# The dually entitled elderly Medicare and Medicaid population living in the community

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This study shows that the elderly living in the community and covered by Medicare and Medicaid have a higher proportion of older persons, of minority races, and of women and are in poorer health than other aged persons covered only by Medicare. The noninstitutionalized poor elderly population use more health care services (especially inpatient hospital care) and have much higher per capita health care expenses compared to those covered by Medicaid. There were also large disparities in education and income. The study indicates that the Medicare program provides substantially more financial protection for all elderly persons living in the community than for the total elderly population.

## Introduction

For nearly two decades almost all aged persons in the United States have been entitled to some health care coverage. This coverage has been provided primarily through two publicly financed programs: Medicare for aged persons and Medicaid for the poor. Although these two programs are distinct and separate and quite different with regard to entitlement and eligibility requirements, a substantial proportion (over 3 million or about 15 percent) of persons 65 years of age or over are entitled to both.[1] In addition to Medicare and Medicaid coverage, nearly 70 percent of the aged population also carry private supplemental health insurance. Although some private supplemental plans offer benefits for services not covered by Medicare, most of the private policies are primarily designed to cover some or all of the deductibles and coinsurance under Medicare.

The population dually entitled to Medicare and Medicaid (commonly referred to as "crossovers") has been a focus of attention for some time. One reason for interest in the members of this group is that their health care needs are greater and thus, their utilization and costs are high relative to other aged persons. Policymakers need to recognize that changes in either of these major entitlement programs are likely to impact on the other. If benefits or eligibility are curtailed under Medicaid, persons also entitled to Medicare may substitute covered Medicare services for services that would otherwise have been covered under Medicaid. Similarly, increased cost-sharing under Medicare, will shift costs to Medicaid for the dually entitled. Although total expenditures might not change, State and Federal shares could change appreciably.

A second reason is that a high proportion of the entire aged population is at risk of becoming a part of the crossover population if their health becomes impaired and they require long-term nursing home care. Few persons have health insurance coverage beyond that for acute-care services. Nearly half of nursing home expenditures come directly from out-of-pocket payments; less than 1 percent comes from private health insurance. Almost half of Medicaid outlays for nursing home care for aged persons are for individuals who entered nursing homes as private-pay patients and who exhausted their assets and became dependent upon Medicaid (Long-Term Care Conference Proceedings, 1984). Data from the Health Care Financing Administration indicate that in 1981 Medicaid financed 45 percent of all nursing home care for the aged. With the changing demographics of the population, that is, the projected expansion in the number of persons 65 years of age or over, and the increase in the proportion who are very old, it is generally believed that the nursing home population will rise substantially over the next several decades. Unless there are changes in the financing and delivery of long-term care to the aged, the crossover population is likely to increase.

A third major reason for interest in the elderly Medicaid population is the continuing need of policymakers to understand the factors associated with poverty, medical indigence, and old age. Data from the Census Bureau show that the elderly population as a group today are better off financially than their parents. In 1959, 35 percent of the aged had incomes below the poverty level; in 1982 the figure declined to 15 percent (U.S. Census Bureau, 1982). Despite this improvement, it is a fact that there are over 3 million aged persons today with low income status and dependent upon Medicaid. To decrease the incidence of poverty and medical indigence in old age continues to be a challenge to public policy.

[1] The 3 million aged Medicaid enrollees who are also entitled to Medicare represent about 95 percent of all aged Medicaid recipients; the remaining 5 percent without Medicare do not meet the quarters of coverage required for Medicare or do not buy-in for Medicare coverage.

## Previous studies

Two earlier studies of those aged persons dually entitled to both Medicare and Medicaid analyzed their patterns of use of health care services under the Medicare program. These studies showed that the crossover population had a higher than average proportion of physician and ambulatory services and level of charges than did other Medicare enrollees (Piro, 1973; Peel and Scharff, 1973). Another study using data from the 1976 Health Interview Survey, focused on the effect of supplementation to Medicare coverage, that is, the presence of private supplementary insurance or Medicaid (Link et al., 1980). That study found that supplementation, whether private or public, increases utilization. Their findings suggest that some of the differences in utilization between the crossovers and other aged Medicare beneficiaries may be due to the greater comprehensive insurance coverage provided by Medicaid.

A recent study of the crossover population focused on demographic characteristics, use of Medicare services in 1978, and hospitalization and mortality rates (McMillan et al., 1983). Using the Medicare Statistical System (MSS), the study showed that the dually entitled population differed substantially by age, sex, and race from all other Medicare enrollees. The crossovers were considerably older, with 36 percent of the group 80 years of age or over, compared with 20 percent of all other Medicare enrollees. More than 70 percent of the dually entitled were women, compared with 59 percent for all other enrollees; 24 percent were races other than white, compared with 6 percent for all other Medicare enrollees.

The probability of being enrolled in Medicaid increases sharply with age. Among white persons 65-69 years of age, 5 percent were covered by both programs whereas by 85 years of age or over, 19 percent were covered; for minority persons 65-69 years of age or over, 23 percent were covered by both programs, and by 85 years of age or over, 51 percent were covered by Medicare and Medicaid.

The proportion of users of Medicare services was larger among the dually entitled than in the group with Medicare entitlement only, even after controlling for age. Average reimbursements per enrollee for crossovers of all ages were higher than for other Medicare enrollees.

Further findings showed that for certain diagnoses there were little differences in the rates of hospitalization between the dually entitled and all others. Hospitalization rates for the crossovers and others covered under Medicare were similar for the diagnostic groups consisting of neoplasms and diseases of the nervous system and sense organs. On the other hand, the hospitalization rates for crossovers were two or more times greater for certain other diagnostic groups—endocrine, nutritional, metabolic diseases; mental disorders; and diseases of the skin and subcutaneous tissues.

The death rate for the crossovers (standardized for age) was 1.5 times that for other Medicare enrollees. To determine if this higher mortality was primarily associated with the medically needy who enter the program because of illness and high medical bills, or if the poor generally have higher mortality rates than the nonpoor, we were able to separate out a group of crossovers receiving cash assistance under the Supplemental Security Income program from other crossovers. This separation showed that the mortality rate for the group including both cash assistance recipients and the medically needy was 70 percent higher than other Medicare enrollees whereas the mortality rate for the group comprised of only cash assistance recipients was 20 percent higher. In the cash assistance group, however, it was found that the mortality rate for persons 65-69 years of age was 50 percent greater. Thus the aged poor, both medically needy as well as cash assistance recipients, were found to experience notably higher mortality rates than the nonpoor, especially those 65-69 years of age.

Although knowledge was gained about the population with entitlement to both Medicare and Medicaid from that study, a number of questions could not be addressed due to limitations in the MSS. Although the MSS contains data on all Medicare enrollees (institutionalized and noninstitutionalized persons), the utilization data are limited to only those services covered under Medicare. Therefore, we could not analyze Medicaid costs or the total use and costs of health care services. The MSS contains only a few demographic variables such as age, sex, and race; no information is available on education, income, or health status. In addition, because institutionalized persons were included, it could not be determined if the higher medical care use and mortality rates found among the crossovers were primarily reflecting the characteristics of the institutionalized population.

## Current study

This article uses survey data gathered about the noninstitutionalized population of the United States. In addition to age, sex, and race characteristics, this study also analyzes data collected in two other important areas: socioeconomic information on education, income, health status, and functional limitations, and use of all medical care services. These data permit a comparison of the use of, and expenditures for, all types of medical care services by the noninstitutionalized Medicare population not enrolled in Medicaid with the noninstitutionalized aged jointly covered by both programs. There are two underlying questions in this study. Are the aged crossovers living in the community in poorer health than other aged persons? What roles do the Medicare and Medicaid programs play in the financing of health care services for the noninstitutionalized elderly?

## Sources of data

Data for this study were obtained from the national household component of the National Medical Care

Utilization and Expenditure Survey (NMCUES). The eligibility status of respondents for the Medicare and Medicaid programs was verified using the administrative records of the two programs. The survey was cosponsored by the Health Care Financing Administration and the National Center for Health Statistics. The data were collected by the Research Triangle Institute and its subcontractors, the National Opinion Research Center and SysteMetrics Inc.

The survey was conducted in five phases, beginning February 1980 through April 1981, and reflects the health care experience of the civilian noninstitutionalized population of the United States during 1980. The survey consisted of a national probability sample of 6,000 households (about 17,900 persons) representing Medicare and Medicaid populations, as well as, the general population. Because the data are based on a sample of households, there are sampling errors associated with the estimates in this article.

Five interviews were conducted with respondents. The first, second, and fifth interviews were conducted in person; the third and fourth were done primarily by telephone. The overall response rate was 89 percent. A core questionnaire containing batteries of questions on medical care utilization, expenditures, sources of payment, health insurance coverage, and employment was used in each interview. Persons reporting that some of their health care was paid for by Medicare and Medicaid were identified as crossovers. Questionnaire supplements were used in the first, third, and fifth rounds of interviews. The supplement for the first round contained questions concerning demographic and social characteristics, limitations in activity, and family income. The third round supplement included questions about access to care and the fifth round supplement included questions concerning employment during 1980, individual income by source, and functional limitations.

The data on enrollment were verified against the Medicare and Medicaid enrollment files; Medicare data on utilization were verified against Medicare claims data.

A limitation in these data is the exclusion of the institutionalized population. The exclusion of the institutionalized, however, allows us to examine the socio-demographic characteristics of poor aged persons living in the community. It also permits us to focus on the financing of health care services for the elderly living in the community.

# Findings

## Age, sex, and race characteristics

The findings reported are confined to Medicare covered persons 65 years of age and over in the survey. For this analysis we divided the Medicare population into two groups: with and without Medicaid coverage. The presence or absence of any other insurance coverage was not taken into account.

There were an estimated 23.5 million noninstitutionalized aged persons covered under Medicare in 1980.[2] Of these, 3.2 million (14 percent) were also entitled to Medicaid (Table 1). Among the crossovers, that is, persons covered by Medicare and Medicaid, about 30 percent were 65-69 years of age,[3] about 51 percent were 70-79 years of age, and about 19 percent were 80 years of age or over. The median age of the crossovers was 73.6 years. The age distribution for persons without Medicaid indicates that there is a larger proportion of persons in the youngest age group and a lower proportion 80 years of age or over. The median age for this group was 72.0 years.

The age distributions shown in Table 1 differ from those obtained from Medicare program data, which includes the institutionalized. The exclusion of the institutionalized from NMCUES removes more of the older Medicare enrollees. The median age of the crossovers from Medicare program data was 3 years older than the corresponding group from NMCUES. Similarly, the median age of the group without Medicaid from Medicare program data was about 1 year older than the corresponding group from NMCUES. These data illustrate differences in the age composition when the institutionalized are excluded and also show that the crossovers (with or without the institutionalized) are older than the population without Medicaid. Because age has a major impact on health status and use of services, age specific rates are shown throughout this article.

### Table 1

### Number and percent distribution of aged persons, by insurance coverage, age, sex and race: United States, 1980

| Age, sex, and race | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| | Number in thousands | | |
| **Total** | 23,477 | 20,245 | 3,233 |
| | Percent distribution | | |
| **Total** | 100.0 | 100.0 | 100.0 |
| **Age** | | | |
| 65-69 years [1] | 36.9 | 38.0 | 30.1 |
| 70-79 years | 48.0 | 47.6 | 50.8 |
| 80 years or over | 15.1 | 14.4 | 19.1 |
| **Sex** | | | |
| Male | 41.2 | 42.8 | 31.7 |
| Female | 58.8 | 57.2 | 68.3 |
| **Race** | | | |
| White | 90.1 | 92.3 | 76.0 |
| All other | 9.9 | 7.7 | 24.0 |

[1]Includes all persons 65 years of age and those who would become 65 years of age during the year; i.e., those persons 64 years of age on January 1, 1980.

SOURCE: National Medical Care Utilization and Expenditure Survey.

[2]The Medicare Statistical System data showed that 25.0 million aged persons were enrolled in Medicare in 1980. This figure, which includes the institutionalized, is about 7 percent greater than the NMCUES estimates.

[3]Includes all persons 65 years of age and those who would become 65 years of age during the year; i.e., those persons 64 years of age on January 1, 1980.

The NMCUES data show that females comprised about 7 out of 10 of the crossovers whereas, females were only about 6 out of 10 of the elderly population without Medicaid. Medicare program data showed similar results. To determine if the higher proportion of females in the crossover population was due to the older age composition of the crossovers, the data for the two populations were standardized (direct method) using the total Medicare population as the standard. The results showed that age differences between the two groups explained only 10 percent of the sex difference. These findings indicate that elderly women are in a poorer financial position than elderly men.

The NMCUES data show that persons of races other than white comprise 24 percent of the crossovers but only about 8 percent of those without Medicaid. These percentages are similar to data from the Medicare program.

## Socio-economic characteristics

We were interested in examining the level of education and income among the crossovers because the earlier studies indicate that these factors are associated with health status. It has been found that the proportion of persons who are severely or partially disabled was greater for those with less than 12 years of education than for all others, and greater for those with family income under $6,000 than for those with higher income (Health Interview Survey, 1977, Butler et al., 1981; Kitagawa and Hauser, 1973).

### Education

The crossover population had strikingly less formal education compared to persons without Medicaid. The vast majority of the crossovers, about 63 percent, had under 9 years of education compared to only about 39 percent for persons covered solely by Medicare (Table 2). Only 5 percent of the crossovers had 13 years or more of education; for the elderly Medicare population without Medicaid, about 4 times as many or 21 percent had 13 years of education or more.

### Table 2

**Number and percent distribution of aged persons, by insurance coverage and educational level: United States, 1980**

| Educational level | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| | Number in thousands | | |
| Total | 23,477 | 20,245 | 3,233 |
| | Percent distribution | | |
| All levels | 100.0 | 100.0 | 100.0 |
| Less than 9 years | 42.7 | 39.4 | 63.4 |
| 9-12 years | 38.1 | 39.1 | 31.5 |
| 13 years or more | 19.2 | 21.4 | 5.1 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

### Income

Family income (Table 3) includes all income, that is, wages, interest, transfer payments etc., in the household, unadjusted for family size. As expected, the crossover population was found to have much lower income levels. Nearly three-fourths (about 74 percent) of the crossovers had family income under $10,000 compared to over two-fifths (about 42 percent) of persons with that income level in the group solely with Medicare coverage. About 9 percent of the crossovers had family income between $10,000 to $14,999 compared to 23 percent in that category of income among other Medicare covered persons. Nearly 18 percent of the crossovers had income of $15,000 or more compared to about 35 percent for all others covered under Medicare.

### Table 3

**Number and percent of aged persons, by insurance coverage and family income: United States, 1980**

| Family income | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| | Number in thousands | | |
| **Total** | 23,477 | 20,245 | 3,233 |
| | Percent distribution | | |
| **Total** | 100.0 | 100.0 | 100.0 |
| Less than $10,000 | 46.7 | 42.4 | 73.6 |
| Less than $5,000 | 19.2 | 14.9 | 46.2 |
| $5,000-9,999 | 27.5 | 27.5 | 27.4 |
| $10,000-14,999 | 21.1 | 23.1 | 8.9 |
| $15,000 or more | 32.2 | 34.5 | 17.5 |
| $15,000-19,999 | 11.4 | 12.3 | 5.4 |
| $20,000-24,999 | 7.3 | 7.4 | 6.8 |
| $25,000-34,999 | 7.4 | 8.0 | 3.8 |
| $35,000 or more | 6.1 | 6.8 | 1.5 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

The official United States Government poverty level was approximately $5,000 for a family of two and about $4,000 for a family of one in 1980 (Bureau of Census, 1982). Among the crossovers, the proportion with family income, adjusted for family size, at or below the poverty level was about four times that for elderly persons without Medicaid (Table 4). Thirty-six percent of the crossovers had family income at poverty levels of 101 to 200 percent of the official standard compared to about 31 percent in the group without Medicaid. Families in this group are often considered "near poor." The remaining 21 percent of the crossovers had family income greater than 200 percent of the poverty level compared to 59 percent of persons covered by Medicare only. Thus, the crossover population had considerably less income than persons covered solely by Medicare.

These data raise certain questions. Why do some of the crossovers have incomes considerably above the poverty level? The National Medical Care Utilization and Expenditure Survey data indicate that about 20

## Table 4

### Number and percent distribution of aged persons, by insurance coverage and poverty level: United States, 1980

| Poverty level | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| | Number in thousands | | |
| **Total** | 23,477 | 20,245 | 3,233 |
| | Percent distribution | | |
| **Total** | 100.0 | 100.0 | 100.0 |
| Poverty level: | | | |
| 0-100 percent | 14.6 | 10.2 | 42.8 |
| 101-200 percent | 31.4 | 30.6 | 36.0 |
| More than 200 percent | 54.0 | 59.2 | 21.2 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

percent of the crossovers had income levels above 200 percent of the poverty level. One possible explanation is that some of these individuals may have had financial reverses during the year or large medical expenses for which they "spent-down" to the Medicaid level. Also this percentage may be high due to procedures used to impute missing income data.[4] Over 10 percent of the group without Medicaid had income levels at or below the poverty level. Several explanations for this finding are possible: these individuals may not have applied or they may have assets that are above the Medicaid requirements. In addition, State Medicaid eligibility requirements vary considerably and are likely to influence these results. Here too, it is possible that imputation procedures affected the results. The income imputed may have been lower than actual income in some cases, making persons appear to be eligible for Medicaid when they were not.

## Health status characteristics

A fundamental question of this study concerns the difference in the health status of the poor and the nonpoor. Respondents were asked to judge their health status as excellent, good, fair, or poor in comparison to other persons their age. Table 5 shows that about 38 percent of all aged noninstitutionalized persons under Medicare reported their health status to be fair or poor. Among the crossovers, more than half, 56 percent, perceived their health status as fair to poor, compared to about 35 percent of those without Medicaid coverage.

It might be expected that the proportion of persons in the fair-to-poor category would increase as age increases. The data for persons 65 years of age or over do not support this. As shown, age, sex, and

[4]Among Medicaid eligibles with high incomes (family income greater than $15,000 or personal income greater than $12,000) 72 percent had this income imputed; only 28 percent reported incomes at this level.

## Table 5

### Number of aged persons and percent with a perceived health status of fair to poor, by insurance coverage age, sex, and race: United States, 1980

| Age, sex, and race | Total Medicare (1) | Medicare without Medicaid (2) | Medicare and Medicaid (3) | Ratio of column 3 to column 2 |
|---|---|---|---|---|
| | Number in thousands | | | |
| **Total** | 23,477 | 20,245 | 3,233 | |
| | Percent in fair to poor health | | | |
| **All persons** | 37.5 | 34.5 | 56.1 | 1.6 |
| **Age** | | | | |
| 65-69 years [1] | 35.7 | 33.8 | 54.0 | 1.6 |
| 70-79 years | 38.6 | 35.3 | 59.2 | 1.7 |
| 80 years or over | 35.5 | 33.3 | 46.3 | 1.4 |
| **Sex** | | | | |
| Male | 37.2 | 35.7 | 50.4 | 1.4 |
| Female | 37.0 | 33.5 | 57.6 | 1.7 |
| **Race** | | | | |
| White | 35.8 | 33.4 | 55.5 | 1.7 |
| All other | 49.2 | 46.9 | 54.8 | 1.2 |

[1]Includes all persons 65 years of age and those who would become 65 years of age during the year; i.e., those persons 64 years of age on January 1, 1980.

SOURCE: National Medical Care Utilization and Expenditures Survey.

race characteristics had little relation to these rates.[5] The findings do show that for every age, sex, and race group, the crossover population had a far greater proportion who judged themselves in fair to poor health, compared with the general Medicare population.

As previously noted, far more of the crossovers stated that their health status was fair or poor compared to all others. Because perceived health status has been shown to be a valid measure, the crossovers, then, would be expected to have a higher proportion with some functional limitations. This is confirmed by the data in Table 6 that provides information on the proportion of persons with moderate to severe limitations. In the total population, about 31 percent reported moderate to severe limitations. Among the crossovers, nearly 53 percent had moderate to severe functional limitations compared to only 27 percent for elderly persons without Medicaid.

In contrast to the finding that age did not have a strong impact on perceived health status for persons 65 years of age or over, the proportion of persons with moderate to severe limitations did increase substantially with age for both the crossovers and all others covered by Medicare. For the crossovers, the proportion with moderate to severe functional limitations increased from about 42 percent for those in the youngest age group to about 66 percent for those 80

[5]For the population under 65 years of age, the proportion of persons reporting their health to be fair or poor rises with age. For the population under 18 years of age, 3.6 percent reported their health to be fair or poor. The corresponding percent for persons 18 to 64 years of age was 13.1 percent.

## Table 6

### Percent of aged persons with moderate to severe functional limitations, by insurance coverage, age, sex, and race: United States, 1980

| Age, sex, and race | Total Medi-care (1) | Medicare without Medicaid (2) | Medicare and Medicaid (3) | Ratio of column 3 to column 2 |
|---|---|---|---|---|
| | Number in thousands | | | |
| **Total** | 23,477 | 20,245 | 3,233 | |
| | Percent with moderate to severe functional limitations | | | |
| **All persons** | 30.6 | 27.1 | 52.8 | 2.0 |
| **Age** | | | | |
| 65-69 years [1] | 21.6 | 19.1 | 41.5 | 2.2 |
| 70-79 years | 33.0 | 29.3 | 54.4 | 1.9 |
| 80 years or over | 45.1 | 40.5 | 66.4 | 1.6 |
| **Sex** | | | | |
| Male | 27.6 | 25.6 | 44.3 | 1.7 |
| Female | 32.7 | 28.1 | 56.8 | 2.0 |
| **Race** | | | | |
| White | 29.7 | 26.6 | 53.1 | 2.0 |
| All other | 39.2 | 32.8 | 51.9 | 1.6 |

[1]Includes all persons 65 years of age and those who would become 65 years of age during the year; i.e., those persons 64 years on January 1, 1980.

SOURCE: National Medical Care Utilization and Expenditure Survey.

years of age or over. For the elderly Medicare population without Medicaid the corresponding figures were 19 percent in the youngest age group and about 41 percent for those 80 years of age or over.

The ratio of the proportion with moderate to severe functional limitations among the crossovers to all others covered by Medicare was greatest in the youngest age group. As shown, the proportion of crossovers 65-69 years of age with moderate to severe limitations was 2.2 times that for others under Medicare in this age group. For those 80 years of age or over the ratio fell to 1.6. Thus, this difference between the two populations in functional limitations lessened as age increased. This result is consistent with findings from the previous study (McMillan et al., 1983) that showed the difference between crossovers and all others in utilization, expenses, and mortality rates was greater for the group 65-69 years of age than for older age groups.

Among the crossovers, about 44 percent of the males had moderate to severe limitations compared to about 26 percent of the males without Medicaid, or a ratio of 1.7. Corresponding figures for females were about 57 percent and 28 percent, a ratio of 2.0.

## Crossovers receiving supplemental security income cash assistance

The poorer health status among the crossovers raises an important question: Is the lower level of health status found in the crossover population primarily reflecting the health status of the medically needy group (who qualify for Medicaid because of their health) or does it reflect the poor, who qualify for Medicaid because they receive cash assistance?

To answer this question, a special tabulation was generated for the crossovers receiving supplemental security income (SSI) cash assistance payments. This tabulation showed that of total crossovers in the community, approximately 60 percent received SSI payments. Further tabulations for the SSI cash recipients showed that their level of perceived health status and their level of functional limitations were similar to that of the crossovers without cash assistance. Therefore, the lower level of health status among the crossovers can be attributed to both groups of crossovers, the cash assistance group and the medically needy.

## Utilization

Before discussing the findings on utilization, it is important to have an understanding of the differences in benefit coverage between the group without Medicaid and the crossovers. The group without Medicaid have hospital and medical care coverage for acute care needs through the Medicare program. Several types of services that the aged often need, such as eyeglasses, prescription drugs, and dental care are not covered by Medicare. Nearly 70 percent of the Medicare population also have private supplemental insurance (Medigap) that primarily covers some or all of the deductible and coinsurance requirements under Medicare. The crossovers have much more comprehensive coverage. In addition to the coverage that Medicare provides, the crossovers have coverage from the Medicaid program which often covers drugs, dental services, long-term care needs, and other services that the aged often use.

Nearly all aged persons used one or more health care services in 1980. Table 7 shows the rates of use and per capita charges for the crossovers and for others covered by Medicare, by type of service. With regard to the number of persons served per 1,000 population, the proportion of crossovers who used some health care services in 1980 was not much greater than that for all others covered by Medicare— 963 per 1,000 compared to 912 per 1,000. Fairly large differences were found between the crossovers and all others for inpatient hospital services. The user rate for inpatient hospital services was 279 per 1,000 among the crossovers or 1.4 times the rate of 199 per 1,000 for all others under Medicare. The user rates for physicians' services were a little higher for the crossovers compared to all others covered by Medicare, 895 per 1,000 versus 801 per 1,000 or a ratio of 1.1.

Coverage for dental care under Medicare may be paid for only when the individual requires hospitalization for the dental work because of an underlying medical condition and clinical status. For persons without Medicaid, most dental services are paid for out-of-pocket because private coverage for dental services is limited. For the crossovers, 34 State Medicaid programs provide some dental coverage. As shown in Table 7, the rate of utilization for the crossovers (179 per 1,000) was only 50 percent of the rate for the population without Medicaid (346 per 1,000).

## Table 7

### Number of aged persons served per 1,000 covered and per capita charges, by insurance coverage and type of service: United States, 1980

| Type of service | Total Medicare (1) | Medicare without Medicaid (2) | Medicare and Medicaid (3) | Ratio of column 3 to column 2 |
|---|---|---|---|---|
| | Persons served per 1,000 covered | | | |
| All services | 922 | 912 | 963 | 1.1 |
| Inpatient hospital | 217 | 199 | 279 | 1.4 |
| Physician services [1] | 819 | 801 | 895 | 1.1 |
| Other medical provider services | 317 | 305 | 359 | 1.2 |
| Dental services | 329 | 346 | 179 | .5 |
| Prescribed medicine | 794 | 776 | 871 | 1.1 |
| Other medical services | 353 | 338 | 396 | 1.2 |
| | Per capita charges | | | |
| All services | $1,773 | $1,579 | $2,984 | 1.9 |
| Inpatient hospital | 1,303 | 1,131 | 2,379 | 2.1 |
| Physician services [1] | 241 | 225 | 341 | 1.5 |
| Other medical provider services | 40 | 39 | 50 | 1.3 |
| Dental services | 53 | 56 | 36 | .6 |
| Prescribed medicine | 98 | 94 | 122 | 1.3 |
| Other medical services | 37 | 34 | 56 | 1.6 |

[1] Includes only ambulatory services.

SOURCE: National Medical Care Utilization and Expenditures Survey.

The National Health and Nutrition Examination Survey, 1971-1975, examined persons 25-74 years of age. Data from the survey indicated that the proportion of the population seeing a dentist during the last 12 months increased sharply with income, rising from only 25 percent for persons with family incomes less than $4,000 to 62 percent for persons with family incomes of $15,000 or more (Hadden, 1980). Andersen et al., (1976) also reported that in 1970 the use of dental services differed by income as well as education. For persons 65 years of age or over, the proportion seeing a dentist rose from 16 percent in the group with income under $2,000 to 49 percent for persons with an income of $10,000 or more. Persons with 13 years or more of education were twice as likely to see a dentist, than persons with 8 years or less of education.

Perhaps the lower user rate for dental services among the crossovers (despite their apparent greater insurance coverage) is associated with their lower income and education. Another factor that may explain the relatively low use of dental services among the crossovers may be the lack of teeth. Data from the National Health and Nutrition Examination Survey, 1971-74 (Kelly, 1979) showed that by age 65, 46 percent of the population have lost all their teeth.

It may be that the crossovers have a substantially higher proportion who are endentulous and, hence would have fewer needs for regular check-ups and cleanings.

The lower bank of Table 7 shows the per capita charges for all services and for each type of service. It is interesting to note, that while the rates of persons served per 1,000 were often quite similar for the crossovers and others covered by Medicare, the per capita charges were quite different (with the exception of charges for dental services) pointing out the greater use of services by the crossovers. For all services, the per capita charges for the crossovers were $2,984, or 1.9 times the amount for all others covered by Medicare, $1,579. The per capita charges for the crossovers for inpatient hospital services were $2,379 compared to only $1,131 for all others or a ratio of 2.1. For physicians' services, crossovers had per capita charges of $341 compared to $225 for others or a ratio of 1.5.

As previously mentioned, the rate of persons served for hospital care for the crossovers was 40 percent greater than that for all other persons covered by Medicare; per capita charges were 90 percent greater. Table 8 shows hospitalization rates and per capita charges by age group. Crossovers 65-69 years of age were hospitalized at a rate of 267 per 1,000 compared to 174 per 1,000 for all others covered by Medicare, or a ratio of 1.5. In the oldest age group, 80 years of age or over, crossovers were hospitalized at a rate of 339 per 1,000 compared to 237 per 1,000 for all other Medicare persons, a ratio of 1.4. Ratios of per capita charges by age group were greater than their corresponding use rates.

In summary, in the previous study of the crossovers which included the institutionalized, we were unable to determine if the higher use and mortality rates found among the crossovers were primarily reflecting the characteristics of the institutionalized population. From this NMCUES study of the crossovers, it is clear that the noninstitutionalized crossover population is in substantially poorer health, and use more health services than other noninstitutionalized aged persons covered only by Medicare.

## Total charges and source of payment

As noted earlier, most aged persons are covered by Medicare, a program designed to cover acute hospital and medical care needs. Other services often required by the aged, such as long-term care, eyeglasses, dental care, and prescription drugs are not covered by Medicare and thus, require other sources of payment for services.

Table 9 shows total charges and the distribution of charges by type of service. Total charges were $41.6 billion for all services combined in 1980. About $9.6 billion of these charges or 23 percent were for services to crossovers and $32.0 billion or 77 percent were for services to others covered under Medicare. About 80 percent of the charges for the crossovers were for inpatient hospital care compared to about 72 percent for the group without Medicaid.

## Table 8

### Number of aged persons served per 1,000 covered and per capita charges for inpatient hospital care and physicians' services by health insurance coverage and by age: United States, 1980

| Type of service and age | Total Medicare (1) | Medicare without Medicaid (2) | Medicare and Medicaid (3) | Ratio of column 3 to column 2 |
|---|---|---|---|---|
| | | Persons served per 1,000 covered | | |
| **Inpatient hospital** | | | | |
| Total | 217 | 199 | 279 | 1.4 |
| 65-69 years [1] | 191 | 174 | 267 | 1.5 |
| 70-79 years | 221 | 207 | 264 | 1.3 |
| 80 years or over | 266 | 237 | 339 | 1.4 |
| **Physicians' Services** | | | | |
| Total | 819 | 801 | 895 | 1.1 |
| 65-69 years [1] | 785 | 766 | 893 | 1.2 |
| 70-79 years | 838 | 818 | 907 | 1.1 |
| 80 years or over | 845 | 835 | 870 | 1.0 |
| | | Per capita charges | | |
| **Inpatient hospital** | | | | |
| Total | $1,303 | $1,131 | $2,379 | 2.1 |
| 65-69 years [1] | 857 | 743 | 1,760 | 2.4 |
| 70-79 years | 1,372 | 1,294 | 1,831 | 1.4 |
| 80 years or over | 2,172 | 1,614 | 4,808 | 3.0 |
| **Physicians' services** | | | | |
| Total | $241 | $225 | $341 | 1.5 |
| 65-69 years [1] | 239 | 228 | 323 | 1.4 |
| 70-79 years | 247 | 231 | 343 | 1.5 |
| 80 years or over | 228 | 200 | 362 | 1.8 |

[1]Includes all persons 65 years of age and those who would become 65 years during the year; i.e., those persons 64 years of age on January 1, 1980.

SOURCE: National Medical Care Utilization and Expenditure Survey.

## Table 9

### Total charges for aged persons and percent distribution, by insurance coverage and type of service: United States, 1980

| Type of service | Total Medicare | | Medicare without Medicaid | | Medicare and Medicaid | |
|---|---|---|---|---|---|---|
| | Amount in millions | Percent | Amount in millions | Percent | Amount in millions | Percent |
| All services | $41,616 | 100.0 | $31,970 | 100.0 | $9,646 | 100.0 |
| Inpatient hospital | 30,580 | 73.5 | 22,888 | 71.6 | 7,692 | 79.7 |
| Physicians' services | 5,664 | 13.6 | 4,563 | 14.3 | 1,101 | 11.4 |
| Office visits | 3,978 | 9.6 | 3,240 | 10.1 | 738 | 7.7 |
| Outpatient department | 1,181 | 2.8 | 989 | 3.1 | 192 | 2.0 |
| Emergency room | 504 | 1.2 | 334 | 1.0 | 171 | 1.8 |
| Other medical provider | 945 | 2.3 | 782 | 2.5 | 162 | 1.7 |
| Dental care | 1,256 | 3.0 | 1,140 | 3.6 | 115 | 1.2 |
| Prescribed medicines | 2,298 | 5.5 | 1,903 | 6.0 | 395 | 4.1 |
| Other medical expenses | 875 | 2.1 | 695 | 2.2 | 180 | 1.9 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

The difference shown in the proportion of charges for inpatient hospital care between the crossovers and all others covered under Medicare reflects the higher hospital utilization rates among the crossovers as noted in Table 8.

The data in Table 10 show the source of payment for health care services. It demonstrates the interrelationship between the Medicare and Medicaid programs. Because Medicare is first payer for Medicare-covered services, it pays a substantial proportion (over half) of charges for all services combined, not only for the elderly Medicare population without Medicaid but also for the crossovers.

It can be observed that while Medicare covered similar proportions of total charges for the crossovers and for other aged Medicare persons, there was a striking difference in the absolute amounts for the two groups. Medicare paid $1,638 of the charges for the crossovers compared to $893 for all others under Medicare or a difference of 83 percent.

For the entire noninstitutionalized population, Medicaid's share was about 7 percent. For the cross-

## Table 10

### Per capita charges for aged persons, by insurance coverage for selected services and source of payment: United States, 1980

| Type of service and source of payment | Total Medicare | | Medicare without Medicaid | | Medicare and Medicaid | |
|---|---|---|---|---|---|---|
| | Amount | Percent | Amount | Percent | Amount | Percent |
| **All services** | | | | | | |
| Total | $1,773 | 100.0 | $1,579 | 100.0 | $2,984 | 100.0 |
| Medicare | 996 | 56.1 | 893 | 56.5 | 1,638 | 54.3 |
| Medicaid | 131 | 7.4 | 2 | .1 | 941 | 31.2 |
| Out-of-pocket | 324 | 18.2 | 336 | 21.3 | 255 | 8.5 |
| Other sources | 326 | 18.3 | 349 | 22.1 | 180 | 6.0 |
| **Inpatient hospital services** | | | | | | |
| Total | $1,303 | 100.0 | $1,130 | 100.0 | $2,379 | 100.0 |
| Medicare | 863 | 66.2 | 769 | 68.0 | 1,455 | 60.5 |
| Medicaid | 92 | 7.1 | 1 | .1 | 660 | 27.4 |
| Out-of-pocket | 97 | 7.4 | 90 | 8.0 | 146 | 6.1 |
| Other sources | 252 | 19.3 | 270 | 23.9 | 143 | 6.0 |
| **Physicians' services** | | | | | | |
| Total | $241 | 100.0 | $225 | 100.0 | $341 | 100.0 |
| Medicare | 107 | 43.9 | 100 | 44.3 | 146 | 42.3 |
| Medicaid | 20 | 8.2 | — | — | 141 | 40.9 |
| Out-of-pocket | 75 | 30.7 | 81 | 35.8 | 36 | 10.4 |
| Other sources | 42 | 17.2 | 45 | 19.9 | 22 | 6.4 |
| **Dental care** | | | | | | |
| Total | $53 | 100.0 | $56 | 100.0 | $36 | 100.0 |
| Medicare | 1 | 1.8 | 1 | 1.8 | — | — |
| Medicaid | 2 | 3.7 | — | — | 15 | 41.7 |
| Out-of-pocket | 45 | 83.3 | 49 | 87.5 | 18 | 50.0 |
| Other sources | 6 | 11.1 | 6 | 10.7 | 3 | 8.3 |
| **Prescribed medicines** | | | | | | |
| Total | $98 | 100.0 | $94 | 100.0 | $122 | 100.0 |
| Medicare | 3 | 3.1 | 3 | 3.2 | 6 | 4.9 |
| Medicaid | 11 | 11.2 | — | — | 78 | 63.9 |
| Out-of-pocket | 66 | 67.3 | 72 | 76.6 | 30 | 24.6 |
| Other sources | 18 | 18.4 | 19 | 20.2 | 8 | 6.5 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

NOTE: Total per capitas are less than the sum of per capitas by source of payment in some instances. In such cases, the percents are computed on the sum by source of payment.

overs, Medicaid paid $941 or 31 percent of the charges, leaving relatively small proportions to be paid out-of-pocket (about 9 percent) or by other sources (6 percent). For aged persons without Medicaid much larger proportions were paid for out-of-pocket (about 21 percent) or from other sources (22 percent).

Medicare and Medicaid together paid about 88 percent of the charges for inpatient hospital care for the crossovers, leaving 12 percent to be met out-of-pocket or from other sources. Medicaid expenditures for inpatient hospital care are primarily for deductibles, coinsurance, and services not covered by Medicare. Of the inpatient hospital charges for aged persons without Medicaid, 68 percent were paid for by Medicare.

For physicians' services, Medicare and Medicaid paid about 83 percent of the charges to the crossovers. In contrast, persons without Medicaid coverage had less than half, 44 percent, of their physicians' services paid for by a publicly funded program. More than a third (36 percent) of the charges for physicians' services to this group were paid out-of-pocket.

For dental services, Medicaid paid about 42 percent of the charges for the crossovers and one-half or 50 percent was paid out-of-pocket. By contrast, most of the charges for persons without Medicaid, about 88 percent, were paid out-of-pocket.

Prescribed medicines also have limited coverage under Medicare. Only those drugs or biologicals that cannot be self-administered and for which the physician incurs a cost are covered. Medicaid, however, pays for prescribed drugs for the SSI population in all States and for the medically needy in 33 States. Some States require a copayment on each prescription. In 1980, Medicaid paid about 64 percent of the charges for prescribed drugs to the crossovers and about 25 percent were paid for out-of-pocket. In contrast, for persons covered by Medicare but without Medicaid coverage, about 77 percent of their charges were paid out-of-pocket and about 20 percent by other sources.

The examination of the source of payment for health care services points out how Medicare and Medicaid complement and supplement each other. For all aged persons, Medicare plays the most important role in financing hospital care; for the crossovers, Medicaid is most important with respect to dental

care, prescribed drugs, and nursing home care (though not shown here because the institutionalized are excluded).

Data on total personal health care expenditures for persons 65 years of age or over, which include the institutionalized, provide further information on the roles and interrelationships of Medicare and Medicaid. Preliminary data for 1981 show that total personal health care expenditures for the aged were $83.2 billion (Table 11). Of that amount, Medicare paid 45 percent and Medicaid paid 14 percent. These data clearly indicate that when nursing home services are included, Medicaid's share of the aged's health care bill doubled from 7 percent (Table 10) to 14 percent.

### Table 11
### Estimated amount of personal health care expenditures for the aged and percent paid by Medicare and Medicaid: United States, 1981

| Type of service | Expenditures | | Percent of total paid by: | |
| | Total in billions | Percent | Medicare | Medicaid |
|---|---|---|---|---|
| **All services** | $83.2 | 100 | 45 | 14 |
| Hospital care | 36.6 | 44 | 74 | 4 |
| Physicians' services | 15.6 | 19 | 55 | 3 |
| Nursing home care | 19.4 | 23 | 2 | 45 |
| All other | 11.6 | 14 | 40 | 10 |

SOURCE: Unpublished data, Division of Information Analysis, Bureau of Data Management and Strategy, Health Care Financing Administration.

## Associations between health status, income, and education

This study shows that the crossovers living in the community differ substantially from other elderly persons in health status, income, and education. Elsewhere we reported on the 50 percent excess mortality among the crossovers (McMillan et al., 1983). The relationships between income and education and mortality have been documented by a study matching death certificates with census date (Kitagawa and Hauser, 1973). Table 12 shows that in 1960 the mortality ratios among white males 25-64 years of age decreased from a high of 1.11 for men with an elementary school level of education to .77 for those with a college education; for white females in that age group, the corresponding ratios were 1.19 and .80. The level of education for all other males 25-64 years of age did not influence the mortality ratios as much as that for white males; for all other females 25-64 years of age the difference in the mortality ratios were considerably greater, 1.13 for those at the elementary level and .74 for high school and college levels. By 65 years of age or over, the educational level among males had a lesser association with mortality ratios. The mortality ratios were quite different for females 65 years of age or over. Ratios for white females range from 1.06 for those with less education to .70 at the college level. For all other females, the level of

### Table 12
### Mortality ratios, by race, sex, age, and highest grade of school completed: United States, May-August 1960

| Age and highest grade of school completed | White | | All others | |
| | Males | Females | Males | Females |
|---|---|---|---|---|
| | Mortality ratios | | | |
| **25-64 years** | | | | |
| Total | 1.00 | 1.00 | 1.00 | 1.00 |
| Elementary school | 1.11 | 1.19 | 1.05 | 1.13 |
| High school | .97 | .89 | { .87 } | { .74 } |
| College | .77 | .80 | | |
| **65 years or over** | | | | |
| Total | 1.00 | 1.00 | 1.00 | 1.00 |
| Elementary school | 1.01 | 1.06 | 1.00 | 1.00 |
| High school | .99 | .94 | { .97 } | { 1.01 } |
| College | .98 | .70 | | |

SOURCE: Population Research Center, University of Chicago, study based on matching death certificates with 1960 census records (Kitagawa, 1973).

education showed little effect on the morality ratios.

The association between income and mortality in 1960 was similar to that between education and mortality (Table 13). White males 25-64 years of age with incomes under $2,000 had a mortality ratio of 1.51 compared with .84 for those with incomes of $10,000 or more. The difference among white females in that age group was not as great, ranging from 1.20 for those with income of under $2,000 to .86 for those with income of $10,000 or more. For persons 65 years of age or over, income had less effect on mortality ratios. The range among white males was 1.10 for those with under $2,000 in income to .92 for

### Table 13
### Mortality ratios, by age and income level for white male and female family members: United States, May - August 1960

| Income in 1959 | Mortality ratios | | |
| | 25 years or over | 25-64 years | 65 years or over |
|---|---|---|---|
| **White male family members** | 1.00 | 1.00 | 1.00 |
| Less than $2,000 | 1.14 | 1.51 | 1.10 |
| 2,000-3,999 | 1.03 | 1.20 | .99 |
| 4,000-5,999 | .97 | .99 | .92 |
| 6,000-7,999 | .91 | .88 | { 1 .96 } |
| 8,000-9,999 | 1.00 | .93 | |
| 10,000 or more | .89 | .84 | |
| **White female family members** | 1.00 | 1.00 | 1.00 |
| Less than $2,000 | 1.05 | 1.20 | .96 |
| 2,000-3,999 | 1.02 | 1.12 | .96 |
| 4,000-5,999 | 1.00 | 1.00 | 1.05 |
| 6,000-7,999 | 1.01 | .98 | { 1.01 } |
| 8,000-9,999 | .95 | 1.92 | |
| 10,000 or more | .92 | .86 | |

[1] Does not meet reliability requirements specified in Survey.
SOURCE: Population Research Center, University of Chicago, Study based on matching death certificates with 1960 census records (Kitagawa, 1973).

those between $4,000 and $7,999. Among women 65 years of age or over there was no consistent pattern in mortality and income.

## Conclusions

In previous studies of the crossovers that included the institutionalized, we were unable to determine if the higher use rates and higher mortality rates found among the crossovers were primarily reflecting the characteristics of the institutionalized population. From this NMCUES study it is clear that the noninstitutionalized crossover population is in substantially poorer health than other noninstitutionalized aged persons without Medicaid.

The NMCUES data provide us with a better understanding of the role that Medicare and Medicaid play in the financing of health care services for the aged. For the elderly living in the community, Medicare pays about 56 percent of all health care outlays. This percentage is substantially higher than the percentage reported for the aged for Medicare (about 44 to 45 percent) in the national health expenditures series that includes institutionalized persons.

Compared to the elderly without Medicaid coverage, NMCUES data show that the poor elderly living in the community have considerably higher (90 percent) per capita medical care charges, no doubt reflecting their greater health problems. For the group with dual entitlement, the Medicare program pays about 54 percent, while the Medicaid program provides substantial supplementary financing and pays about 31 percent of their health care charges. For the elderly living in the community without Medicaid entitlement, Medicare covered about 57 percent of their health care charges, with the remainder to be met out-of-pocket or by other sources.

The NMCUES data provided us with an opportunity to compare the characteristics of the subset of elderly persons living in the community enrolled in both Medicare and Medicaid with the elderly not entitled to Medicaid. As expected, the elderly with Medicaid coverage are poorer, with 60 percent receiving SSI cash assistance in 1980. They have a much lower educational attainment. There are four times as many persons of minority races (about 24 percent of the dually entitled) as are found in the elderly population without Medicaid (about 6 percent). Nonetheless, three out of four among the poor elderly are white persons. They are somewhat older with a median age of 1.6 years greater than the elderly without Medicaid.

The NMCUES data indicate that the probability of being on Medicaid is greater for women than for men. This fact holds true even after correcting for the greater proportion of older persons on Medicaid. These data raise anew the issue of the concentration of poverty among minorities and women.

Because Medicaid coverage is also targeted to medically needy persons, not unexpectedly NMCUES data show an association between health status and Medicaid coverage. The elderly living in the community and dually entitled to Medicare and Medicaid were found to have significantly poorer health status compared to the elderly without Medicaid coverage. It is likely that for some of the crossovers lower health status was a major cause of their lower educational attainment and financial status. For others among the dually entitled, it is likely that low income and educational status in early and mid-years have contributed to their higher morbidity and mortality in their later years.

These survey data show, in summary, that the Medicare program provides significantly more financial protection to the elderly living in the community than is generally the case when the institutionalized elderly are included. Medicare is the predominant payer for the poor elderly living in the community, while Medicaid provides substantial supplementary coverage. These data also indicate that there are significant associations between being an elderly person on Medicaid with age, gender, race, health status, income, and education. It is hoped that these associations can contribute to a better understanding of the factors leading to poverty and medical indigence among the elderly and hence to some solutions.

## Technical note [1]

### Reliability of estimates

The estimates presented in this article are based on a probability sample of the population rather than the entire population and hence, are subject to sampling variability. Sampling variability occurs because observations are made only on a sample, not on the entire population. The particular sample that was used in this survey is one of a large number of possible samples that could have been selected using the same sample design. Estimates derived from different samples would differ from each other. The standard error of a survey estimate is a measure of the variation among the estimates from all possible surveys. Thus, the standard error is a measure of the precision with which an estimate from a particular sample approximates the average result of all possible samples. The relative standard error is defined as the standard error of the estimate divided by the absolute value of the quantity being estimated. Tables of estimated relative standard errors for some of the estimates presented in this article are provided in Tables 14 through 16. The estimated standard error of a sample statistic can be found by multiplying the estimated relative standard error by the absolute value of the statistic. If the reader requires standard errors for estimates not covered in these tables, additional information is available from the author.

## Table 14

### Relative standard errors for Table 3, number and percent of aged persons, by insurance coverage and family income: United States, 1980

| Family income | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| | Number | | |
| **Total** | .047 | .049 | .087 |
| | Percent distribution | | |
| Less than $5,000 | .062 | .071 | .073 |
| $5,000-9,999 | .044 | .049 | .109 |
| 10,000-14,999 | .054 | .056 | .236 |
| 15,000-19,999 | .085 | .090 | .231 |
| 20,000-24,999 | .105 | .110 | .303 |
| 25,000-34,999 | .084 | .086 | .335 |
| 35,000 or more | .108 | .110 | .504 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

## Table 15

### Relative standard errors for Table 7, number of aged persons served per 1,000 covered and per capita charges, by insurance coverage and type of service: United States, 1980

| Type of service | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| | Persons served per 1,000 covered | | |
| **All services** | .008 | .009 | .010 |
| Inpatient hospital | .044 | .050 | .108 |
| Physician services[1] | .013 | .015 | .020 |
| Other medical provider services | .039 | .038 | .090 |
| Dental services | .041 | .041 | .160 |
| Prescribed medicine | .012 | .014 | .019 |
| Other medical services | .030 | .033 | .078 |
| | Per capita charges | | |
| **All services** | .081 | .080 | .189 |
| Inpatient hospital | .105 | .106 | .234 |
| Physician services[1] | .064 | .070 | .087 |
| Other medical services | .164 | .185 | .181 |
| Dental services | .106 | .103 | .301 |
| Prescribed medicine | .036 | .038 | .079 |
| Other medical services | .076 | .073 | .209 |

[1]Includes only ambulatory services.
SOURCE: National Medical Care Utilization and Expenditures Survey.

## Table 16

### Relative standard errors (on amount of charges) for Table 9, total charges for aged persons and percent distribution, by insurance coverage and type of service: United States, 1980

| Type of service | Total Medicare | Medicare without Medicaid | Medicare and Medicaid |
|---|---|---|---|
| **All services** | .089 | .091 | .204 |
| Inpatient hospital | .108 | .112 | .244 |
| Physicians' services | .090 | .096 | .130 |
| Office visits | .095 | .102 | .136 |
| Outpatient department | .143 | .163 | .206 |
| Emergency room | .108 | .097 | .249 |
| Other medical provider | .171 | .189 | .210 |
| Dental care | .129 | .123 | .330 |
| Prescribed medicines | .059 | .062 | .109 |
| Other medical expenses | .087 | .088 | .226 |

SOURCE: National Medical Care Utilization and Expenditure Survey.

The sample estimate and estimate of its standard error together permit the construction of an interval estimate with prescribed confidence that the interval includes the average result of all possible samples (for a given sample design). These interval estimates are such that:

- In approximately two-thirds of the possible samples, an interval from one standard error below the estimate to one standard error above the estimate would include the average value for all possible samples. Such an interval is called a 67 percent confidence interval.
- Approximately nineteen-twentieths of the possible sample intervals from two standard errors below the estimate to two standard errors above the estimate would include the average value of all possible samples. Such an interval is called a 95 percent confidence interval.
- For almost all the possible samples, the interval from three standard errors below the estimate to three standard errors above the estimate would include the average value of all possible samples.

Estimated relative standard errors have been provided since they are free of the effects of scale and are more readily interpretable. For example, an estimate of $10 per visit with a standard error of 10 would have a relative standard error of 1.0 and would generally be regarded as being unreliably estimated. On the other hand, an estimate of $100 per visit also with a standard error of 10 would have a relative standard error of 0.10 and would usually be considered relatively reliable.

In general, estimates for small subgroups tend to be relatively unreliable. However, the magnitude of the sampling error that is tolerable depends on the conclusions being drawn. The reader should be aware that some estimates in this article may have relative standard errors in excess of 30 percent. Statistics with relative standard errors this large are generally viewed as not precisely estimated and should be interpreted cautiously.

The standard error of the difference between statistics can be approximated by the square root of the sum of squares of the standard error estimates for the two statistics. This approximation ignores the covariance between the two statistics. The approximation will be conservative (too large) for positively correlated statistics and liberal (too small) for negatively correlated statistics.

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