Cost Sharing, Supplementary Insurance, and Health Services Utilization Among the Medicare Elderly

by Charles R. Link, Stephen H. Long, and Russell F. Settle

This paper investigates the extent to which private supplementary insurance and Medicaid, which vitiate the effect of Medicare cost-sharing, encourage elderly beneficiaries to seek additional medical care. A multivariate model of health services utilization is estimated with the Tobit technique, using the 1976 Health Interview Survey. We find that either private or public supplementation induces greater use of hospital and physician services, though in amounts that vary considerably according to health status. The paper closes with observations on cost savings brought about by Medicare cost-sharing and some implications for equity among beneficiaries.

The Medicare program provides basic health insurance for approximately 24 million elderly people.[1] While Medicare coverage for medical expenses is generous, it is far from complete. To illustrate, the average health care expenditure by an elderly person was $1,745 in 1977; only 41 percent ($715) of this amount was reimbursable through Medicare (Gibson and Fisher, 1979).

Part of the reason for this shortfall in protection against medical expenses arises from the limitations and restrictions in the program's benefit package. For example, expenditures for nursing home care, routine physical examinations, dental care, and vision care are generally not covered by Medicare.

Another reason for the gap in coverage arises from Medicare's cost sharing provisions, requiring beneficiaries who become ill to bear a portion of their health care costs. For example, the Hospital Insurance (or Part A) portion of the program contains a deductible for inpatient hospital services during any spell of illness approximately equal to the average *per diem* for such services ($144 in 1978). Moreover, Medicare beneficiaries must coinsure for periods of hospitalization in excess of 60 days during any spell of illness. Similarly, the Supplementary Medical Insurance (or Part B) portion of the program requires beneficiaries to satisfy a deductible (currently, $60 per year) and to coinsure for 20 percent for all covered services. Additional cost sharing occurs in the case of unassigned claims. Since Medicare only reimburses 80 percent of usual, customary, and reasonable charges, the beneficiary is left liable for the balance when the physician does not accept assignment of the Medicare reimbursement in lieu of the actual charge.

These coverage gaps have led the majority of Medicare beneficiaries to seek some form of supplementary health insurance coverage. In 1976, only 29 percent of all aged beneficiaries had no supplementary protection against medical expenses. About 63 percent of the aged beneficiaries had some form of private supplementary coverage, while another 14 percent benefited from public supplementation mainly through Medicaid (Link et al, 1979).[2]

Supplementation can serve two functions. It can redistribute income by shifting costs among those holding private supplementary insurance—from those who receive considerable medical attention to those who receive little, if any, medical care—and from

---

[1] In addition, Medicare provides coverage for about three million people under age 65 with long-term disabilities or chronic renal disorders.

[2] These percentages total to 106 percent of the elderly population because of some overlap in the supplementary coverage categories: 6 percent of the aged beneficiaries reported coverage under both private and public forms of supplementation.

Medicaid beneficiaries to taxpayers. In addition, supplementation can stimulate use of health services by lowering or even eliminating those financial barriers to health care left by Medicare. This paper addresses the latter issue by investigating the extent to which supplementation of Medicare encourages beneficiaries to seek additional medical care.

Section I of the paper briefly describes the econometric model used in this investigation. The data and estimation techniques are discussed in Section II. We present the main findings in the third section. A concluding section briefly discusses the policy implications of the findings.

The Model

The objective of this study is to quantitatively estimate the effect of Medicare supplementation on use of health services by Medicare beneficiaries. However, the extent of supplementary health insurance coverage is only one of many factors influencing the use of health services by Medicare beneficiaries. Previous studies of health services utilization have found such factors as age, sex, race, income, and health status to be capable of exerting independent influences on the use of health services (Leopold and Langwell, 1978). In order to isolate the influence of supplementary health insurance coverage, it is necessary to control for the variation in utilization arising from these other factors.

Accordingly, our empirical results are based upon a multivariate model that relates an individual's use of either physician or hospital services to a variety of underlying determinants. In particular, the empirical specification for the model is:

$$U_i = b_0 + b_1(PRIV_i) + b_2(CAID_i) + b_3 X_{3i} + \ldots + b_N X_{Ni} + e_i$$

where the subscript i denotes the ith Medicare beneficiary; U_i measures the person's annual use of health services (two alternative models are estimated: one for annual number of physician visits and one for annual number of hospital days); $PRIV_i$ is a binary variable indicating whether the ith beneficiary supplements Medicare with some type of private health insurance; $CAID_i$ is a binary variable indicating whether the ith beneficiary received Medicaid benefits during the past 12 months; X_{3i} through X_{Ni} compose a set of variables to control for other factors influencing the ith person's utilization; and e_i is a stochastic error term, assumed to have a truncated-normal distribution. The set of control variables in this model is designed to capture the influence of family income, race, sex, region of

residence, education, family size, health status, age, marital status, labor-force status, veteran status, and the availability of medical resources.[3]

Data and Estimation Technique

The primary data source is the 1976 Health Interview Survey (USDHEW, 1977). This survey contains detailed information on approximately 9,000 Medicare beneficiaries age 65 or over. Observations were excluded for persons for whom family income or education was unknown or not reported, reducing the sample for the analysis of hospital utilization to 8,325. The elimination of observations pertaining to persons who failed to report the number of physician visits during the preceding 12 months further reduced the sample for analyzing physician utilization to 8,239.

For each of the dependent variables, there is a large concentration of values at zero. About 30 percent of the sample reported no use of physician services during the preceding 12 months, and approximately 80 percent did not use inpatient hospital services. Ordinary least squares coefficient estimates from such truncated samples are biased toward zero. Accordingly, the Tobit estimation technique (Tobin, 1958) was used for this study.

Covariance analyses revealed that our investigation of physician utilization should be conducted with data stratified according to the presence or absence of chronic health problems.[4] Thus, results from the analysis of physician utilization are reported separately for (1) elderly Medicare beneficiaries who have no chronic health problems and (2) those who have one or more such conditions. In contrast, covariance tests for hospital utilization indicated that it was appropriate to pool over all health conditions. The estimates pertaining to hospital utilization are thus based upon the complete sample.

---

[3] One assumption of our model that has been questioned in other research (Newhouse and Phelps, 1976) is that insurance coverage is an exogenous determinant of utilization. Newhouse and Phelps have argued that health insurance is endogenous; that is, sicker people purchase better insurance. However, these authors were unable to support this hypothesis with their data on the working-age population and abandoned their more complex model for one similar to ours.

[4] Chronic conditions in the Health Interview Survey include any condition that was first noticed by the respondent more than three months before the interview week. They also comprise one of 34 special conditions which are always classified as chronic, regardless of the onset. See USDHEW, 1977, pages 51-52, for a list of these conditions.

Findings

The main results of the study are presented in Tables 1 through 3. These tables highlight the influence of supplementary coverage on the utilization of health services by elderly Medicare beneficiaries.

Table 1 reports the *average* utilization of health services among Medicare beneficiaries by type of supplementation, both in absolute terms and relative to the average utilization by Medicare beneficiaries who do not supplement (shown in parentheses in the table). These average rates were tabulated directly from the Health Interview Survey (HIS) data, and thus are *unadjusted* for other determinants of utilization. The differentials between these averages should not be interpreted as reliable indicators of the influence of supplementation on utilization. These unadjusted averages are presented for comparison purposes only.

Since we shall compare these unadjusted averages with utilization rates adjusted for other determinants, a brief examination of the apparent implications of the results in Table 1 is merited. These unadjusted averages reveal that beneficiaries who supplement Medicare with private health insurance generally make greater use of health services than those who do not supplement. The largest differential between those with private supplementation and those with only Medicare arises in connection with physician visits by beneficiaries with no chronic health problems: those who have private supplementation in this group report 39 percent more visits to physicians than their counterparts who rely solely on Medicare. Private supplementation is also associated with somewhat greater use of hospital services (2.79 days per year), relative to the average utilization among those with no supplementation (2.51 days).

In contrast, those with one or more chronic health problems and private supplementation tend to have fewer physician visits compared to those with no supplementary coverage. While the differential is small (6.23 visits versus 6.72 visits), it is nevertheless paradoxical. One would expect supplementary insurance to encourage utilization. We will return to the paradox below.

Public supplementation of Medicare is associated with relatively high rates of utilization of both physician and hospital services. For example, Medicare beneficiaries with Medicaid supplementation spent an average of 76 percent more days in the hospital than those with no supplementation and 58 percent more than those with private supplementation. Based upon this type of evidence, one might be tempted to conclude that public supplementation of Medicare has greatly stimulated the use of health services. However, while such a conclusion may be correct, it does not necessarily follow from the evidence in Table 1. The high utilization rates in the Medicaid category may simply reflect the relatively poor health status of persons in this group. We return to this issue below.

Table 2 contains the key findings of this study, namely, the predicted utilization rates by type of supplementation, adjusted for other determinants. These estimates are derived from a multivariate model that controls for a variety of determinants of utilization and thus isolates the influence of supplementation on utilization from the influence of other factors such as health status.[*] The values reported in Table 2 represent predicted utilization rates for "typical" Medicare beneficiaries; that is, they are derived under the assumption that all of the determinants of utilization (except the supplementation variables) equal their mean values.

---

[*] Link, Long, and Settle (1980) present a more detailed explanation of the models, variable definitions, and results upon which these estimates are based.

TABLE 1
Average Utilization of Health Services by Elderly Medicare Beneficiaries, by Type of Supplementation

Type of Supplementation	Annual Physician Visits		Annual Hospital Days
	No Chronic Conditions	Some Chronic Conditions	
No Supplementation: Medicare Only	1.66	6.72	2.51
	(100%)[1]	(100%)	(100%)
Private Supplementation	2.30	6.23	2.79
	(139%)	(93%)	(111%)
Public Supplementation: Medicaid	2.71	8.92	4.41
	(163%)	(133%)	(176%)

Source: our calculations based upon tabulations from the 1976 Health Interview Survey
[1] The numbers in parentheses indicate the average utilization rate for a group *relative* to the utilization rate among those beneficiaries who do not supplement their Medicare coverage.

What do these predicted utilization rates imply about the influence of supplementation on the use of health services by elderly Medicare beneficiaries? First, other things equal, supplementation always stimulates use of health services, generally by statistically significant amounts. This finding contrasts with the results reported in Table 1. In particular, the paradox of relatively low demand for ambulatory care by those chronically ill beneficiaries with private supplementation disappears once the utilization rates are adjusted for other determinants.

Second, public supplementation always stimulates more utilization of health services than does private supplementation. However, in no instance is the differential in utilization rates between those with private supplementation and those qualifying for . Medicaid statistically significant. We are justified in concluding only that, other things equal, Medicaid supplementation of Medicare permits elderly beneficiaries to use physician and hospital services at least as often as those who purchase private supplementary health insurance. This conclusion contrasts sharply with the one implied by the unadjusted average utilization rates in Table 1: those estimates suggest that the influence of public supplementation on the demand for health services far outweighs the influence of private supplementation.

A final important implication of the estimates reported in Table 2 pertains to the differential effectiveness of supplementary coverage at stimulating demand for health services. Supplementation greatly increases the use of both hospital services and physician services among elderly persons with no chronic health problems. However, among those elderly beneficiaries with one or more chronic health problems (about 78 percent of the beneficiary population), persons with some type of supplementation

have only slightly more physician visits than those with no additional coverage. Apparently the deductibles and coinsurance provisions of Medicare's Part B medical insurance do not represent an important barrier to ambulatory medical care for those beneficiaries who suffer from chronic health problems. For these individuals, supplementation—particularly through Medicaid—serves mainly to redistribute income to the chronically ill Medicare beneficiaries. The unadjusted averages reported in Table 1 would support the contrary—but erroneous—conclusion that public supplementation was very effective at stimulating demand for ambulatory care among those with chronic illnesses.

The estimates presented in Table 3 provide an additional perspective on supplementation's role in determining utilization rates among elderly Medicare beneficiaries. Mean utilization for a group, U, can be defined as:

$$(1) \qquad U=PU',$$

where P is the probability that a person with mean characteristics will use a particular health service and U' is the mean utilization rate among those who actually use the health service. Thus, any change in a group's utilization rate (ΔU) can be divided along the following lines:

$$(2) \qquad \Delta U=\Delta PU'+\Delta U'P+\Delta P\ \Delta U'.$$

This relationship can be restated in percentage terms as

$$(3) \qquad \Delta U/U=\Delta P/P+\Delta U'/U'+\Delta P\ \Delta U'/U.$$

Table 3 partitions the percentage increase in utilization arising from supplementation into the three components identified in equation 3: the percentage increase in the probability of using a particular health service, the percentage increase in the utilization rate among those that make use of the health service, and the interaction between these two factors.

TABLE 2
Predicted Utilization of Health Services by Elderly Medicare Beneficiaries, by Type of Supplementation, Adjusted for Other Determinants

Type of Supplementation	Annual Physician Visits		Annual Hospital Days
	No Chronic Conditions	Some Chronic Conditions	
No Supplementation: Medicare Only	1.79 (100%)[1]	8.59 (100%)	1.90 (100%)
Private Supplementation	2.53** (142%)	9.00 (105%)	2.53** (133%)
Public Supplementation: Medicaid	2.68* (150%)	9.61* (112%)	2.79** (147%)

Source: our calculations based upon estimates from the 1976 Health Interview Survey

[1] The numbers in parentheses indicate the predicted mean utilization rate for a group relative to the predicted mean utilization rate among those beneficiaries who do not supplement their Medicare coverage.

* Significant at the 95 percent level.
** Significant at the 99 percent level.

TABLE 3
Influence of Supplementation on Predicted Mean Utilization and its Components, by Type of Health Service, Adjusted for Other Determinants

Type of Service and Supplementation	Percentage Increase in Utilization Among Utilizers	+	Percentage Increase in Probability of Utilization	+	Interaction	=	Percentage Increase in Predicted Utilization Due to Supplementation
Physician Visits—No Chronic Conditions							
Private	16%	+	22%	+	4%	=	42%
Medicaid	18%	+	27%	+	5%	=	50%
Physician Visits—Some Chronic Conditions							
Private	3%	+	2%	+	0%	=	5%
Medicaid	5%	+	6%	+	1%	=	12%
Hospital Days							
Private	9%	+	21%	+	3%	=	33%
Medicaid	14%	+	29%	+	4%	=	47%

Source: our calculations

The estimates in Table 3 reveal that supplementation raises a group's mean utilization rate (adjusted for other determinants) largely by increasing the proportion of the group that uses medical services. This characterization applies especially well to the hospital-days category. When compared to no supplementation for example, Medicaid supplementation raises the use of hospital services by 47 percent. Most of this gain (29 percent out of the 47 percent) arises from the hospitalization of persons who, in the absence of Medicaid supplementation, would not have received treatment on an inpatient basis. Private supplementation has a similar influence on the utilization of hospital services: most of the gain comes from more people being admitted to hospitals rather than from an increase in average length of stay. These results suggest that the Part A deductible (approximately equal to the average charge for an inpatient hospital day) represents a significant barrier to the utilization of hospital services by the elderly.

Similar conclusions apply to physician visits among those with no chronic conditions. Supplementation increases utilization by persons in this group mainly by permitting a larger fraction of the group to visit a physician than would otherwise be the case. The Part B deductible ($60) thus appears to also serve as an important barrier to the use of ambulatory medical services by those with no chronic health problems.

In addition, the Part B coinsurance rate (20 percent of covered services) apparently serves as an important deterrent to physician utilization by those elderly persons with no chronic conditions. This conclusion follows from the relatively large positive effect of supplementation on utilization among those who, in the absence of supplementary coverage, would have still made some use of physician services. To illustrate, private supplementation leads to a 42 percent increase in physician visits by persons in this health-status group. Of this increase, 16 percent is due directly to greater utilization among those who would have seen a physician even without supplementary coverage.

As we noted earlier, supplementation stimulates physician utilization only to a small degree among those elderly with chronic health problems. Table 3 reveals the two underlying components of mean utilization to be about equally responsible for this small gain in the use of physician services. Apparently neither the deductible nor the coinsurance provisions of Part B represent important barriers to physician utilization among those elderly beneficiaries with chronic health problems.

Policy Implications

Our principal finding is that beneficiaries' utilization of health care services rises when Medicare is supplemented by private insurance coverage or by Medicaid, though in varying amounts depending on individuals' health status. To turn the conclusion around, we find that Medicare cost-sharing (when not vitiated by private or Medicaid supplementation) leads to significantly lower levels of hospital and physician utilization than would have prevailed in the absence of the program's deductibles and coinsurance.[6]

The estimates we report allow for an illustrative calculation of the magnitude of the cost savings owing to Medicare cost-sharing. Cost-sharing under Parts A and B is an effective economic incentive for the 29 percent of the 24 million elderly beneficiaries (about 7 million) who have neither private nor public supplementary health insurance. The predicted hospital utilization rates in Table 2 imply a utilization reduction of between 630 and 890 days per thousand beneficiaries per year when cost-sharing is effective (compared to private supplementation and Medicaid, respectively). Therefore, the Part A cost-sharing provisions result in 4.4 million to 6.2 million fewer days of hospital care for the elderly. Assuming a cost per day of $160 (the Part A hospital inpatient deductible for calendar year 1979), Medicare cost-sharing results in a reduction in total hospital expenditures by the elderly of between $700 million and $1 billion.[7] Of course, only part of these savings

---

[6] Our cross-section data do not permit us to comment on whether or not the added utilization encouraged by supplementary insurance contributes to improved health status; or, in other words, whether or not the effect of cost-sharing on use reduces consumption of medically-effective services.

[7] This calculation is for illustrative purposes only. A conceptually correct economic estimate would, at minimum, require 1) an accurate measure of the *marginal* cost of the extra hospital days, while we have used a convenient *average* cost measure here, and 2) an allowance for any macro effects of the additional 5.3 million bed days demanded.

accrue to the Medicare program since some of the reduced utilization would have been subject to the Part A deductible.

However, cost control is not the sole goal of the Medicare program. It has been argued that Medicare cost-sharing is particularly perverse because it largely reduces the health services utilization of certain disadvantaged groups—the Medicaid-ineligible low income and nonwhite populations—for whom Medicare was designed to equalize access to medical care (Gornick, 1976; Davis and Schoen, 1978). Thus it is conceivable that the advantage of cost-sharing in controlling health expenditures might be outweighed by the disproportionate reduction in utilization among certain population groups.

To test the hypothesis that the availability of private health insurance supplementation leads to inequitable utilization advantages for whites and higher income groups, we re-estimated the above-described model after omitting the private insurance variable. Examination of the changes in the coefficients on the race and income variables, respectively, will reveal unequal access afforded by the private market availability of supplementary insurance, if any. In all three regressions—physician visits for chronics and non-chronics and hospital days—the coefficients for southern and non-southern blacks changed insignificantly. Similarly, as reported in Link, Long, and Settle (1980), the variables representing income classes did not change significantly. Whatever inequitable access to services exists for Medicare beneficiaries is apparently caused by factors other than the availability of private supplementary insurance.

In summary, we conclude that Medicare cost-sharing, in the absence of private or public supplementation, reduces medical care utilization and, therefore, costs to the program. Moreover, it appears that the burden of this cost-sharing is not so concentrated among race and income groups as to cause uniformly inequitable access to medical care. However, "fine-tuning" among these competing objectives remains in the province of policymakers, not researchers.

References

Davis, Karen and Cathy Schoen, *Health and the War on Poverty: A Ten-Year Appraisal,* Washington, D.C.: Brookings Institution, 1978.

Gibson, Robert M. and Charles R. Fisher, "Age Differences in Health Care Spending, Fiscal Year 1977," *Social Security Bulletin,* 42, 1 (January 1979), pp. 3-16.

Gornick, Marian, "Ten Years of Medicare: Impact on the Covered Population," *Social Security Bulletin,* 39, 7 (July 1976), pp. 3-21.

Leopold, Jacqueline R. and Kathryn M. Langwell, "The Demand for Health Care With Special Emphasis on Cost Containment: A Review of the Literature," in *National Commission on the Cost of Medical Care, 1976-1977,* Volume 3, Monroe, WI: American Medical Association, 1978, pp. 46-93.

Link, Charles R., Stephen H. Long, and Russell F. Settle, "Health Insurance Coverage Among the Aged and Disabled," unpublished deliverable to Health Care Financing Administration, July 1979.

Link, Charles R., Stephen H. Long, and Russell F. Settle, "Medicare and the Utilization of Health Care Services by the Elderly: New Evidence," unpublished deliverable to the Health Care Financing Administration, May 1980.

Newhouse, Joseph P. and Charles E. Phelps, "New Estimates of Price and Income Elasticities of Medical Care Services," in Richard N. Rosett, *The Role of Health Insurance in the Health Services Sector,* New York: National Bureau of Economic Research, 1976.

Tobin, James, "Estimation of Relationships for Limited Dependent Variables," *Econometrica,* 26 (January 1958), pp. 24-36.

U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, "Current Estimates from the Health Interview Survey—1976," *Vital and Health Statistics,* Series 10, No. 119, Washington, D.C.: U.S. Government Printing Office, 1977.