An Analysis of Utilization and Access From the NHIS: 1984-92

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While the aged as a group have better access to health care since the inception of Medicare, there are subsets of the population that are still vulnerable to large out-of-pocket expenses. The focus of this analysis is on those segments of the Medicare population which are particularly vulnerable to access problems due to their personal characteristics. In particular, using data from the National Health Interview Survey (NHIS), this article will focus on the simultaneous influence of personal characteristics, such as insurance status, income, health status, and race on the use of physician services by the elderly population.

INTRODUCTION

The implementation of the Medicare program in the 1960s was a direct response to the recognition that many elderly people lacked adequate access to health care (Aday, Fleming, and Andersen, 1984; Davis, 1991; Long and Settle, 1984). In 1963, almost 50 percent of the population 65 years of age or over did not have hospital insurance, yet this was the group most likely to require hospital care (Gornick et al., 1985). With the passage of Medicare, the elderly experienced substantial improvements in access to health care services (Gornick et al., 1985).

Even today, however, two important factors which could negatively impact on access remain a concern. First, while as a group the aged are better off since the advent of Medicare, there are subsets of the aged population that are still vulnerable to large out-of-pocket expenses. Second, with the growing cost of the Medicare program, there is pressure to reduce public-sector expenditures. These two factors together threaten the ability to achieve equal access for all beneficiaries. To better understand the implications of these potentially negative forces, it is necessary to briefly describe how access has been conceptualized in the literature.

Access has been defined as the "the degree to which individuals...are able to obtain needed services" (Institute of Medicine [IOM], 1993). The likelihood of an individual receiving timely and appropriate health care services is influenced by two dimensions: the characteristics of the health care delivery system and the personal characteristics of the individual (Aday, Fleming, and Andersen; 1984). This article will concentrate on some of the personal characteristics which influence access.

According to the widely recognized framework of Aday, Fleming, and Andersen (1984), the personal characteristics that influence whether an individual seeks health care can be categorized into predisposing factors, enabling factors, and need. Predisposing factors are those elements that increase an individual's propensity to seeking care, such as age and education. Enabling factors are those elements, such as insurance coverage and income, which provide an individual with the means for seeking care. Need is a measure of health status; that is, individuals in poor health status are more likely to

require health care services. This conceptual model has typically led researchers to measure access in terms of the relationship between utilization of health services and the need for those services (Davis, 1991). While the use of health services after controlling for need has been widely used as a measure of access, access has also been examined through more direct measures. For example, survey questions have been developed which ask a respondent about their satisfaction with the ease of getting a doctor's appointment.

Regardless of the framework used to characterize access, income, insurance, and health status are clearly important factors. Researchers have shown that health status as a measure of need is the strongest predictor of utilization (Davis, 1991; Health Care Financing Administration, 1995). In an earlier study, Davis (1975) found that after controlling for health status, significant differences in utilization existed between income groups. Elderly Medicare enrollees with higher income used more physician services than lower income elderly enrollees. More recent data from the Medicare Current Beneficiary Survey (MCBS) support the findings that health status is the strongest predictor of utilization, and that higher income Medicare enrollees are more likely to have a physician visit than lower income enrollees (Health Care Financing Administration, 1995). Further, the MCBS data have also shown that Medicare enrollees without supplemental insurance are less likely to have a physician visit than Medicare enrollees with some form of supplemental coverage.

Along with income, insurance, and health status as determinants of use, race has been cited as a factor which influences access to care (Schulman et al., 1995). In the early days of the Medicare program, non-white enrollees had fewer physician visits and hospital stays than white enrollees (Gornick et al., 1985). These differences diminished substantially during the first 20 years of Medicare, though they did not disappear entirely. Thirty years after the inception of Medicare, black Medicare enrollees still have slightly fewer physician visits, fewer preventive services, and fewer elective procedures than white enrollees (Health Care Financing Administration, 1994). In contrast, black enrollees are much more likely than white enrollees to be admitted to the hospital for an ambulatory-care-sensitive condition (Health Care Financing Administration, 1994). Black persons over 65 years of age are also more likely to have an activity limitation and have a higher mortality rate than white enrollees, suggesting that black enrollees are in poorer health (Benson and Marano, 1994; Health Care Financing Administration, 1995).

The focus of this analysis is on those segments of the Medicare population which are potentially vulnerable to access problems due to their personal characteristics. In particular, this article will focus on aged Medicare enrollees with low income, aged Medicare enrollees without any supplemental health insurance, Medicare enrollees in poor health, and racial differences. Using data from NHIS, the purpose of this article is to explore the simultaneous influence of personal characteristics, such as insurance status, income, health status, and race, on the use of physician services by the elderly population. Use of physician services is an important indicator of access because the physician is typically a person's entry into the health care delivery system.

The NHIS is a national survey sponsored by the Federal Government to provide information on important policy issues, including access to health care, particularly for vulnerable groups (Health Care Financing Administration, 1992). As previ-

ously stated, one of the main objectives when Medicare was first implemented was to ensure that beneficiaries have adequate access to the health care delivery system. Surveys have been used in the past to demonstrate the enabling effects on access to services for the elderly as Medicare was first implemented (Aday, Fleming, and Andersen, 1984). The NHIS is an important source of data in these access studies because it collects data on socioeconomic factors (such as income and insurance status) and health status which are not available in administrative data systems.

METHODS

The NHIS is an annual household survey of the civilian non-institutionalized U.S. population. This survey has been conducted continuously since 1957 by the National Center for Health Statistics (Benson and Marano, 1994). The sample is selected using a multistage probability design. From this survey, information on the health and sociodemographic characteristics of the U.S. population can be examined.

In this analysis, physician use for the population 65 years of age or over is examined by sociodemographic characteristics and measures of health status. Data from the NHIS conducted in 1984, 1986, and 1989-92 are used because these years had supplemental questions on health insurance coverage. Approximately 41,000 households were interviewed in 1984; 25,000 households in 1986; 48,000 households in 1989; and 49,000 households per year in 1990, 1991, and 1992.

In this article, use rates by vulnerable segments of the Medicare population are measured by the percent of persons with at least one physician visit in a year and the mean number of visits per person per year. Comparisons of these utilization measures are made across population groups. A

logistic regression was also conducted to explore the independent effects of particular variables on the probability of a physician visit. The sociodemographic and health status variables from the NHIS which are described below were included in the descriptive and multivariate analyses because, as described in the introduction, previous research has shown that these variables are important predictors of use.

Sociodemographic Characteristics

Insurance Coverage

Insurance status is categorized as Medicare only, Medicare and other public coverage, Medicare and other insurance, insurance other than Medicare, and unknown or none. Each of these groups is mutually exclusive. The Medicare and other public coverage group consists primarily of persons with Medicare and Medicaid. The Medicare and other group consists primarily of Medicare enrollees with privately purchased medigap coverage and Medicare enrollees with employer-sponsored supplementary coverage.

Medicaid coverage was imputed for aged persons with Supplemental Security Income who did not report Medicaid coverage. The insurance other than Medicare and the unknown/no coverage groups are included in the totals but are not shown separately in this analysis.

Income

The NHIS collects information on family income, but family income was not reported by about 23 percent of the elderly. Therefore, income was imputed for persons with an unknown value using a model that included family size, race, whether there is a married couple in the family, the number of adults in the family in the labor force, and other variables.

Race

Race is shown as white, black, and other.

Health Status

There are two mesaures of health status in the NHIS: self-reported health status and activity limitation status.

- Self-Reported Health Status. There are five levels of self-reported health status: excellent, very good, good, fair, and poor.
- Activity Limitation Status. There are four levels of activity limitation: unable to perform major activity, limited in kind or amount of major activity, limited in other activities, and not limited. The not limited category includes persons with an unknown activity limitation level. For the purpose of the descriptive analysis, data for persons with a limitation in kind or amount of major activity or a limitation in other activities have been combined into a category called "limited."

For the descriptive data, unless otherwise noted, all utilization estimates in this article have relative standard errors (the standard error divided by the estimate) of 10 percent or less. To yield standard errors of 10 percent or less, weighted averages were computed across the 6 years of data. The weights are proportional to the inverse of the standard error for that estimate and sum to one across the 6 years. These relative standard errors were calculated using the SUDAAN software package. This software package accounts for the complex sampling design of the NHIS in deriving relative standard errors. Unless noted, the differences presented in the text are significant at the 0.05 level using the Z test.

To investigate the independent effects of particular variables on the use of physician services while controlling for possible covariates, a multivariate analysis of the 1984-92 data was conducted. A logistic regression was used to explore the effect of a range of sociodemographic and health status variables on the probability of having at least one physician visit.[1]

DESCRIPTIVE RESULTS

Population Characteristics

Data from the NHIS confirm that the majority of the population 65 years of age or over has Medicare coverage and some form of supplemental coverage (Table 1). In 1992, 21.3 million aged persons, or 69.1 percent, had Medicare and private coverage, 7.3 percent (2.2 million aged persons) had Medicare and another form of public coverage (primarily Medicaid), and 14.6 percent (or 4.5 million aged persons) had only Medicare coverage. The extent of insurance coverage varies according to income. The poor and near poor (persons with household income at or below 200 percent of the Federal poverty level) are more likely to lack supplemental coverage than those who are not poor: 22.3 percent versus 8.5 percent.

Of the 30.8 million aged persons, 61.2 percent do not have any activity limitation. The elderly who are not poor, however, are more likely to be in better health than the poor and near poor: 66.2 percent of the non-poor elderly do not have an activity limitation versus 54.9 percent of the poor and near-poor elderly.

Almost 90 percent of all aged persons are white. However, the elderly who are not poor are more likely to be white than the poor and near-poor elderly (94 percent versus 83.6 percent).

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[1]These regressions were originally developed as part of a trend analysis and, as such, the samples were not pooled (Health Care Financing Administration, 1995).

Table 1

Number and Percent Distribution of the Population 65 Years of Age or Over, by Insurance Status, Health Status, Race, and Income: 1992

Measure	Total		Poor and Near Poor		Not Poor	
	Number	Percent	Number	Percent	Number	Percent
Total	30,791,751	100.0	13,582,345	100.0	17,209,406	100.0
Insurance status						
Medicare Only	4,502,346	14.6	3,033,015	22.3	1,469,331	8.5
Medicare and Other						
Public Coverage	2,242,109	7.2	1,805,091	13.2	437,018	2.5
Medicare and Private	21,285,379	69.1	7,340,121	54.0	13,945,258	81.0
Other/Unknown	2,761,917	8.9	1,404,118	10.3	1357799	7.8
Activity Limitation						
Not Limited	18,851,270	61.2	7462449	54.9	11,388,821	66.1
Limited	8,661,231	28.1	4,256,715	31.3	4,404,516	25.5
Unable to Perform						
Major Activity	3,279,250	10.6	1,863,181	13.7	1,416,069	8.2
Race						
White	27,539,375	89.4	11,359,669	83.6	16,179,706	94.0
Black	2,621,722	8.5	1,933,728	14.2	687,994	3.9
Other	630,654	2.0	288,948	2.1	341,706	1.9

Source: Mentnech, R., Ross, W., Park, Y., and Benner, S., 1995.

Use of Physician Services and Health Status

As expected, use of physician services is highest for persons reporting the poorest health (Table 2). For example, 94 percent of elderly persons with the most severe activity limitation had a physician visit compared with 80 percent of persons without an activity limitation. Persons with the most severe activity limitation had a much higher mean visit rate than did those without a limitation. The mean visit rate was 21.5 visits per person for those unable to perform a major activity versus 6 visits per person for those without an activity limitation.

Use of Physician Services and Sociodemographic Characteristics

The percent of persons with a visit and the mean visit rate for the aged Medicare population is highest for those having other public program coverage (primarily Medicaid) compared with those having Medicare and other coverage (e.g., medigap policies), and

those having Medicare only. This reflects the fact that the population with Medicare and another form of public coverage (Medicaid) is sicker than average. Among the aged, those with Medicare coverage only are the least likely to have at least one physician visit, and they generally have a lower mean visit rate than those with supplemental coverage. A limitation of using the mean number visits per person as a measure of access is that it includes both users and non-users. This measure reflects, therefore, not only the level of use but also the likelihood of having a visit in the first place. If the likelihood of having a visit is lower for a particular group, then the mean visit rate will also be lower. An alternative approach is to examine the mean number of visits per user. The mean number of visits per user was approximated from the estimates in this article. In general, this approximation did not have a substantial impact on the observed patterns. However, in contrast to the mean number of visits per person, the overall mean number of visits per user for Medicare enrollees without supplemental coverage

Table 2

Percent of Persons With a Physician Visit and Mean Number of Visits per Person, by Selected Health Status and Sociodemographic Characteristics[1]: 1984, 1986, 1989, 1990, 1991, and 1992

	Percent of Persons With a Visit				Mean Number of Visits per Person			
Characteristic	Total	Medicare Only	Medicare and Other Public Coverage	Medicare and Private	Total	Medicare Only	Medicare and Other Public Coverage	Medicare and Private
All Aged	85.0	[2]78.3	[3]89.2	86.9	9.2	[2]8.0	[3]14.2	9.2
Poor/Low Income	*83.7	[2]77.4	[3]89.3	*85.9	9.4	[2]8.1	[3]14.6	9.2
Not Poor	86.2	[2]80.0	88.6	87.4	9.0	[2]7.7	[3]12.8	9.1
Not Limited	80.2	[2]71.3	83.0	82.9	6.0	[2]4.7	[3]8.0	6.3
Limited Activity	92.2	[2]86.9	92.5	93.6	11.7	[2]9.2	13.4	12.0
Unable to Perform Major Activity	93.8	[2]91.1	95.4	95.0	21.5	19.1	[3]25.9	21.8

*Significant difference between the poor/low-income group and the not poor group at $p < * 0.05$.

[1]Weighted averages.
[2]Medicare-only group significantly different from Medicare/private group at $p <= 0.05$.
[3]Medicare/Medicaid group significantly different from Medicare/private group at $p <= 0.05$.

Source: Mentnech, R., Ross, W., Park, Y., and Benner, S., 1995.

was essentially the same as the overall rate for Medicare enrollees with private coverage (10.3 versus 10.5, respectively).

The mean visit rate is similar for the poor and near-poor elderly (persons with family income at 200 percent or less of the poverty level) and the elderly who are not poor. However, the percent of persons with a visit is slightly higher for those who are not poor (86.2 percent versus 83.7 percent).

MULTIVARIATE RESULTS

To illustrate the independent effects of particular variables on the likelihood of having a physician visit, Table 3 contains the coefficients and odds ratios from the logistic regression for 1992.[2] The results from the logistic regression demonstrate that income, health status, and degree of insurance coverage all influence the likelihood of having a physician visit. For example, Medicare enrollees with other public coverage and Medicare enrollees with private coverage are 1.69 and 1.97 times more likely to have a physician visit than Medicare enrollees without supplemental

coverage. Likewise, aged enrollees who are unable to perform their major activity are 1.33 times more likely to have a visit than those without a limitation.

To further investigate the influence of health status and income on the probability of a visit after controlling for other variables, predicted probabilities were derived for aged persons in the best health and aged persons in the worst health, by race and income.[3] To illustrate the influence of income on the probability of a physician visit, the income to poverty ratio at the ninetieth (high income) and tenth (low income) percentiles were used to define hypothetical income groups.[4]

As expected, regardless of insurance, race, and income, the probability of a visit is higher for persons in the worst health than

[2]The results from the logistic regressions for the other years used in this analysis can be found in Health Care Financing Administration (1994).

[3]In the derivation of the predicted probabilities, persons in the best health were given a value of 1 for no chronic condition, excellent health status, and no activity limitation. Persons in the worst health were given a value of 1 for the presence of a chronic condition, poor health status, and unable to perform their major activity. All other explanatory variables in the model were set to the mean value for the population 65 years of age or over.

Table 3

Coefficients and Risk (Odds Ratios) of Having a Physician Visit for Selected Variables for Persons 65 Years of Age or Over: 1992

Independent Variable	Coefficient	Odds Ratio
Intercept	*-0.368	0.69
Income-to-Poverty Ratio	*0.101	1.11
Sex (Male=0, Female=1)	*0.378	1.46
Race[1]		
Black	0.093	1.10
Other	0.041	1.04
Self-Reported Health Status[2]		
Very Good	*0.344	1.41
Good	*0.552	1.74
Fair	*0.887	2.43
Poor	*1.067	2.91
Activity Limitation[3]		
Unable to Perform Major Activity	*0.287	1.33
Limited in Kind/Amount of		
Major Activity	0.147	1.16
Limited in Other Activity	*0.255	1.29
Presence of Chronic Condition (No=0; Yes=1)	*1.137	3.12
Geographic Area of Residence[4]		
MSA - Central City	0.046	1.05
MSA - Not Central City	0.067	1.07
Highest Educational Level[5]		
0-11 Years	*-0.170	0.84
1-3 Years College	0.075	1.08
College Graduate or More	*0.237	1.27
Age Division (65-70 Years = 0, 75 Years or More=1)	*0.357	1.43
Insurance[6]		
Medicare and Other Public		
Coverage	*0.528	1.69
Medicare and Other Coverage	*0.677	1.97
Other than Medicare	*0.391	1.48

[1]Reference group: white.
[2]Reference group: excellent health status.
[3]Reference group: not limited.
[4]Reference group: non-MSA.
[5]Reference group: high school diploma.
[6]Reference group: Medicare-only group.

*Significant at $p <= 0.05$.

NOTE: MSA is metropolitan statistical area.

SOURCE: Mentnech, R., Ross, W., Park, Y., and Benner, S., 1995.

persons in the best health in all cases (Table 4). However, the difference between the aged in the best health and the aged in the worst health is more pronounced for the low-income population. To illustrate, high-income white Medicare enrollees without supplemental insurance in the worst health are 63 percent more likely to have a visit than high-income white Medicare enrollees without supplemental

insurance in the best health (0.95 versus 0.58). In contrast, low-income white Medicare enrollees without supplemental insurance in the worst health are 93 percent more likely to have a visit than low-income white Medicare enrollees without supplemental insurance in the best health (0.93 versus 0.48). The more pronounced difference for the low-income group is because low-income aged persons in the best health have a lower probability of at least one physician visit than high-income aged persons in the best health, while there is virtually no difference in the probability of a visit by income for those in the worst

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[4]Each person in the NHIS was assigned an income-to-poverty ratio based on the reported household income. The sample was then distributed and the corresponding income-to-poverty ratios at the tenth and ninetieth percentiles were selected. During the study years, the income-to-poverty ratio for aged persons at the tenth percentile ranged between 0.89 and 0.99; the income-to-poverty ratio for aged persons at the ninetieth percentile ranged between 4.7 and 5.4.

	Medicare Only											Medicare and Private											
	White			Black			White			Black		
	Income		H/L	Income		H/L	Income		H/L	Income		H/L
Health Status	High[1]	Low[1]	Ratio	High[1]	Low[1]	Ratio	High[1]	Low[1]	Ratio	High[1]	Low[1]	Ratio
Best Health[2, 3]	0.58	0.48	1.22	0.61	0.51	1.20	0.72	0.63	1.14	0.74	0.66	1.13
Worst Health[2, 3]	0.95	0.93	1.03	0.96	0.93	1.02	0.97	0.96	1.01	0.98	0.96	1.01
Ratio of Worst Health to Best Health	1.63	1.93	NA	1.57	1.84	NA	1.35	1.52	NA	1.31	1.47	NA

[1]Best health is no chronic conditions, no activity limitations, and excellent health status. Worst health is chronic conditions, unable to perform major activities, and poor health status.
[2]High is 90th percentile in the distribution of the relative income-to-poverty threshold. Low is 10th percentile. Both are based on the overall distribution by year. For a given year, the identical values are applied to all categories.
[3]Other explanatory variables are set to the mean values for the 65 years of age or over population.

NOTE: H/L is high/low. NA is not applicable.

SOURCE: Mentnech, R., Ross, W., Park, Y., and Benner, S., 1995.

health. To summarize, after controlling for other variables, high-income aged persons in the best health are more likely to have a physician visit than aged persons with low income; however, low-income aged persons in the worst health are as likely to have at least one physician visit as high-income elderly persons in the worst health.

DISCUSSION

Both the descriptive results and the multivariate results confirm that health status is a very important determinant of the use of physician services. Insurance coverage is also a very important determinant of the use of physician services since insurance reduces the financial barriers to receiving care. Moreover, supplemental insurance coverage further reduces financial barriers to receiving care.

While not as strong a predictor as insurance, income also appears to influence the probability of a visit, though generally not the visit rate. Interestingly, the multivariate results show that after controlling for other variables, there is virtually no difference between income groups and between the two insurance groups in the probability of

a visit for those in the worst health status. This seems to suggest that insurance and income have a strong effect on the probability of a visit for aged persons in better health, but have less of an influence on the probability of a visit for aged persons in the poorest health. That is, very poor health may serve as an equalizing factor in the probability of a physician visit. Race does not appear to be a strong predictor of the probability of a visit.

The use of physician visits as an indicator only provides a partial look into the influence of health status, insurance status, race, and income on access. A physician contact is typically a person's entry into the health care delivery system; it is generally believed that access to timely and appropriate ambulatory care reduces the risk of admission for certain diseases. While poor health status seems to serve as an equalizing factor in the probability of a visit, previous work using claims data has shown substantial differences between vulnerable groups in the use of health services. For example, black enrollees and enrollees living in poverty areas have a higher rate of admission for diabetes with complications than white enrollees and those living in non-poverty areas, respectively (Health

Care Financing Administration, 1994). The troubling differences observed using claims data could suggest that physician visits might be too crude a measure to examine the impact of income, insurance, race, and health status on use of health services. Alternatively, the differences between vulnerable groups in the population based rates of admission for certain ambulatory-care-sensitive conditions could reflect underlying differences in health status.

This article compared the probability of a visit for those in the best health with the probability of a visit for those in the worst health. Despite the finding that the probability of a visit does not differ by income and insurance for those in the worst health, it cannot be concluded that insurance and income have no effect on access for those in poor health. To more fully understand the influence of income, insurance status, race, and health status on use, other use measures should be examined in the future. First, the influence of income, insurance status, and race on the probability of being admitted for an ambulatory-care-sensitive condition for those with a specific disease needs to be examined. Second, between the two ends of the health spectrum are Medicare enrollees with varying degrees of health status. Data from the NHIS show that the likelihood of not having supplemental insurance coverage increases as health status deteriorates and as income declines.[5] It is conceivable that lower income Medicare enrollees who lack supplemental coverage and who are neither in excellent health or very poor health may be foregoing care until their health status deteriorates further because of the out-of-pocket expense. The implication is that these enrollees may be better served by earlier intervention. If it is true that vulnerable subgroups are foregoing care, this could become more of a problem with the pressure to contain costs in public programs.

[5]Data available from the authors upon request.

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