were high users.

Table 17. Percent of Medicare Enrollees Age 65 and Older Who Were Low Users (0-2) and High Users (3 or more) of Preventive Services, By Sex, Income, Education, and Race, 1998

Income, Education, and Race	Male*		Female†	
	0-2 Services	3-4 Services	0-2 Services	3-5 Services
<i>High Income‡</i>				
Black	57	43	43	57
White	37	63	32	68
<i>Low Income§</i>				
Black	62	38	59	41
White	48	52	47	53
<i>High School Graduate</i>				
Black	54	46	50	50
White	40	60	38	62
<i>Less than High School</i>				
Black	65	35	63	37
White	50	50	53	47

* For men, four preventive services are included: influenza immunization, pneumococcal immunization, digital rectal exam or PSA, and eye exam.

† For women, five preventive services are included: influenza immunization, pneumococcal immunization, mammogram, Pap smear, and eye exam.

‡ High income = More than \$25,000; §Low income = \$25,000 or less.

Source: Health Care Financing Administration, Medicare Current Beneficiary Survey (1998) (data on file with authors).

III. DISCUSSION

Differences by race and SES in the use of common surgical procedures among Medicare beneficiaries raise concerns, but the implications of these differences are not always clear. To understand whether differences in the use of a particular surgical procedure signifies disparities in access to services requires more clinical information than is available in administrative or survey data. Arguments can be made that differences in surgery rates (for example, for heart disease) may not necessarily reflect inequalities in access because groups can differ in need and preferences. For some surgical procedures there may be alternative treatments, such as changes in diet, lifestyle, and medication, which could prove as effective as using the more invasive surgical approach.

In contrast, similar arguments cannot be made for disparities in

influenza immunization. All elderly persons are at risk of contracting influenza, an illness that has been shown to exact an enormous burden on health and costs of care.²⁸ Moreover, although there are alternative screening tests for certain cancer sites, screening for cancer is widely endorsed for early detection and treatment to decrease the burden of this disease. Thus, disparities in the use of preventive services, juxtaposed against disparities in health, provide substantial evidence that new approaches are needed to equalize access to services that promote health.

Financial barriers may be a factor influencing disparities in the use of preventive services covered by Medicare. Mammography, for example, has a 20% co-insurance requirement, and that may contribute to the lower rate among black women. However, influenza immunizations can be obtained “free,” yet influenza immunization rates differ more by race and SES than mammography rates do. This finding led to the fundamental question: Do some Medicare beneficiaries tend not to use health promotion services while others tend to use them? And are these tendencies related to race, income, and education?

The new analyses show that there is a pattern in the use of preventive services: The use of any one preventive service is associated with the use of a second preventive service. White or black, rich or poor, well-educated or not, groups that use one preventive service are more likely to use a second than those who do not use the first preventive service.

An especially strong relationship was found between the use of mammograms and Pap smears. If a group of elderly women do not get mammograms, we can expect no more than 10% will get Pap smears. But if they do get mammograms, we can expect a six-fold increase in their use of Pap smears. Although many individuals initiate the use of a preventive service, it is common experience that health care providers play an important role in encouraging their patients during a visit (and sometimes with a postcard reminder) to schedule an influenza immunization, mammogram, Pap smear, eye exam, and other screening tests, such as colonoscopy and sigmoidoscopy.

The similarity of the relationships between smoking habits and the use of a preventive service, such as mammography or prostate screening, reinforces our conclusion that actions and behaviors are important in thinking about ways to ameliorate disparities in health care. Smoking was used in this study because it provided insight into behaviors. Current Medicare beneficiaries were teenagers before the publication of the Surgeon General’s report on smoking. Very likely, their past smoking habits were formed before the consequences of smoking were well known. Therefore, it is not surprising to find that there is no relationship between

whether the beneficiary smoked sometime during his or her lifetime and the use of health promotion services. However, those who quit smoking likely broke the habit in the hope of improving their chances for good health. Not surprisingly, quitting smoking is related to the use of preventive services. In contrast, current smokers, including those who may have tried, but were not able to break the habit, use fewer preventive services.

The connection between the use of one preventive service with the use of another preventive service may help shed some light on the puzzle raised by studies that find relatively small effects on life expectancy from the use of a single preventive service, such as the influenza immunization.²⁹ Our study suggests that the use of a preventive service is not an isolated event, but rather is interconnected with the use of other preventive services and with other health behaviors. Thus, calculations of the benefits of any one preventive service very likely provide only a partial picture of its full impact on health outcomes. Research is needed to find methods for studying the interactions and how they affect life expectancy.

The findings from this study raise questions about the views held by some that health care plays only a minor role in explaining disparities in health outcomes. The Medicare experience indicates an association between measures of mortality, morbidity, and disability, and patterns of use of preventive and health promotion services. These associations suggest a need to strengthen "low-tech" prevention and monitoring through appropriate and effective use of physicians' visits, immunizations, and cancer screenings, especially among the most vulnerable beneficiaries.

There are several policy implications of this study. First, the consistency in behaviors relating to prevention suggests that efforts and resources expended to raise the level of use of any one preventive service (e.g., influenza immunizations among the elderly), may have a multiplicative effect by, for example, raising the level of mammography among women and prostate screening among men. Therefore, providers are likely to have the greatest impact by recommending not just an influenza immunization, for example, but a whole array of wellness and screening services.

Second, the new analyses suggest that there are markers for identifying populations most at risk for not using preventive services. For example, identifying women without an influenza immunization, or women who currently smoke, may help in identifying those who have not had a mammogram. Moreover, patterns of use of preventive services found among the elderly, with regard to prevention, may apply to younger age groups. We need to determine if there are similar patterns of prevention

among persons under age sixty-five (including children) enrolled in private and public health care, and if the patterns can also serve as markers in identifying younger people at risk for not using preventive services. Other factors related to health behaviors, including smoking habits, weight, and exercise among persons under age sixty-five may also serve as markers for identifying groups at risk for not using preventive services.

Third, the Census Bureau estimated that forty-three million people in the nation were uninsured in 1999.³⁰ It is likely that the uninsured are less willing to pay out-of-pocket for “discretionary” services, such as immunizations and cancer screening procedures, than they are for emergency and acute care needs. Thus, habits of obtaining wellness services are weakened by lack of health insurance, and very likely have an impact on health disparities in the nation.

Fourth, this study explored potential causes and remedies solely for disparities by race and SES in the use of preventive services covered by Medicare. There is a pressing need to understand the reasons for disparities in the use of diagnostic tests, such as colonoscopy, and in the use of common surgical procedures, such as cataract removal, coronary artery revascularization procedures, and hip and knee replacement. That research will be much more difficult than the present study because clinical data are required to control for factors relating to need.

In summary, efforts to embrace a social medicine perspective are needed as much today as when the New York Academy of Medicine raised that issue half a century ago. By providing access to care, Medicare has played an important role in improving the health of the elderly of our nation. Since the inception of the program, life expectancy has increased substantially for those age sixty-five and older. However, at age sixty-five, white beneficiaries today can expect to live nearly two years longer than their black counterparts. In light of the disparities by race and SES in the health of the elderly, Medicare utilization patterns raise concerns. Elderly blacks and the least advantaged beneficiaries use fewer disease prevention and health promotion services, use fewer of the common surgical procedures generally performed to improve health and functioning, and yet they are more likely to undergo procedures associated with the failure to manage chronic diseases, such as diabetes or hypertension. These patterns indicate a need to understand the causes of such disparities in the use of Medicare services.

The present study focused on the use of preventive and screening services because they are recommended for all beneficiaries. We found that beneficiaries who use one preventive service are more likely to use a second, compared to beneficiaries who do not use the first service. It is

deeply troublesome, therefore, that a recent study found that race, ethnicity, and SES are associated with physician recommendations for mammography.³¹ It seems clear that a greater emphasis is needed on health promotion and prevention of morbidity and disability, especially for vulnerable subgroups of the elderly. The substantial changes that have occurred in smoking behavior among current Medicare beneficiaries show that habits can be altered. And, our analyses show that quitting smoking is associated with a greater likelihood of using preventive services. Although we have used the concept of behavior, we believe that the efforts of individuals, the health care delivery system, and society are needed if we are to ameliorate inequalities in health care and in health.

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