Medicare and the Disadvantaged Elderly: Objectives and Outcomes

STEPHEN H. LONG and RUSSELL F. SETTLE

Maxwell School, Syracuse University

PRINCIPAL OBJECTIVE OF **H**E THE MEDICARE program is the provision of equitable access to health care for the elderly and certain other groups (namely, the disabled and those with end-stage renal disease). However, as the true, long-run dimensions of the financial crisis confronting Medicare grow clearer, policy emphasis is shifting away from provision of equitable access and toward containment of escalating program costs (Ginsburg and Moon 1984). Even as these policy concerns shift, it is appropriate and important to chronicle the achievements of the Medicare program and to identify its shortcomings. Recognizing the accomplishments of this major health insurance program is appropriate, lest cost-containment issues become an obsession. Carefully documenting outcomes in previous periods is important insofar as it provides a baseline for future evaluations of the access implications of present-day cost-containment efforts. Moreover, it is important to recognize explicitly those stubborn access problems which remain and those undesirable, inefficient side-effects which arose from pursuit of initial program objectives. For these reasons, this paper presents an assessment of the accomplishments and shortfalls of the Medicare program.

The paper is organized in the following way. The first section

Milbank Memorial Fund Quarterly/Health and Society, Vol. 62, No. 4, 1984 © 1984 Milbank Memorial Fund and Massachusetts Institute of Technology

examines the access problems confronting the disadvantaged elderly at the dawn of Medicare. The second section considers access outcomes under the mature program. The third section evaluates the program's achievements and shortcomings through a comparison of the findings for the two periods. The final section contains a brief summary of the results.

Access Objectives at the Dawn of Medicare

The broad access objectives of the Medicare legislation were twofold. One goal was removal of access inequities within the elderly population for instance, as might occur between the poor and nonpoor elderly. A second general objective was provision of the same degree of access to health care services for the elderly as was enjoyed by the better insured nonelderly population, taking into consideration, of course, health status and other differences between these two populations. In addition to the access objectives, there was also concern about protecting the elderly from the financial hardship of health care expenditures; while clearly important, this objective is not considered explicitly in this paper. (For an alternate interpretation of the motivation behind passage of the Medicare legislation, see Marmor 1970.)

The impetus for passage of the Medicare legislation of 1965 arose in large part from an increasing awareness of access inequities confronting certain subgroups within the elderly population (i.e., the first of the abovementioned objectives) and, only to a much lesser degree, from concern over access inequities between the elderly and nonelderly populations (the second objective) (U.S. House of Representatives. Committee on Ways and Means 1964, 1965). The failure of various groups of disadvantaged elderly to receive care mainly on the basis of medical need was substantiated in congressional testimony and in other reports (U.S. Department of Health, Education, and Welfare. Social Security Administration 1962, 1967).

A review of these documents suggests that the elderly subgroups of greatest concern at the dawn of Medicare were: (1) the poor, (2) racial minorities, (3) rural dwellers, (4) the "old-old," and (5) those living alone. Statistical portraits, sketched with data from surveys of the utilization patterns among the United States population, provided the most convincing evidence of access problems for these particular groups. The main statistical evidence pertaining to the access difficulties confronting each of these groups is presented in table 1. The two major types of health services covered by Medicare are considered: ambulatory physician care and inpatient hospital care. For each service, three measures of use are reported: (1) the likelihood that a typical elderly person in a particular subgroup makes some use of a service, (2) the level of use among those actually using a particular service, and (3) the average level of use for all persons in a subgroup.

These measures of health services utilization were developed from published tabulations of Health Interview Survey (HIS) data collected during the three fiscal years (July 1963 through June 1966) preceding the program. (Published tabulations from any single year of the HIS failed to provide data on all the elderly subgroups for all the utilization measures. Therefore, table 1 combines estimates from selected years.) Since the HIS samples several thousand households of noninstitutionalized elderly persons, the measures in table 1 are statistically accurate indicators of the utilization experiences of the nation's noninstitutionalized elderly at the dawn of the Medicare program. (See the technical appendix for more information on the HIS.)

Family Income

The principal argument in favor of Medicare was that financial barriers inhibited many elderly persons from seeking care commensurate with their medical needs (e.g., see U.S. House of Representatives. Committee on Ways and Means 1964, 1965; see also Davis and Reynolds 1976). The argument had two main components. First, the poor were in generally worse health than the nonpoor, so their medical needs were greater. Yet, the poor, virtually by definition, were less able than the nonpoor to afford either private health insurance or the out-ofpocket expenses associated with medical care. The facts supported the arguments. For example, during the 1963 to 1965 period 86 percent of the lower income (less than \$3,000) elderly had one or more chronic health problems, as compared to only 77 percent of the higher income (\$7,000 and above) group. Similarly, members of the lower income group were 1.5 times as likely (31 percent versus 20 percent) to be limited in the amount or kind of their major activity (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1966).

Health Services Ut	tilization amo	ng Various E	TABLE lderly Populat	1 ion Subgroups, du	tring Selected	Pre-Medicare	Periods"
		Annus	ıl use of physici	an services ⁶	An	nual use of inpo hospital service	ttient S
		D	uly 1963–June	1964)			
El John Station	Percent of	Probability	Number of visits	Average number of visits for	Probability of use (July 1965– 1	Number of days for users (July 1965-	Average level of use for all persons ⁶ (July 1963– Turor 1063)
Elderly population group			Dy users		June 1900	June 1900)) une 1907)
All Elderly Persons	100%	.088	9./	0./	150	1	2.4
Income							
\$2,999 or less	51	.674	9.0	6.0	.125	15.6	2.3
3,000-6,999	31	.705***	10.3**	7.3	.134	15.4	2.4*
7,000 and over	18	.732***	10.0	7.3	.132	16.8	2.6***
Race							
White	92	.692***	9.7	6.7	.134***	/ ,	/ -
Nonwhite	x	.641	8.7	5.6	.079	/ ,	/ 2
Residence							
Metropolitan	60	.684	9.9	6.8	125	15.8	2.3
Nonmetropolitan	40	.694	9.4	6.5	138*	15.4	2.5**

612

$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{2}{2}$ $\frac{23}{7}$ $\frac{e}{2}$ $\frac{e}{2}$ $\frac{130}{14.8}$ $\frac{18.3}{2.8***}$ $\frac{2.8***}{14.8}$	greater than the utilization rate of the comparison group (i.e., lowest income, nonwhite, metropolitan, 65–74 years, or itves) at 90 percent confidence level for a one-tailed <i>t</i> -test of difference in means or proportions. greater than the utilization rate of the comparison group (i.e., lowest income, nonwhite, metropolitan, 65–74 years, or y greater than the utilization rate of the comparison group (i.e., lowest income, nonwhite, metropolitan, 65–74 years, or vives) at 95 percent confidence level for a one-tailed <i>t</i> -test of difference in means or proportions. <i>y</i> greater than the utilization rate of the comparison group (i.e., lowest income, nonwhite, metropolitan, 65–74 years, or itves) at 99 percent confidence level for a one-tailed <i>t</i> -test of difference in means or proportions. <i>y</i> greater than the utilization by the commic and dejmographic groups shown were not available for other time period prior to Medicare. Therefore, this table reports data from various selected years for the pre-Medicare period ride a complete representation of the utilization patterns across the various groups. In published tabulations reported in U.S. Department of Health, Education, and Welfare. National Center for Health Statistics for all elderly persons (15.7 days) is reported in U.S. Department of Health, Education, and Welfare. National Center for for all elderly persons (15.7 days) is reported in U.S. Department of Health, Education, and Welfare. National Center for the averoid probine of published breakdowns, the remaining entries in this column are approximations, calculated by first call effects. This approach establishes an estimate of the relative variation in hospital days ious groups. This relative distribution then provides the basis for creating the distribution of days (with an overall average for the pre-toted in U.S. This approach establishes an estimate of the relative variation in hospital days ious groups. This relative distribution then provides the basis for creating the distribution of days (with an overa
Age 65–74 75 years and over	Living Arrangement Living alone Living with relatives	* Significantly greater than the with relatives) at 90 percent co with relatives) at 90 percent co iving with relatives) at 95 per rest. Significantly greater than living with relatives) at 99 per "Detailed published tabulation a single year or other time peri Developed from published tab 1966. "The estimate for all elderly Health Statistics 1969. In the dividing the average level of ho of use (from the first column for across these various groups. The of 15.7 days) reported here.

Medicare and the Disadvantaged Elderly

613

While the medical needs of the lower income elderly were greater than those of the higher income group, the ability of the lower income group to pay for their care was clearly far less than that of the higher income group. As income declines, the financial burden of out-ofpocket medical expenses grows larger. Similarly, as income falls, the financial burden of private health insurance premiums rises, thereby discouraging the purchase of private coverage. Indeed, during the 1962 to 1963 period only 44 percent of the lower income group were covered through private hospital insurance, while 71 percent of the higher income group had such coverage (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1964b). Of course, some of those in the lowest income group qualified for medical care benefits through state medical assistance programs (Stevens and Stevens 1974).

Nevertheless, as the data in table 1 confirm, financial barriers still prevented those with smaller incomes from receiving levels of medical care commensurate with their needs. Although medical needs tend to rise as income declines, the use of health care services falls as income diminishes. For example, the probability of seeing a physician at least once during the year was 0.67 for the lowest income group, as compared to 0.71 for the middle-income group and 0.73 for the highest income group. (Both of these income-related utilization advantages are statistically significant at the 99 percent level of confidence.) Likewise, the probability of receiving some inpatient care varied directly with income, from 0.125 for the lowest income category to 0.132 for the highest income group, although this relationship was not statistically significant at conventional levels of confidence. A similar pattern emerges in connection with the level of use measures for both ambulatory and inpatient services. The evidence presented in table 1 reveals income to have a positive and statistically significant effect on both of these utilization measures. Notably, the relation beween income and utilization would be even more sharply defined had the published tabulations relied upon finer calibrations for the income categories (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1964a).

Race

A review of the congressional testimony concerning the then pending Medicare legislation reveals an apparent indifference—at least among

615

government officials and others testifying before Congress-toward possible racial inequities in the distribution of health care services among the elderly (U.S. House of Representatives. Committee on Wavs and Means 1964, 1965). Nevertheless, evidence presented in table 1 clearly suggests the presence of such racial inequities. During the period just prior to the advent of Medicare, both the likelihood of receiving any ambulatory care from a physician and the number of physician visits among those receiving such care was substantially lower for the nonwhite elderly than for the white elderly (.64 versus .69 for probabilities and 8.7 versus 9.7 for number of physician visits, respectively), although only the former disparity is statistically significant at conventional levels. Racial disparities in access to inpatient services were even more dramatic, with the probability of an elderly white person receiving inpatient care being nearly double the comparable probability for a nonwhite elderly person (the *t*-value for this difference is a highly significant 4.36). These disparities in utilization are striking indeed when the greater medical needs of the nonwhite elderly population are recognized. For instance, in the early 1960s about one of every four elderly nonwhites was completely unable to work or keep house, as compared to about one in seven for the elderly white population (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1965a).

Since nonwhites tend to have lower incomes than whites (in 1959, 63 percent of the elderly blacks lived in poverty as compared to 33 percent of the elderly whites [U.S. Department of Commerce. Bureau of the Census 1971]), it might be argued that the concern about access inequities arising from income differences constitutes an implicit concern about access disparities related to race. While such an argument has merit, it nevertheless overlooks other reasons why access disparities may be correlated with race. For example, nonwhites are more likely than whites to live in areas served by relatively few medical resources, such as rural areas in the South, or inner cities in urban areas. Further, racial disparities in the use of health services may have arisen from various forms of discrimination against nonwhites. Even if access disparities related to income differences among individuals were removed, the use of health services would probably still vary between whites and nonwhites for these two reasons alone. It is fairly evident, then, that removal of racial disparities in access to medical care was not among the principal objectives established for Medicare by the framers of the legislation.

In spite of this apparent early indifference to the access barriers confronting racial minorities, there is reason to believe that removal of at least some of these barriers became a goal of the program soon after, or even simultaneously with, its inception in 1966. Throughout the early to mid-1960s, civil-rights activities and the passage of civilrights legislation focused the attention of the entire federal government on racial problems and inequities. Presumably, the Medicare bureaucracy felt the same social and legal pressures. Indeed, they were obligated to enforce Title VI of the Civil Rights Act of 1964, which required institutional providers of medical care to furnish services without discrimination (U.S. House of Representatives. Committee on the Judiciary 1974).

Place of Residence

Explicit concern over access problems facing the rural elderly was expressed during the congressional hearings leading up to passage of the Medicare legislation. For example, Orville L. Freeman, then Secretary of Agriculture, testified before the House Ways and Means Committee that "the need for a hospital service insurance program for older persons in rural America is so great that it alone justifies your favorable action on this legislation" (U.S. House of Representatives. Committee on Ways and Means 1964).

The reasons for this concern over the rural elderly, relative to the urban elderly, were manifold. Their health problems were relatively more numerous and more serious. To illustrate, in the pre-Medicare period the fraction of the elderly population suffering from one or more chronic health problems was about 87 percent in rural areas compared to 80 percent in urban areas. Moreover, about one of every six elderly persons in rural areas was completely unable to work or keep house, in contrast to one of every eight elderly persons in metropolitan areas (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1966). Yet, the incomes of the rural elderly were relatively low. For example, as of 1959 nearly half of the rural elderly lived below the poverty line, as compared to only about a quarter of the urban elderly (U.S. Department of Commerce. Bureau of the Census 1971). Partly as a consequence of this income differential, the urban elderly were twice as likely as the rural elderly to have some form of hospital insurance coverage prior to Medicare,

with coverage rates of 69 and 34 percent, respectively (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1965b). Finally, medical resources were relatively scarce in rural areas (U.S. House of Representatives. Committee on Ways and Means 1964). Thus, in comparison to the urban elderly, the rural elderly had greater medical needs but smaller ability to pay for medical care.

Compounding this problem was the relative scarcity of health care resources in rural areas.

Paradoxically, the utilization measures reported in table 1 reveal no substantial disparities in the rates at which the urban and rural elderly used health services. In fact, the likelihood of an inpatient stay for those living in nonmetropolitan areas is significantly greater than for those living in metropolitan areas. The explanation for this seeming paradox is that rough equality in utilization still implies the existence of an access inequity, since the greater health problems of the rural elderly suggests the need for relatively more medical care for this disadvantaged group.

Age

During the deliberations leading up to passage of the Medicare legislation, concern was clearly expressed about the access problems confronting the more elderly population groups. On the one hand, the aging process was seen as leading to deteriorating health. For example, it was noted that as of 1960 almost one out of four persons age 75 or older was completely unable to work or keep house, as compared to only one out of ten persons in the 65 to 74 years age bracket (U.S. Department of Health, Education, and Welfare. Social Security Administration 1962). On the other hand, advancing age was also seen as leading to a declining ability to pay for necessary medical services, partly because of lower incomes and partly because of less extensive health insurance coverage among the older population groups (U.S. House of Representatives. Committee on Ways and Means 1964, 1965). Indeed, the average after-tax income in 1960 for persons 75 years of age or older was only about 77 percent of the average income for persons in the age bracket 65 to 74 years (\$1,723 and \$2,223, respectively) (U.S. House of Representatives. Committee on Ways and Means 1964). Further, among those 75 years of age or older, only 33 percent had hospital insurance, and 24 percent had surgical

insurance in 1959. In contrast, among those in the age bracket 65 to 74 years, 53 percent had hospital insurance, and 44 percent had surgical coverage (U.S. House of Representatives. Committee on Ways and Means 1964).

The factual evidence bearing on the relation between age and the use of health services during the pre-Medicare period (see table 1) is limited to broad averages, which, of course, may disguise underlying access inequities (e.g., in initial access to care). These broad utilization indicators reveal the older population group (75 years and above) to use somewhat more health services than the younger group (65 to 74 years). Both the expected number of physician visits and the expected number of inpatient days are significantly greater for the older group. However, in light of the considerably greater medical needs of the older population, their significantly greater utilization rates do not eliminate the possibility of an access shortfall, relative to the utilization rates attained by the less elderly group.

Living Arrangement

The final elderly population groups to be considered are those who live alone versus those who live with relatives. (Those few elderly who live with nonrelatives are not considered in this analysis.) Living arrangements were of concern to the framers of the Medicare legislation for a variety of reasons. On the one hand, elderly persons who live alone tend to have several characteristics which serve to impede access; on average, they are poorer and older than those elderly who live with relatives. For instance, among those elderly who lived alone in the early 1960s, about 62 percent lived in poverty and about 42 percent were 75 years of age or older. In contrast, among those who resided with relatives, only about 27 percent lived in poverty and approximately 33 percent were 75 years of age or older (U.S. Department of Commerce. Bureau of the Census 1971; U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1966). On the other hand, elderly persons who live alone may have a greater need for certain forms of medical care, such as longer hospital stays because they have no one at home to care for them (U.S. Department of Health, Education, and Welfare. Social Security Administration 1962; U.S. House of Representatives. Committee on Ways and Means 1964, 1965).

For the pre-Medicare period, the actual statistical evidence on the relation between living arrangements and the use of health services is sketchy. As indicated in table 1, reliable statistical measures of the influence of different living arrangements on the use of ambulatory services were not available during congressional deliberations on the Medicare legislation. At that time, the available information was limited to the connection between living arrangements and the use of inpatient services. These data supported at least some of the concerns about those who lived alone. While living arrangements were uncorrelated with the probability of being admitted to a hospital, they were clearly related to the length of stay, with those living alone averaging three to four days more in the hospital than those living with relatives, a difference significant at the 99 percent level of confidence (t = 4.81). This pattern is consistent with the view that poorer health and a reduced opportunity for home care forces those elderly who live alone into longer hospital stays than those who live with relatives, even though the financial burden of such extended stays tends to be greater for the former group than for the latter.

Outcomes under the Mature Program

In this section, the findings of a careful examination of the underlying sources of variation in use of health services by the elderly under the mature Medicare program are discussed. (A detailed description of the data and methods underlying these results is provided in the technical appendix.) The data for this evaluation pertain to 1977, a period eleven years after inception of the Medicare program. Presumably, after the passage of more than a decade, patients and providers in the medical marketplace would have fully adjusted their behavior to account for the presence of Medicare, thereby justifying reference to a "mature" program. Findings pertaining to such a program are much more likely to reflect long-run effects than are those pertaining to a newly established program.

The principal findings are reported in tables 2 through 5 and figures 1 through 4. In connection with each of these tables and figures, the intent is to consider, in some detail, the extent to which various determinants cause variation in the utilization of health services among the Medicare elderly. The following potential sources of variation in utilization are analyzed: (1) family income, (2) the interaction of race

	Ann	ual physician u	itilization		
	ar - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1994 - 1	One or n cone	nore chronic ditions	Annual hospital utilization	
Income level	No chronic conditions	No inpatient care	Some inpatient care		
At or below poverty standard					
Probability of use	.421	.909	.999	.246	
Level of use	2.07	6.68	9.91	13.24	
1.0 to 1.5 poverty standard					
Probability of use	.368	.948*	.999	.232	
Level of use	3.16*	7.01	10.52	11.00	
1.5 to 2.0 poverty standard					
Probability of use	.402	.931	.972	.232	
Level of use	2.60	7.16	10.30	12.78	
Greater than twice poverty standard					
Probability of use	.477	.905	.968	.227	
Level of use	2.81*	7.19	9 .77	12.16	

TABLE 2
Predicted Utilization of Health Services among the Elderly, by Family
Income and Health Status, Adjusted for Other Determinants

Source: Calculated from multivariate probit and OLS equations available from the authors.

* Significantly greater than the lowest income group's utilization at 95 percent confidence level for a one-tailed test.

and region of residence, (3) the interaction of health status and place of residence, (4) age, and (5) living arrangement. For the most part, this list of determinants or characteristics coincides with the set of characteristics used in table 1 to identify those elderly population groups disadvantaged to some degree by access barriers. (The differences between the present set of categories and those employed in the preceding section stem from differences in the data for the two periods; the individual-level data supporting the study of utilization under the mature program permit identification and measurement of significant interactions, relationships on which the published tabulations for the pre-Medicare period shed no light.) In evaluating the influence of each determinant, other influences on utilization are held constant. Medicare and the Disadvantaged Elderly

TABLE 3
Predicted Utilization of Health Services among the Elderly, by Race,
Region, and Health Status, Adjusted for Other Determinants

	Ann	ual physician ut	ilization		
One or more chronic conditions				Annual	
Race and region	No chronic conditions	No inpatient care	Some inpatient care	hospital utilization	
Southern whites					
Probability of use	.422	.931	.973	.273	
Level of use	2.48	6.66	9.44	11.75	
Southern blacks					
Probability of use	.362	.930	.969	.146***	
Level of use	3.63*	7.09	7.65*	12.23	
Nonsouthern blacks					
Probability of use	.328	.915	.999	.261	
Level of use	2.75	9.07***	9.87*	13.94	
Nonsouthern whites					
Probability of use	.443	.914*	.979	.237**	
Level of use	2.68	7.13*	10.45	12.69	

Source: Calculated from multivariate probit and OLS equations available from the authors.

* Significantly different from utilization rate of southern whites at 90 percent confidence level for a one-tailed test.

** Significantly different from utilization rate of southern whites at 95 percent confidence level for a one-tailed test.

*** Significantly different from utilization rate of southern whites at 99 percent confidence level for a one-tailed test.

Thus, the estimates, or predicted values, presented in the following tables reflect the separate influence of each determinant on utilization, after adjusting for other things (including not only those determinants listed above, but also sex, education, and the availability of medical resources; see the technical appendix for further detail).

Two types of predictions are reported in each table and figure: 1) the probability a person with certain specified characteristics has an initial contact with a health care provider during the year, and 2) the level of use (i.e., number of physician visits or inpatient days) among those experiencing an initial contact during the year. In addition, the tables and figures reveal whether observed variation in utilization is statistically significant.

	A	Annual physician visits				
		One or more chronic conditions				
Age	No chronic conditions	No inpatient care	Some inpatient care	hospital utilization		
65 to 74 years						
Probability of use	.426	.919**	.997**	.218**		
Level of use	2.54	7.21*	10.71**	12.15		
75 to 84 years						
Probability of use	.455	.935**	.969	.275		
Level of use	3.01	7.03*	9.76*	12.64		
85 or more years						
Probability of use	.377	.852	.961	.285		
Level of use	2.75	6.11	8.14	12.93		

TABLE 4 Predicted Utilization of Health Services among the Elderly, by Age and Health Status, Adjusted for Other Determinants

Source: Calculated from multivariate probit and OLS equations available from the authors.

* Significantly different from utilization of those 85 or more years old at 95 percent confidence level for a one-tailed test.

** Significantly different from utilization of those 85 or more years old at 99 percent confidence level for a one-tailed test.

These results are not immediately comparable to those presented in the preceding section on access during the pre-Medicare period. This lack of comparability is intentional inasmuch as the purpose of this section is to present the most accurate, disaggregated results possible for the mature program. The degree of accuracy and disaggregation of the evidence presented in the preceding section was determined by the level of detail offered in published tabulations of survey data. In the next section, the disaggregated findings of this section will be aggregated into a form comparable to the results for the pre-Medicare period.

The primary source of data for this part of the study is the 1977 Current Medicare Survey (CMS), a monthly panel survey of about 5,000 elderly Medicare beneficiaries. The CMS, conducted annually since 1967, was discontinued by the government after 1977. Designed to represent the universe of Medicare beneficiaries, the CMS provides detailed information about the socioeconomic, demographic, and health Medicare and the Disadvantaged Elderly

TABLE 5

Predicted Utilization of Health Services among the Elderly, by Living Arrangement and Health Status, Adjusted for Other Determinants

	Ann	Annual physician utilization				
		Annual				
Living arrangement	No chronic conditions	No inpatient care	Some inpatient care	hospital utilization		
Lives alone						
Probability of use	.380*	.882**	.968**	.251		
Level of use	2.94	6.89	9.20*	12.12		
Lives with a relative						
Probability of use	.452	.939	.990	.240		
Level of use	2.57	7.16	10.52	12.61		

Source: Calculated from multivariate probit and OLS equations available from the authors.

* Significantly different from utilization of those elderly living with a relative at 95 percent confidence level for a one-tailed test.

** Significantly different from utilization of those elderly living with a relative at 99 percent confidence level for a one-tailed test.

characteristics of the respondents. Moreover, it thoroughly documents the respondents' use of a variety of health services over a 15-month period (from October 1976 through December 1977). For this study, the CMS yields 4,303 observations on noninstitutionalized elderly Medicare beneficiaries and their families. (See the technical appendix for further detail on survey methods and for comparability with more recent survey data.)

Family Income

One of the principal concerns underlying the passage of Medicare legislation in 1965 was that the use of health services among the elderly declined as income grew smaller. Moreover, even some years following the inception of Medicare, inequities related to income were still evident (these seminal results, based upon 1969 data, appear in Davis 1975, Davis and Reynolds 1976, and Davis and Schoen 1978). However, in a recent paper, Link, Long, and Settle (1982b) reported the following findings, based upon an analysis of data from the 1976 Health Interview Survey:



FIG. 1. Physician utilization probabilities and levels for health/residence interactions: no chronic conditions—no inpatient stays. *Source:* Derived from multivariate probit and OLS equations available from the authors.

By 1976 the link between income and hospital utilization among the elderly covered by Medicare appears to have been greatly weakened, if not broken. Moreover, the influence of income on the demand for ambulatory care among those elderly Medicare enrollees with chronic health problems also seems to have weakened, if not entirely disappeared, by 1976. Only among those elderly with no chronic health conditions...does the use of physicians' services diminish significantly as income becomes smaller.

The present study largely confirms these latter conclusions. The evidence from analysis of the CMS is presented in table 2. Family



income is represented in this table relative to the federal poverty level in 1977 (\$2,906 for a single elderly person and \$3,666 for a twoperson household).

In connection with the use of inpatient hospital services, the 1977 CMS estimates reveal no statistically significant evidence of an income effect. That is, differences in family income apparently cause no systematic variation either in the likelihood of being hospitalized or in the length of stay.

The predictions in table 2 suggest a similar conclusion with regard to ambulatory care among those elderly Medicare beneficiaries with one or more chronic health problems. The level of use among the users of ambulatory services is not significantly affected by variation in income. Moreover, with a single exception, the likelihood of ex-



FIG. 2. Physician utilization probabilities and levels for health/residence interactions: chronic conditions—no inpatient stays.

Source: Derived from multivariate probit and OLS equations available from the authors.

* Urban rate significantly greater than the utilization of those in similar health but living in a rural area at the 90 percent level for a one-tailed test. ** Urban rate significantly greater than the utilization of those in similar health but living in a rural area at the 99 percent level for a one-tailed test.

periencing an initial contact is also insignificantly affected by changes in income.

Among those elderly with no chronic health problems, the analysis reveals no significant income effects on the probability of initial contact. However, the level of use in this group appears to be significantly affected by variation in family income. Relative to those elderly living

Medicare and the Disadvantaged Elderly



at or below the federal poverty standard, all three of the higher income groups have more physician visits, with two of these differentials being statistically significant.

Race and Region of Residence

In their studies of access under the early Medicare program, Davis and her collaborators uncovered evidence of racial inequities in access to medical care in the South in 1969. However, two studies using more recent data concluded that this pattern of apparent racial discrimination in access to health services seems to have been substantially altered by the mid-1970s (Link, Long, and Settle 1982b; Ruther and Dobson 1981). Specifically, Link, Long, and Settle (1982b) found that:



FIG. 3. Physician utilization probabilities and levels for health/residence interactions: chronic conditions—with inpatient stays.

Source: Derived from multivariate probit and OLS equations available from the authors.

* Urban rate significantly greater than the utilization of those in similar health but living in a rural area at the 95 percent level for a one-tailed test.

By 1976 racial differences in the utilization of physician services in the South seem to have disappeared completely. Significant differences remain in the rates at which southern blacks and whites utilize hospital services. However, . . . estimates suggest that some narrowing of these differences occurred between 1969 and 1976.

As in the case of income, the present analysis of the 1977 CMS largely confirms these recent findings. Table 3 contains the utilization predictions by race and region of residence, after controlling for other





determinants. Among those elderly Medicare beneficiaries with no chronic health problems, we find no statistically significant evidence of racial barriers to health care services in the South. To the contrary, after adjusting for other determinants, the level of use among southern blacks is actually significantly higher (although only at the 90 percent level of significance) than the level of use among southern whites.

Among those with one or more chronic health problems, the picture is somewhat more complicated. For those with health problems not requiring inpatient care (representing about 75 percent of all the elderly in this chronic-illness group), ambulatory utilization rates among southern blacks differ insignificantly from those of southern whites. However, among those southerners requiring some inpatient care during the year, the level of use of ambulatory services by blacks is only 81 percent that of whites—a disparity significant at the 90



FIG. 4. Hospital utilization probabilities and levels for health/residence interactions: chronic conditions.

Source: Derived from multivariate probit and OLS equations available from the authors.

* Urban rate significantly less than the utilization of those in similar health but living in a rural area at the 95 percent level for a one-tailed test.

****** Urban rate significantly less than the utilization of those in similar health but living in a rural area at the 99 percent level for a one-tailed test.

percent level of confidence. Examination of the effect of hospitalization on the use of ambulatory services provides another perspective on this racial inequality. Health problems requiring some inpatient care during the year also substantially increase the level of use of ambulatory services among southern whites—specifically, by about 42 percent or from 6.66 visits per year to 9.44. In contrast, southern blacks requiring inpatient care use only slightly more ambulatory services during the

Medicare and the Disadvantaged Elderly



year than those not experiencing a hospital stay (7.65 visits compared to 7.09 visits, respectively).

Finally, the estimates presented in table 4 contribute to the mounting evidence of continuing racial inequalities in the use of inpatient services by elderly Medicare beneficiaries living in the South. Although there are essentially no differences in the lengths of stay experienced by southern blacks and whites, there is a large, statistically significant racial disparity in the probability of being admitted to a hospital. In fact, the admission rate among southern whites is almost twice as high as that of southern blacks, after adjusting for other determinants of hospital utilization. The magnitude of this inequality is consistent with the racial disparities in inpatient use reported by both Davis and her collaborators and Link, Long, and Settle (1982b).

Health Status and Place of Residence

In this section, the interactive influence of health status and place of residence (i.e., urban or rural area) on the use of health services by the Medicare elderly is investigated. One of the concerns underlying the original Medicare legislation was that elderly persons in poorer health were particularly disadvantaged—because of relatively low incomes, high medical costs, and mobility problems—and, thus, faced the greatest barriers to receiving care commensurate with their medical needs. In addition, considerable concern was expressed about the access problems confronting elderly persons living in rural areas. Such persons tended to be in worse health but have lower incomes than their urban counterparts; their medical needs were greater but their ability to pay for medical care was less than that of the elderly population in urban areas.

As will become clear shortly, an elderly person's health status influences the use of health services differently depending upon whether the person lives in an urban or a rural area. Thus, it is necessary to examine the simultaneous effects of health status and urban-rural residence on health services utilization, rather than examining their separate and independent effects.

Throughout this part of the study, separate estimates are presented for the two different chronic-illness groups, the presence or absence of chronic health problems representing one important measure of an individual's health status. In this section, the influence of an additional health status measure on the use of health services is examined.

This health status measure indicates whether a person has "good," "fair," or "poor" health. Good health is attributed to those persons reporting no activity limitations and assessing their own health as being at least as good as the health of others of the same age. Fair health is assigned to those persons either reporting an activity limitation or assessing their health as being worse than that of others of the same age, but not both. Poor health is imputed to those persons reporting an activity limitation and assessing their health as worse than the health of others their age.

The joint effect of health status and place of residence on the ambulatory utilization rates among those elderly with no chronic health problems is depicted in figure 1. In examining the sources of variation in utilization among those with no chronic illnesses, the relatively small number of observations in the fair-health and poorhealth categories required that these two samples be combined. Thus, in figure 1 the utilization patterns for the fair- and poor-health groups are depicted as being the same. The panels of figure 1 reveal some apparent differences in utilization rates between the various groups, but none of these differences are statistically significant. Overall, the utilization rates among those with no chronic conditions are relatively low, and place of residence seems to have little influence on access to health care services for this group.

In contrast, utilization rates are much higher among those elderly with chronic health problems, and residing in a rural area provides a statistically significant deterrent to the use of ambulatory health services. Consider first those elderly in this chronic-illness group who required no inpatient services during the year. As depicted in figure 2, both the likelihood of an initial contact and the level of use tend to be significantly higher among those elderly living in urban areas than for those residing in rural areas. The interaction of poor health and rural residence serves to greatly lower the probability of an initial contact, relative to the utilization probabilities for the other health/ residence groups. The likelihood of no physician visits during the year for this group is nearly 20 percent, whereas it is closer to 5 to 10 percent for the other groups. Notably, the utilization patterns are reversed for those who actually use ambulatory services, holding place of residence constant. That is, those in poor health have more visits than those in fair health who, in turn, have more visits than those in good health. Although, once again, residing in a rural area impedes access to ambulatory health care services.

The utilization patterns depicted in figure 2 suggest the following conclusions, at least for those elderly with chronic health problems not requiring inpatient care during the year. Living in a rural area acts as a significant barrier to the use of ambulatory health services. Similarly, deteriorating health lessens access to ambulatory health services insofar as it lowers the probability of an initial contact with a physician during the year. However, for those who get over the barriers to initial contact, declining health leads to greater use of ambulatory health services, probably as a result of the physician's influence on the patient's utilization decisions.

On balance, the same ambulatory utilization patterns are depicted in figure 3 for those elderly with chronic health problems requiring some inpatient care during the year. Of course, within this group there is virtually no variation in the probability of seeing a physician for ambulatory care; for most of the elderly, a hospital episode is preceded or followed by at least one visit with a physician. However, the level of use does vary significantly in some instances. As suggested in the visits-per-year panel of figure 3, elderly persons in this particular group who reside in a rural area have about 1.5 to 2.0 visits per year less than their counterparts residing in an urban area. Thus, once again, rural residence serves to impede access to ambulatory health care services.

Finally, inpatient utilization also appears to be influenced by the interaction of health status and area of residence. These relations are depicted in figure 4. As indicated in the days-per-year panel, there is some tendency for length of stay to be somewhat longer for persons in either fair or poor health and living in an urban area. However, these differences between urban and rural areas are not statistically significant. In contrast, the predicted probabilities of being admitted to a hospital are lower for urban dwellers, at least for those in either good or poor health (the admission rates for those in fair health are essentially identical in the two areas). These differences are highly significant, especially for the poor-health group.

This pattern of lower ambulatory utilization rates and higher hospital admission rates for the rural elderly relative to the urban elderly lends itself to the following interpretation. The difficulty the rural elderly experience in obtaining ambulatory care (e.g., because of relatively high travel costs) may cause physicians to prescribe more inpatient treatment for such persons—treatment that might have been provided on an ambulatory basis for urban dwellers with similar health problems. Since institutional care is generally more costly than ambulatory care, this interpretation raises an efficiency concern as well as one of equitable access.

Age

The principal concerns over the access problems confronting the more elderly segments of the Medicare population arose from the fact that aging is often associated with worsening health and declining income. Yet, the findings reported in this part of the paper are based upon multivariate analyses which adjust for an individual's health status and income, among other factors. Naturally, the question then arises

Medicare and the Disadvantaged Elderly

as to whether any residual influence of age on utilization is of interest in this evaluation. While the health status variables explain a significant amount of the variation in the use of health services, they nevertheless provide only partial controls for the individual's state of health. Among the elderly, health status commonly worsens as a person grows older. Accordingly, the age variables in the utilization equation may be viewed as an additional indicator of a person's health status.

As a proxy for the underlying state of health, age probably provides an imperfect reflection of two major and, in some circumstances, perhaps opposing influences. On the one hand, as a person grows older deteriorating health status undoubtedly heightens the demand for health care services. However, on the other hand, as a person grows older mobility limitations may impede access to health care services, especially ambulatory services.

The utilization predictions reported in table 4 lend support to the hypothesis that age reflects opposing influences on the use of health services. In broad terms, these utilization patterns reveal a tendency to use fewer ambulatory services and more inpatient services as an elderly person grows older.

More specifically, in connection with inpatient care, persons 75 years of age and older are hospitalized nearly one-third more frequently than those elderly in the 65-to-74-year age group. However, length of stay is unaffected by the patient's age.

The pattern of use of ambulatory services is reversed, especially for those with chronic health problems. Among those with chronic-illness conditions, the likelihood of receiving any ambulatory care and the number of physician visits among the users both tend to fall significantly as a person ages. For example, the ambulatory utilization predictions for the group receiving no inpatient care during the year indicate that the probability of seeing a physician at least once declines from the 92-to-94-percent range for those less than 85 years of age to about 85 percent for those 85 years of age or older. Similarly, the level of use is about one visit a year less for the eldest group than for the other two age groups represented in table 4.

Among those with no chronic health problems, the probability of an initial contact with a physician also tends to decline with age, although this pattern is not a statistically significant one. The level of use among those with no chronic health problems seems unrelated, certainly in any statistically significant way, to the aging process. It seems reasonable to assume that this group is a relatively healthy one. Indeed, almost none of them required inpatient care during the year. Thus, the opposing influences identified above may not operate very forcefully within this group.

Living Arrangement

The utilization predictions for the two different living arrangements are reported in table 5. Notably, the predictions for hospital inpatient services reveal living arrangements among the Medicare elderly in 1977 to exert no significant influence on the use of those services. After adjusting for other determinants of inpatient utilization, there is no apparent evidence that care-giving by relatives substitutes for care received as an inpatient.

There is some indication that living arrangements may be responsible for some significant variation in the use of ambulatory health care services by the Medicare elderly. For each of the three categories of physician utilization represented in table 5, elderly persons living alone are significantly less likely to see a physician during the year than are their counterparts living with a relative. Moreover, in one instance (namely, for those with chronic health problems and who required inpatient care during the year), the level of physician use by those living alone is significantly less than for those elderly persons living with a relative.

The following conjectures about the underlying reasons for this utilization pattern are offered. First, elderly persons living alone may encounter greater transportation difficulties than those persons living with a relative. For example, an elderly person living alone and unable to drive an automobile is likely to encounter greater difficulty getting to a doctor's office than one living with a relative capable of driving. Second, familial interactions may be partially responsible for the higher utilization rates observed among those elderly persons living with a relative. For example, spouses may encourage one another to seek more frequent care than would be obtained if they lived alone.

Achievements, Shortcomings, and Unintended Consequences

In this section, the evidence on utilization rates presented in the preceding two sections is pulled together in an assessment of achievements, shortcomings, and unintended consequences of the Medicare program. The original access objectives of the program provide the benchmark for the assessment of the actual outcomes. However, before proceeding, it should be emphasized that at least some part of the changes in utilization patterns over this period is attributable to factors other than Medicare—for example, increased reliance on private supplementary (Medigap) insurance, growth in government transfer programs (such as Supplemental Security Income and Medicaid) benefiting the low-income elderly, improvements in the availability of medical resources, and simply attitudinal changes among both providers and patients. Nevertheless, the presumption remains that Medicare is the dominant source of change in the utilization patterns among the elderly.

The principal statistical evidence underlying this evaluation is presented in table 6. This table contains summary measures of ambulatory and inpatient utilization for both the pre-Medicare period (1963 to 1966), based upon table 1, and the mature-program period (1977), based upon tables 2 to 5 and figures 1 to 4. In contrast to the considerable disaggregation undertaken above to provide detailed estimates for outcomes under the mature program, table 6 is the result of aggregation over the various health status and other groups to arrive at a weighted average of the utilization levels for population groups comparable to those for whom utilization data are available from the 1963 to 1966 period. To facilitate gauging the extent to which access barriers have been lowered by Medicare, the utilization measures in table 6 are expressed in relative terms (e.g., utilization rates of whites relative to nonwhites, of higher income to lower income, and so forth).

Family Income

The relative utilization measures in table 6 reveal financial barriers to have represented a more substantial impediment to the elderly's use of health care services at the dawn of Medicare than under the mature program. All four utilization measures show the higher income elderly using more health services than the lower income elderly during the 1963 to 1966 period. However, these same broad aggregates reveal the income-related disparities in utilization to have disappeared by 1977. (As noted above, some minor inequities by income still exist within certain health status groups; however, the process of

rly population group ome: op half relative to bottom half e: Whites relative to nonwhites	Physic Probability 1.06 1.08	Prior to cian Use 1.13 1.11	o Medicare Hospi Probability 1.07 1.70	(tal Use 1.02	Thysic Probability .99 1.04	Under the r ian Use 1.00 .95	nature program Hospi Probability .89 1.17	ltal Use .98
nce: an relative to ıral	66.	1.05	.91	1.03	1.03	1.21	.57	1.10
/ears and above elative to 65 to 4 years	1.1	4	• 0.1 1.02	x	1.03	1.00	1.27	1.05
arrangements: se living with elatives compared o those living one	/ ,	/ ,	1.01	.81	1.06	1.04	.92	1.04

638

[&]quot; Data for 1963-1966 were not available from published tabulations.

developing aggregate utilization measures tends to obscure the evidence of access problems among the smaller subpopulations.)

Presumably, much of the credit for the access gains enjoyed by the lower income elderly over this 12-to-15-year period must go to the Medicare program, since it represents the principal source of health care financing for this group. However, other developments since the inception of Medicare have undoubtedly also helped to lower the financial barriers to medical care. For example, the use of private supplementary health insurance-to cover deductibles and copayments under Medicare-has grown over time. Similarly, public supplementation through Medicaid has expanded over time, a trend which surely contributed to the access gains enjoyed by the lowest income segment of the elderly population. In fact, by 1976 about 70 percent of the elderly Medicare population had some form of supplementary coverage to Medicare. Notably, this supplementation proportion-when both private and public supplementation rates are combined-does not vary substantially with income (Long, Settle, and Link 1982; Wilensky and Berk 1983), thereby weakening any tendency for the use of health services to vary with income.

Race

The aggregate utilization predictions in table 6 reveal elderly nonwhites to have enjoyed impressive gains in access to health care services between the pre-Medicare and mature-program periods. Prior to the inception of Medicare, the likelihood of receiving any ambulatory care and the number of physician visits among the users of physician services were both substantially greater for elderly whites than for elderly nonwhites. By 1977 the likelihood of seeing a physician during the year was still somewhat higher for whites than for blacks, although the disparity was smaller than that for the 1963 to 1966 period. In contrast, among the users of physician services blacks had slightly more visits than whites, even after adjusting for other determinants of utilization.

In connection with the use of inpatient services prior to Medicare, the apparent racial inequities were startling indeed. Admittedly, once elderly nonwhite persons gained entrance to a hospital, they experienced essentially the same length of stay as whites. (Although, since these pre-Medicare utilization rates are unadjusted and since nonwhites tended to be in poorer health than whites, equality in length-of-stay probably represents an inequitable outcome.) However, the likelihood of being admitted to a hospital during the pre-Medicare period was far greater—in fact, 1.7 times greater—for whites than for nonwhites. Undoubtedly, some of this racial disparity in admission rates during this period can be attributed to racial discrimination by some medical care providers. Nevertheless, some of it must also be attributed to the fact that, during this pre-Medicare period, elderly whites were much more likely than elderly nonwhites to purchase private hospital insurance.

As of 1977, the likelihood of being admitted to a hospital continued to be substantially higher for whites than for nonwhites (at least in the South). However, this gap between the races, while still substantial, has been narrowed enormously from its 1963 to 1966 magnitude. As with the pre-Medicare racial inequality in hospital admission rates, the inequality under the mature program probably arises from two principal sources: (1) racial discrimination, particularly in the South; and (2) a greater tendency for whites to acquire some form of supplementary health insurance coverage, even after accounting for racial differences in income, education, and so forth (Long, Settle, and Link 1982).

The effect of race on access to health care services probably has been diminished by a variety of forces, much as was the effect of income on access. Civil rights legislation, changes in attitudes, and the growth of social programs such as Medicaid have undoubtedly all helped to narrow the access disparities between whites and nonwhites. Nevertheless, there is surely a presumption in favor of awarding to Medicare much of the credit for the reduction of these racial inequalities in access to health care services.

Place of Residence

At the dawn of Medicare, the use of health services by the elderly exhibited some variation by place of residence (i.e., either in a metropolitan or a nonmetropolitan area). The main differences during this earlier period arose in connection with the number of physician visits by users of ambulatory services and the likelihood of being admitted to a hospital; urban dwellers received somewhat more ambulatory care but were somewhat less likely to be hospitalized than rural dwellers. Under the mature program, the influence of place of residence on the use of health services seems to have been greatly amplified. With regard to ambulatory care under the mature program, urban dwellers were slightly more likely than their rural counterparts to receive some physician care during the year; however, among the actual users of ambulatory care services in 1977, urban dwellers received substantially more—in fact, 21 percent more—such care than rural dwellers. In contrast, rural elders were almost twice as likely as their urban counterparts to be hospitalized, although for somewhat shorter lengths of stay.

The predicted utilization levels for the mature-program period are derived from multivariate equations which control for a variety of determinants of utilization. Thus, the variation in utilization between urban and rural dwellers is not attributable to urban-rural differences in such factors as health status, income, age, sex, race, or education. What then explains the rather substantial differences in the use of health services by urban and rural elderly persons, differences apparently accentuated by the Medicare program?

A plausible explanation is that the amplification of urban-rural utilization differentials arises from an urban-rural difference in Medicare's effect on the "full" price-that is, out-of-pocket expenses plus the implicit value of travel and waiting time-perceived by users of health care services (Acton 1975). The average travel time for a physician visit is 19 percent longer for the elderly residing in nonmetropolitan areas than for their metropolitan counterparts (authors' tabulations from the 1978 Health Interview Survey). Yet physicians' allowable charges under Medicare-and, hence, the required coinsurance payments by the elderly-are 20 percent lower in nonmetropolitan areas for an identical market basket of services (authors' tabulations of the 1975 county-level fee index described in Burney et al. 1978). Therefore, on average, waiting and particularly travel time costs would represent a larger proportion of the full price confronting rural dwellers than they would for urban dwellers. Moreover, travel time and waiting time costs would represent a relatively larger fraction of the full price for ambulatory care than they would for inpatient care, due to the fact that the average expenditure for a physician visit is far less than the average expenditure for a hospital stay. Consequently, Medicare, which lowers out-of-pocket expenditures for the elderly, would have two effects on relative prices for medical care: (1) it would lower the

full price of ambulatory care relatively more for urban dwellers than for rural dwellers; and (2) it would lower the full price of inpatient care relative to the full price of ambulatory care proportionately more for rural dwellers than for urban dwellers. These changes in relative prices would induce: (1) a relatively greater increase in the demand for ambulatory care among urban dwellers than among rural dwellers, and (2) greater substitution of inpatient care for ambulatory care among the rural elderly than among the urban elderly.

In summary, while Medicare has benefited both urban and rural elderly persons, it appears to have benefited the urban elderly relatively more than the rural elderly, at least in connection with the use of ambulatory health care services. In addition, it seems to have induced a rather significant substitution of inpatient for ambulatory services among those residing in rural areas. This observation leads naturally to the issue of whether such substitutions represent an efficient means for delivering care to the rural elderly. Indeed, there may well exist considerable opportunity for reducing program costs by encouraging development of lower cost ambulatory care alternatives for the rural elderly.

Age

During the pre-Medicare period, the older and consequently more infirm segments of the elderly population (e.g., those of age 75 or above) made somewhat greater use of health services than the younger and healthier segments of the elderly population (e.g., those in the 65 to 74 age category). This disparity in utilization rates gives rise to no obvious equity concerns because of the underlying health status difference between the older and younger parts of the elderly population. In fact, equity could conceivably have been served by an even further widening in this disparity in the rates at which the different age groups use health services.

The evidence for the mature program suggests that Medicare successfully stimulated the use of health services relatively more among the elder groups (i.e., those aged 75 years or more). However, these relative gains in utilization are limited to the inpatient-services category.

While the predictions for the mature-program period are derived from multivariate equations which control for a variety of utilization determinants, the presumption that the age variable continues to serve as a proxy for health status nevertheless remains. Even if the broad indicators of health status are the same for two elderly persons, an illness is more likely to represent a serious, even life-threatening situation for the older of the two. Accordingly, the increase in inpatient utilization among the more elderly, apparently induced by Medicare, may well represent a desirable change—that is, a change resulting in the delivery of additional medical care to those most in need of it.

However, some of this increase in the use of hospital inpatient services may have been motivated by somewhat different reasons. With the exception of an initial deductible (roughly equal to the average daily charge for a semiprivate hospital room), Medicare pays for all allowable charges incurred during a hospital stay. Inpatient stays can, therefore, be quite inexpensive for many Medicare beneficiaries, particularly for those with supplementary coverage that pays for the initial deductible and some of the other charges not allowable under Medicare. The absence of significant cost-sharing with patients creates incentives to overutilize inpatient services. With out-of-pocket costs substantially reduced, if not eliminated, tests or procedures offering a negligible likelihood of enhancing patient health will nevertheless seem worthwhile to both physician and patient. While these tendencies apply to all age groups among the Medicare elderly, they presumably apply with greater force the older the group under consideration. Thus, the observation that the use of inpatient services tends to rise with age may suggest an equitable improvement in the distribution of health care services among the Medicare elderly, or it may suggest the presence of incentives capable of yielding an inefficient distribution of health care services among the elderly.

Living Arrangement

At the dawn of Medicare, there was a clear relationship between living arrangements and patterns of inpatient hospital utilization. The elderly who lived alone and the elderly who shared their residence with relatives were equally likely to be hospitalized during the year, both groups presumably facing significant out-of-pocket burdens for each day of care, once they were admitted. Yet among the elderly with hospital episodes, lengths of stay by those who lived alone were 23 percent (or four days per year) longer than for those who would return to homes with relatives. It seems reasonable to attribute much or all of this difference in inpatient days to the opportunity for relatives to substitute their own care for expensive inpatient hospital care.

In stark contrast to this earlier pattern is the finding of no statistically significant differences in hospital utilization by living arrangement under the mature program. While there remains a financial deterrent to hospital admissions under Medicare, in the form of the deductible, the lack of any coinsurance for the next sixty days of care removes the financial incentive for relatives to undertake the burdens and responsibilities of home care. Our finding of equalized lengths of stay by living arrangement suggests that the provision of social insurance not only lessened relatives' financial liabilities, but their home care burdens as well. While we cannot judge whether this substitution is an efficient one-indeed the added inpatient care may be beneficialit represents a sizable and presumably unintended transfer from nonelderly taxpayers to elderly and nonelderly relatives of those who become hospitalized. This substitution from home to market also represents a source of significant increases in national health expenditures that has previously gone unmeasured.

Conclusion

In general, many of the most severe inequities in access to health care that gave rise to Medicare have since been corrected, representing a major achievement of the program. However, this paper identifies both some stubborn, unresolved access problems and some unintended side effects that may have cost-increasing consequences. A significant achievement is that substantial income-related barriers to equal access that existed prior to Medicare have, with only minor exception, disappeared. Much the same can be said of racial differences, where startling pre-Medicare access gaps for nonwhites have all been narrowed, most to complete equality. However, access to hospital services among southern blacks, after over a dozen years of Medicare, still lags embarrassingly far behind that of southern whites. Pre-Medicare differences by residence-specifically, that urban dwellers received somewhat more ambulatory care but were somewhat less likely to be hospitalized than rural dwellers-have been exacerbated under the program, leading us to question the efficiency of the highly inpatient-intensive pattern of care for the rural elderly. Under the mature program a widening differential in hospital utilization between the 65 to 74 and the 75and-over age groups is observed, much of it presumably correcting for past disadvantage. Prior to Medicare, the elderly who lived with relatives had shorter hospital stays, in all likelihood as a result of home care provided by their relatives. Yet, there has since been a complete equalization of hospital lengths of stay between the elderly living alone and those living with relatives, apparently as a result of program-financed free care being substituted for relatives' care. As policy makers continue to address the interminable Medicare cost problem, they should strive to preserve the impressive accomplishments documented here. They should also seek correction of the Southern hospitalization differential and the unintended side effects by place of residence.

Technical Appendix

Data

The Health Interview Survey (HIS) contains information on the illnesses, injuries, chronic conditions and impairments, and medical care utilization of the civilian, noninstitutionalized population of the United States. The data are collected through an interview survey administered to a continuing nationwide multistage probability sample of households. Each year of HIS data includes approximately 42,000 households containing about 134,000 persons living at the time of the interview. A series of statistical reports (*Vital and Health Statistics*, Series 10) provides the public with key findings. Since the 1969 HIS, magnetic data tapes have been available to researchers through the National Technical Information Service. However, prior to 1969 the available data are limited to published reports, which contain only selected tabulations of the data for selected years, thereby rendering multivariate analyses impossible.

Details concerning the source of and limitations in the HIS data are available in the annual *Current Estimates* series (e.g., U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1978) and in the specialized reports from which the data in table 1 were taken (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1966, 1969). In general, they are not repeated here. However, certain aspects of the HIS deserve

emphasis. Because the HIS sample is limited to living persons who reside in the community (i.e., the noninstitutionalized), measures of hospitalization based upon respondents' twelve-month recall will generally be lower than those obtained from hospital discharge data that include persons who died or were subsequently institutionalized. However, since the purpose of this paper is to document the relative inequities among elderly subgroups, the omission of these persons should not seriously bias the results. Strictly then, the findings are limited to that vast majority of the elderly who lived outside institutions during the year prior to the interview. The measures of physician visits include "consultation with a physician, in person or by telephone, for examination, diagnosis, treatment, or advice." Physician consultations may be at home, office, hospital outpatient clinic or emergency room, company or industry health unit, by telephone, or at another site, but do not include consultations while a hospital inpatient (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1966).

The Current Medicare Survey (CMS), conducted from 1967 through 1977, was initiated to supplement the information provided by Medicare eligibility and claims data. Specifically, the CMS collected information on physician, hospital, skilled nursing facility, and home care; prescription drugs; conditions treated; bills and sources of payment; and respondent characteristics including income, age, race, marital status, living arrangements, and place of residence. (For purposes of this paper, the CMS data are superior to Medicare administrative data in that they provide information on income and on physician use prior to meeting the Medicare deductible.) The CMS is a self-weighting sample survey designed to represent the universe of persons enrolled for Medicare Supplementary Medical Insurance in the 50 states and the District of Columbia. A two-stage sampling design was employed, the first stage comprising 105 primary sampling units and the second a systemic sample from the Medicare Statistical System's 5 percent sample of persons enrolled. About 5,000 persons were selected each year and remained in the sample for a 15-month interview cycle. Utilization, condition, and payment data were collected by means of monthly personal interviews, and augmented by a single demographic survey and administrative records data.

Some of the important background and health characteristics of the CMS sample are described in table A-1. Also represented in this table

is the distribution of these various characteristics among the entire elderly population of the United States in 1977 (nearly all of whom are covered by Medicare). As anticipated from the self-weighting feature of the sample, these two sets of descriptive statistics correspond closely. They confirm that results of this analysis can be extrapolated with confidence to the elderly Medicare population in general. Moreover, there is limited evidence that the 1977 utilization patterns described here are similar to utilization patterns observed in more recent periods. In a report on medical care use and expenditure by the elderly in 1980, Kovar (1983) finds little variation in total expenditure for subgroups of elderly people when they are classified by income and race. Specifically, "poor elderly people did not receive significantly less medical care" (Kovar 1983, 3).

Detailed descriptions of the CMS sample and methods, as well as several years of tabulations, have been collected and reprinted by the National Technical Information Service (U.S. Department of Health, Education, and Welfare. Social Security Administration 1981). Only three points require further discussion here. The CMS definition of a physician visit is comparable to that of the HIS. Specifically, a visit involves either seeing a physician or talking with one on the telephone, excepting periods of hospitalization. A key stratifying variable in the analyses of CMS data is the presence or absence of one or more chronic conditions. This variable was constructed from the CMS condition information on the hospital and physician records to match, as closely as possible, the definition of chronic condition used in the HIS. That definition comprises conditions having lasted more than three months or being one of a list of 34 conditions considered chronic regardless of the recency of onset. These include arthritis or rheumatism, cancer, diabetes, hardening of the arteries, heart trouble, high blood pressure, and stroke (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1978, 51-2). An important feature of the CMS is the panel design, which permits the use of health services to be measured monthly. Accordingly, while this paper analyzes annual utilization patterns (derived by simply aggregating the responses to the monthly inquiries), it is, nevertheless, based ultimately on measures of monthly utilization rates. Often, annual utilization rates (e.g., as provided by the HIS) are based upon answers requiring 12-month recall and, thus, may be measured with error. The more careful measurements provided by the CMS should enhance

Selected Characteristics of the 197	TABLE A-1 77 Current Medicare Survey (CMS)	Sample and the U.	S. Elderly Population	i in 1977
	CMS		U.S. elderly	population ⁶
Individual characteristic	Observations	Percent	Number (millions)	Percent
Income At or below poverty	804	19	3.3	14
Above poverty	3,499	81	20.6	86
Race Black	305	L	2.0	œ
White	3,998	93	21.7	91
Residence	×13 C	57	0 71	67
Metupultan area Nonmetropolitan area	1,489	35	9.1	38
Age				
65 to 74	2,552	59	14.6	61
75 to 84	1,382	32	7.3	31
85 and over	369	6	2.0	80
Living arrangement	1 40 1	7 6	с Т	
Living alone Living with a relative	1,461	54 66	1.2	06 70

	21 $d/$	79		74 74	18	œ	
	896	3,407		3,168	792	343	
Health Status	No chronic health problems	One or more chronic health problems	Health status: self assessment/activity limitations [:]	"Good" health	"Fair" health	"Poor" health	

The 1977 CMS (U.S. Department of Health, Education, and Welfare. Social Security Administration 1981) collected information on about rom U.S. Department of Commerce. Bureau of the Census (1982b); residence from U.S. Department of Commerce. Bureau of the Census (1978); and living arrangement from U.S. Department of Commerce. Bureau of the Census (1979). Breakdowns based upon 1970 census controls were adjusted to reflect the revised estimate of the 1977 elderly population total based upon the 1980 census (U.S. Department of 5,000 elderly persons. However, for the purposes of this analysis, the CMS provides complete information on 4,303 persons. For the most Sources of data on the U.S. elderly population: income from U.S. Department of Commerce. Bureau of the Census (1982a); race and age part, observations were excluded from the sample because of nonreporting of important information (e.g., income, health status).

nealth as being at least as good as the health of others of the same age. "Fair" health indicates a person either reported an activity limitation These health status measures are defined as follows: "Good" health indicates a person reported no activity limitations and assessed their or assessed their health as being worse than the health of others of the same age, but not both. "Poor" health indicates a person both reported an activity limitation and assessed their health as worse than others of the same age.

U.S. population counts for health status groups are not available.

Commerce. Bureau of the Census 1982b).

the likelihood of detecting inequities in the patterns of health services utilization among the Medicare elderly.

Notably, prior to this study the CMS has not been used to examine the multivariate sources of variation in health services utilization among the elderly. Historically, use of the CMS data has been limited to descriptive studies, usually based on relatively simple cross-tabulations of two or three variables (U.S. Department of Health, Education, and Welfare. Social Security Administration 1981).

Methods

The methods employed in analyzing the information from the pre-Medicare period were largely determined by the form in which the data for that period came: published tabulations. Thus, only limited comparisons of unadjusted utilization patterns between the various subpopulations were possible. In fact, utilization data for some of the groups were not available, rendering even comparisons of unadjusted utilization rates impossible.

In connection with these published tabulations for the pre-Medicare period, the text (and table 1) report the results of statistical significance tests for differences in means or proportions. These tests were conducted in accordance with the procedures described in *Vital and Health Statistics*, Series 10, Numbers 32 (U.S. Department of Health, Education, and Welfare. National Center for Health Statistics 1966, 65–68) and 50 (U.S. Department of Health, Education, and Welfare. National Center for Health, Education, and Welfare. National Center for Health, Education, and Welfare tests were taken from the standard errors for the significance tests were taken from the standard-error charts contained in the above publications (pp. 69–72 and 47–48, respectively).

The individual-level data from the CMS permit a sophisticated multivariate analysis of the sources of variation in the use of health services by the Medicare elderly. Four measures of health services utilization are employed: (1) the probability of receiving any ambulatory care during the year, (2) the probability of receiving any inpatient care during the year, (3) the number of physician visits during the year, and (4) the length of stays in short-term hospitals during the year. The analysis is conducted within the context of a multivariate model designed to isolate the independent influence of a variety of socioeconomic and health-related factors on the elderly's use of ambulatory and inpatient health services. As this empirical model of health services utilization is conventional, it is not developed in detail here. The model is more thoroughly developed, for example, by Davis and Reynolds (1976), Leopold and Langwell (1978), and Link, Long, and Settle (1982b). Essentially, the model accounts both for (1) those individual characteristics (including health status, age, income, sex, education, race, and living arrangement) likely to affect the demand for medical care, and also for (2) the availability of medical resources.

However, one issue pertaining to the empirical model of utilization merits further discussion. The CMS reveals whether a beneficiary has some form of supplementary health insurance coverage, either private, Medigap coverage or public supplementation (through Medicaid). Yet, the empirical model contains no variables to control for this particular determinant of utilization. The reason for omitting supplementary coverage variables from the empirical model is as follows. The likelihood of receiving Medicaid benefits and the likelihood of acquiring private supplements to Medicare are both functions of income (among other factors). Thus, changes in income may affect utilization patterns, either directly by changing the extent to which the cost-sharing provisions of Medicare act as a deterrent to use, or indirectly by inducing some changes in an individual's supplementation arrangements which, in turn, alters the net price of medical care for that individual. By omitting supplementary coverage variables from the estimating equations, the coefficient on the income variable reflects both of these influences on utilization. If supplementary coverage variables were included, the income coefficient would reflect the former (or direct) effect only. Presumably, an assessment of equitable access by income requires estimates of the total effect of income on utilization, rather than estimates of a partial effect of income on utilization.

The variation in the use of health services by the elderly is analyzed with the aid of two different multivariate estimation procedures. The effect of the various independent variables on whether an elderly person uses a health service at all during the year is assessed with the aid of the probit estimation procedure, since the dependent variable is qualitative (e.g., a person either has physician visits, or not). These probit equations, which will shed light on the sources of variation in the likelihood of initial contact with a health care provider, are estimated over samples which include both users and nonusers of a particular service. The influence of the independent factors on the level of utilization (i.e., either annual physician visits or hospital days) is investigated with ordinary-least-squares methods. These utilization equations are estimated over samples of users of a health service.

The samples for estimating these equations are limited to observations satisfying certain criteria. For example, they are restricted to observations on persons actually reporting their age, race, health status, and so forth. Moreover, observations on persons reporting exceptionally high levels of ambulatory or inpatient utilization were excluded from the samples. These outlying observations represent a small fraction (about 2 percent) of the overall CMS sample, and the likelihood they can be "explained" by conventional utilization equations is negligible. Furthermore, leaving them in the samples is potentially troublesome as they will bias the coefficient estimates for any variables with which they happen to be correlated. Thus, following standard procedures for identifying outlying observations (Grubbs 1950), all observations on individuals who used physician or inpatient hospital services at levels greater than 3.5 standard deviations above the respective mean utilization rate were excluded from the samples.

In a number of recent studies, Link, Long, and Settle (1980, 1982a, 1982b) have shown that an individual's health status often affects the demand for health care in two ways: (1) directly, and (2) indirectly, through interactions with other determinants of health care demand. The presence of numerous and significant indirect effects, or interactions, raises doubt over the appropriateness of analyzing utilization with data pooled across different health status groups. If there are underlying behavioral differences between health status groups, then pooling observations across those groups yields misleading estimates.

The previous work by Link, Long, and Settle (1980, 1982a, 1982b) suggests that behavioral estimates should be based on data stratified in accordance with the presence or absence of chronic health problems. This procedure is followed in the present paper. Among those with no chronic health problems, relatively few received inpatient care. (In effect, at least within the CMS sample, the absence of chronic health problems virtually assures avoidance of a hospital episode during the year.) Accordingly, the analysis of the determinants of hospital utilization is conducted with data pertaining to those with one or more chronic health problems only. The analysis of the determinants of physician use is not limited in this way. Among those with no chronic health problems, about 40 percent received care from a physician. Around 90 percent of those with chronic health problems saw a physician at least once during the year.

Examination of the data suggests one further stratification prior to analyzing variation in the use of ambulatory care services. Elderly persons who experienced a hospital stay during the year made significantly greater use of *ambulatory* health services than those not hospitalized. Undoubtedly, the underlying health problem responsible for the hospital episode also heightens the need for ambulatory care, probably both before and after the hospital stay. These effects of a hospitalization on the use of ambulatory services occur, at least in part, through interactions with other determinants of ambulatory care utilization. This observation caused us to divide the samples for analyzing sources of variation in ambulatory care into subsamples, reflecting whether or not a person experienced a hospital stay during the year. Since those with no chronic illnesses were rarely hospitalized, this stratification decision actually pertains to the sample of chronically ill persons only. Since the hospital admission rate among those with no chronic conditions is so low, it was not possible to estimate separate equations for those receiving inpatient care. Rather, those few observations on elderly persons with no chronic conditions but who received inpatient care during the year were simply omitted from the sample.

There is one potential problem in comparing the utilization rates for the pre-Medicare period with those for the mature-program period. The predicted utilization rates for the 1963 to 1966 period are derived from published tabulations which make no adjustments for other determinants of utilization. In contrast, the predicted rates reported for 1977 are derived from multivariate equations which adjust for other determinants. In general, comparisons between adjusted and unadjusted predictions are potentially misleading. However, in the present instance such appears not to be the case. While it is not now possible to develop adjusted predictions for 1963 to 1966 (since the individual data from those early periods are no longer available), it is, of course, possible to develop unadjusted predictions for 1977. A comparison of adjusted and unadjusted predictions for 1977 (not reported here) reveals some differences, but none of sufficient magnitude to warrant serious concern over the conceptually imperfect procedure of comparing adjusted predictions with unadjusted ones.

References

- Acton, J.P. 1975. Nonmonetary Factors in the Demand for Medical Services: Some Empirical Evidence. *Journal of Political Economy* 83 (June):595-614.
- Burney, I.L., G.J. Schieber, M.O. Blaxall, and J.R. Gabel. 1978. Geographic Variation in Physicians' Fees: Payments to Physicians under Medicare and Medicaid. *Journal of the American Medical* Association 240 (September 22):1368-71.
- Davis, K. 1975. Equal Treatment and Unequal Benefits: The Medicare Program. Milbank Memorial Fund Quarterly/Health and Society 53 (4):449-88.
- Davis, K., and R. Reynolds. 1976. The Impact of Medicare and Medicaid on Access to Medical Care. In *The Role of Health Insurance in the Health Services Sector*, ed. R.N. Rosett, 391-425. New York: National Bureau of Economic Research.
- Davis, K., and C. Schoen. 1978. Health and the War on Poverty: A Ten-Year Appraisal. Washington: Brookings Institution.
- Ginsburg, P.B., and M. Moon. 1984. An Introduction to the Medicare Financing Problem. *Milbank Memorial Fund Quarterly/Health and* Society 62 (2):167-82.
- Grubbs, F. 1950. Sample Criteria for Testing Outlying Observations. Annals of Mathematical Statistics 21:27-58.
- Kovar, M.G. 1983. Expenditures for the Medical Care of Elderly People Living in the Community throughout 1980. National Medical Care Utilization and Expenditure Survey. Data Report No. 4. Washington: Public Health Service, U.S. Department of Health and Human Services.
- Leopold, J.R., and K.M. Langwell. 1978. 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, Vol. 3, 46-93. Monroe, Wis.: American Medical Association.
- Link, C.R., S.H. Long, and R.F. Settle. 1980. Cost-Sharing, Supplementary Insurance, and Health Services Utilization among the Medicare Elderly. *Health Care Financing Review* 2 (Fall):25-31.

-----. 1982a. Access to Medical Care under Medicaid: Differentials by Race. Journal of Health Politics, Policy and Law 7:345-65.

------. 1982b. Equity and the Utilization of Health Care Services by the Medicare Elderly. *Journal of Human Resources* 17:195-212.

- Long, S.H., R.F. Settle, and C.R. Link. 1982. Who Bears the Burden of Medicare Cost Sharing? Inquiry 19 (Fall):222-34.
- Marmor, T.R. 1970. The Politics of Medicare. New York: Aldine.

Medicare and the Disadvantaged Elderly

- Ruther, M., and A. Dobson. 1981. Equal Treatment and Unequal Benefits: A Re-examination of the Use of Medicare Services by Race, 1967–1976. *Health Care Financing Review* 2 (Winter): 55– 83.
- Stevens, R., and R. Stevens. 1974. Welfare Medicine in America. New York: Free Press.
- U.S. Department of Commerce. Bureau of the Census. 1971. Social and Economic Characteristics of the Population in Metropolitan and Nonmetropolitan Areas: 1970 and 1960. *Current Population Reports*, series P-23, no. 37, Washington.

------. 1979. Statistical Abstract of the United States, 1979. Washington.

Level: 1982a. Characteristics of the Population below the Poverty Level: 1980. *Current Population Reports, Consumer Income*, series P-60, no. 133. Washington.

- ------. 1982b. Preliminary Estimates of the Population of the United States, by Age, Sex, and Race: 1970 to 1981. Current Population Reports, Population Estimates and Projections, series P-25, no. 917. Washington.
- U.S. Department of Health, Education, and Welfare. National Center for Health Statistics. 1964a. Medical Care, Health Status, and Family Income: United States. Vital and Health Statistics, series 10, no. 9. Washington.

—. 1964b. Health Insurance Coverage: United States, July 1962– June 1963. Vital and Health Statistics, series 10, no. 11. Washington.

-----. 1965a. Chronic Conditions and Activity Limitation: United States, July 1961–June 1963. Vital and Health Statistics. series 10, no. 17. Washington.

—. 1965b. Health Insurance, Type of Insuring Organization and Multiple Coverage: United States, July 1962–June 1963. Vital and Health Statistics, series 10, no. 16. Washington.

-----. 1966. Age Patterns in Medical Care, Illness, and Disability: United States, July 1963–June 1965. Vital and Health Statistics, series 10, no. 32. Washington.

—. 1969. Persons Hospitalized by Number of Hospital Episodes and Days in a Year: United States, July 1965–June 1966. Vital and Health Statistics, series 10, no. 50. Washington.

—. 1978. Current Estimates from the Health Interview Survey: United States-1977. Vital and Health Statistics, series 10, no. 126. Hyattsville, Md.

- U.S. Department of Health, Education, and Welfare. Social Security Administration. 1962. The Health Care of the Aged. Washington. ———. 1967. The Aged Population of the United States: The 1963
 - Social Security Survey of the Aged. Washington. . 1981. Current Medicare Survey Reports: July 1967-April 1976. Nos. CMS-1 through CMS-31. Reproduction no. PB 81-222523.

Springfield, Va.: National Technical Information Service.

- U.S. Department of Health and Human Services. Health Care Financing Administration. 1982. *The Medicare and Medicaid Data Book 1981*. HCFA pub. no. 03128. Washington.
- U.S. House of Representatives. Committee on the Judiciary. 1974. Title VI Enforcement in Medicare and Medicaid Programs. Hearings before the Subcommittee on Civil Rights and Constitutional Rights. 93rd Congress, 1st session. Washington.
- U.S. House of Representatives. Committee on Ways and Means. 1964. *Medical Care for the Aged.* Parts 1-5. 88th Congress, 1st and 2nd sessions. Washington.
 - -----. 1965. Medical Care for the Aged. Parts 1-2. 89th Congress, 1st session. Washington.
 - —. 1983a. 1983 Annual Report, Federal Hospital Insurance Trust Fund. Document no. 98-75. 98th Congress, 1st session. Washington.

. 1983b. 1983 Annual Report, Federal Supplementary Medical Insurance Trust Fund. Document no. 98-76. 98th Congress, 1st session. Washington.

Wilensky, G., and M. Berk. 1983. Medicare and the Elderly Poor. Testimony in Hearings on the Future of Medicare, before the Special Committee on Aging, U.S. Senate. 98th Congress, 1st session. Washington.

Acknowledgments: The authors thank Phil Welsh, Lauri Bechtel, Jay Crozier, Mark Miller, and Brenda Spillman for research assistance. The paper benefited considerably from the comments of three anonymous referees. This research was sponsored by grants from the AARP Andrus Foundation and the Health Care Financing Administration (#18-P-97874/2).

Address correspondence to: Stephen H. Long, Associate Professor of Economics and Public Administration, The Maxwell School, 400 Maxwell Hall, Syracuse University, Syracuse, NY 13210.