# Factors Affecting Differences in Medicare Reimbursements for Physicians' Services

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*Under Medicare's Part B program, wide variations are found in average reimbursements for physicians' services by demographic and geographic characteristics of the beneficiaries. Average reimbursements per beneficiary enrolled in the program depend upon the percentage of enrolled persons who exceed the deductible and receive reimbursements, the average allowed charge per service, and the number of services used.*

*This study analyzes differences in average reimbursements per beneficiary for physicians' services in 1975 and discusses allowed charges and use factors that affect average reimbursements. Differences in the level of allowed charges and their impact on meeting the annual deductible are also discussed. The study indicates that average reimbursements per beneficiary are likely to continue to vary significantly year after year under the present Part B cost-sharing and reimbursement mechanisms.*

## Introduction

The Medicare program provides health insurance to 28 million persons in the nation today. It is designed to operate throughout the nation with a uniform set of benefits and a uniform set of cost-sharing requirements in the form of deductibles and coinsurance. For Part B (Supplementary Medical Insurance), a uniform monthly premium is also required for participation. Over the years, program data have indicated that although Medicare has uniform premiums and deductibles, benefits paid out vary significantly by State of residence of the beneficiary. These variations are due in part to the fact that reimbursements are based on local physicians' prices. The primary purpose of this paper is to discuss the variations found in Part B reimbursements and to analyze some of the factors that influence these differences.

A considerable body of knowledge has already been developed about variations in physicians' charges under Medicare and about the mechanism Medicare uses to determine allowed charges, known as the customary, prevailing, and reasonable charge (CPR) method. Under Medicare, the "reasonable" or "allowed" charge is the lowest of (1) the actual charge made by the physician for that service, (2) the physician's customary charge (the physician's 50th percentile) for that service, or (3) the prevailing charge (set at the 75th percentile of weighted customaries) in that locality for that service. It has been widely reported that physicians' charges for the same service vary substantially in different localities (Muller, 1979). Also widely publicized is the escalation in total expenditures for physicians' care since Medicare and Medicaid began (Gibson, 1979).

In response to concern about the continuing rise in physicians' charges—and the fact that under the CPR method, submitting higher charges one year raises the basis for reimbursement the next year—legislation was enacted to control the rate of increase in Medicare reimbursements. Starting in fiscal year 1976, increases in prevailing charges (the maximum Medicare allows) have been limited to an economic index. The index parallels the rate of increase in certain economic indicators that relate to the cost of maintaining an office practice and to the earnings level in the general economy.

Data have been available from the ongoing Medicare Statistical System to study variations by State in the proportion of persons enrolled in Part B who exceed the deductible and receive benefits. Until recently, however, data have not been available to analyze variations by State in actual allowed charges or in the number of reimbursed services.

This paper focuses on newly available data collected to study the relationship between submitted charges and allowed charges and to analyze variations in use factors that directly affect Medicare reimbursements on a per beneficiary basis. The paper analyzes the percentage of persons who receive reimbursement for physicians' services under Medicare,

the number of services used, and average allowed charges to determine how these factors vary by demographic characteristics of the beneficiaries and by State of residence, and how they relate to differences in reimbursements. The scope of this paper is limited to a descriptive account of program experience. Local factors such as the supply of physicians' services or other factors in the economy that may explain differences in the use of services or differences in charges are not studied. With regard to the beneficiaries, the factors analyzed are age, sex, race, and area of residence. The ongoing statistical system does not include information about income or private health insurance coverage. Not studied, either, are differences in use or reimbursements for Medicare beneficiaries with Medicaid entitlement.

## SOURCES OF THE DATA

Since the beginning of Medicare in 1966, Medicare carriers (the Part B fiscal agents) have been required to prepare a payment record for 100 percent of all bills for which reimbursements are made under Part B. The payment records are used administratively to allow HCFA to equate the amount of reimbursement for bills with the amount the carriers report as disbursed on their monthly financial reports, to validate entitlement to benefits, and to monitor the computation of the reimbursable amount.

To obtain more detailed information than that available from the payment records, the Office of Research, Demonstrations, and Statistics (ORDS) in HCFA designed the five-percent Bill Summary Record System—hereafter referred to as the "Bill Summary." From the Bill Summary—implemented in 1975—more detailed data became available on type of service (for example, medical care, surgery, laboratory, etc.) and site of service (office, hospital, etc.) for medical care services and for surgery. Also, in contrast to the payment record which does not contain the physician's submitted charges but only the physician's allowed charges, the Bill Summary record contains both the submitted and the allowed charges.

The information contained in the Bill Summary record is based on data submitted on specific HCFA claims forms: the 1490 (and its variations), the 1491, and the 1556. Claims for services submitted on the 1554 (for hospital-based physicians) and for services from Group Practice Prepayment Plans (GPPPs) that deal directly with HCFA were not included in the Bill Summary system, because reimbursement mechanisms for these services differ from the CPR system generally used. Reimbursements for claims submitted on the 1554 account for an estimated three percent of total reimbursements; payments to GPPPs account for an estimated 1.5 percent.

The Bill Summary system is based upon a five percent sample of Medicare beneficiaries. For each beneficiary whose identification number falls into the five percent sample, carriers are instructed to prepare a Bill Summary for all claims. The record includes the Medicare identification number of the beneficiary, the physician's charges, the amount Medicare allowed, the Medicare reimbursement, whether the claim was assigned, the specialty of the physician or supplier, and the number, type of service, and site of service for medical care services and for surgery. Data from the master health insurance enrollment file—which contains the age, sex, race, and residence of the beneficiary—are incorporated into the Bill Summary to provide information about the characteristics of the users. At the end of each year the data base is refined to include only beneficiaries who exceeded the $60 deductible and received Medicare benefits. Data for the set of persons who did not exceed the deductible were eliminated because the set is incomplete, that is, some individuals may choose not to submit claims if they know they have not met the deductible. Also, the Bill Summary records for physicians' bills submitted on the HCFA-1556 (for group practice prepayment plans that are processed by the carriers) were eliminated from this study, since they represent an insignificant fraction of all reimbursements and are not directly comparable to the 1490 type of claim.

There are two major limitations of this data set for descriptive and analytical studies. Neither the patient's diagnosis nor the specific medical or surgical service received has been coded. Despite these limitations, the data permit a detailed analysis of program reimbursements and of the impact of variations in allowed charges and use on reimbursements. In this report the information presented is confined to the Medicare population aged 65 years and over.

### Sampling Errors

To facilitate data processing for this study, a subset was drawn that contains information for a one percent sample of the population. The Technical Note at the end of this report contains information about the sampling errors associated with the data.

### Non-Sampling Errors

The consistency of the Bill Summary record is checked by the carrier and by HCFA, using a series of computer edits on a record-by-record basis. Such edits detect a limited set of errors—primarily invalid codes and claim numbers. The completeness of the file is checked by HCFA against the administrative payment record system; because the two data sets vary somewhat in content, only judgements can be made as to the completeness of the Bill Summary system. On a national basis, it is estimated that the Bill Summary system for 1975 falls short of the administrative payment record system by approximately three percent of total reimbursements. Firm estimates cannot be made about the completeness of the data in the Bill Summary system for each State. For this reason Table A provides a comparison of data from the administrative payment record system with data from the Bill Summary system. An explanatory note about the potential incompleteness of the Bill Summary data for certain States is contained in the section on Non-Sampling Errors in the Technical Note.

## METHODS

Claims records were accumulated for services rendered throughout 1975. They were aggregated by beneficiary identification number and by age, sex, and race groups. First, sample reimbursements were multiplied by 100 (to estimate the universe of reimbursements) and then divided by the number of beneficiaries enrolled in Part B to analyze differences in reimbursements per beneficiary by characteristics of beneficiaries. Second, reimbursements were aggregated by State of residence of the beneficiaries and divided by the number of beneficiaries enrolled in Part B to analyze differences in reimbursements per beneficiary by State. Thus, State-level data are beneficiary-oriented, referring to State of residence of the beneficiary, without regard to where the services were received.

To analyze demographic or geographic differences in Medicare reimbursements per beneficiary for physicians' services, each of the factors that affect reimbursements are examined. The first two are price and quantity. The price factor will be defined as:

$C$ = the average allowed charge per service

The quantity factor will be defined as:

$S_u$ = the average number of services per user receiving Medicare reimbursements

In addition to price and quantity, Medicare reimbursements per beneficiary for physicians' services are affected by the cost-sharing provisions of the law. An annual deductible of $60 in allowed charges must be met before Medicare makes any reimbursement.

$D_u$ = the average annual deductible per user

For the average user, less than $60 of allowed charges are deducted for physicians' services because (a) the "carryover" provision allows charges that were applied toward the deductible during the last quarter of the year to be applied to the next year also, and (b) part of the deductible is met through other Part B services such as hospital outpatient care.

In addition to the deductible, beneficiaries must share in the cost of each service. Medicare reimburses 80 percent of allowed charges while the beneficiaries are liable for 20 percent.

Finally, average reimbursement per beneficiary depends upon the proportion of beneficiaries who exceed the deductible and receive Medicare reimbursements. If we define:

$P$ = proportion of beneficiaries who exceed the deductible and receive reimbursements
and
$R_b$ = average reimbursement per beneficiary,

then an equation can be set up that takes into account price, quantity, the deductible, coinsurance, and the proportion of beneficiaries with reimbursements.

Equation (1): $R_b = .8P(C \times S_u - D_u)$

The next part of the paper presents the findings from the data collected from the Bill Summary for 1975. It is organized around the concepts included in Equation (1). First, average reimbursements per beneficiary ($R_b$) will be examined by demographic characteristics of the beneficiaries and by area of residence. In this section, relationships between submitted charges and allowed charges and between submitted charges and reimbursements will be studied. Then the following sections will examine the right hand factors in the equation: P, C, and $S_u$. As P, C, or $S_u$ increases in an area, $R_b$ increases. To test whether $R_b$ is well correlated with P, a simple correlation coefficient is computed between $R_b$ and P using data for each State. Similarly, simple correlation coefficients are computed between $R_b$ and C and between $R_b$ and $S_u$.

In addition, because the level of charges in an area affects the proportion of beneficiaries who exceed the deductible, the strength of the relationship between C and P is tested using data for each State. Similarly, the average number of services per user in an area affects P. To test that relationship, $S_u$ and P are correlated.

## Findings

### AVERAGE MEDICARE REIMBURSEMENTS PER BENEFICIARY ($R_b$)

Table 1 shows physicians' submitted charges for services rendered in 1975, the percentage allowed by Medicare, and the percentage reimbursed, by characteristics of the beneficiaries. Of the total $4.9 billion in charges submitted nationally, 81.5 percent were allowed, that is, deemed reasonable under the CPR methodology. This means that physicians' charges were reduced an average of 18.5 percent. After the deductible and coinsurance were subtracted, Medicare reimbursed nationally 58.1 percent of total charges or an average of $131 per beneficiary. ("Per beneficiary" throughout this report means "per person enrolled" whereas "per user" means "per person who met the deductible and received reimbursements." Persons who used Medicare benefits but failed to meet the deductible are not included in this analysis.)

### Age, Sex, and Race

As shown in Table 1, the relationship between total submitted charges and the percent of charges allowed (col. 2) and reimbursed (col. 3) varies very little by age, sex, or race. As expected, reimbursement per beneficiary was higher for older age groups—$105 for the group 65-69 years of age and $159 for the group 85 years of age and over (col. 4). This reflects a greater proportion of persons who met the deductible and a greater number of services per user for older age groups (as will be shown later). Reimbursements for men averaged $140 in comparison to $125 for women.

Disparities by race in benefits paid for physicians' services were considerable. Aged white persons were reimbursed an average of $135 per beneficiary; aged persons of all other races were reimbursed $98 per beneficiary. Although the average age of white persons is greater than the average for all other races, differences in the age composition of the two groups do not explain these findings. As the data in Table 1-A indicate, reimbursement per beneficiary for physicians' services in the U.S. and in the South (where 56 percent of persons of other races reside) was consistently higher for white persons compared to persons of other races for every age and sex category.

**TABLE 1**

**Medicare Beneficiaries: Total Physicians' Charges, Allowed Charges, and Medicare Reimbursements by Age, Sex, and Race, for Persons Aged 65 and Over, 1975**

| Age, Sex, and Race | Total Physicians' Charges (in mil.) | Allowed Charges as Percent of Physicians' Charges | Medicare Reimbursements | |
|---|---|---|---|---|
| | | | Percent of Physicians' Charges | Per Beneficiary |
| | (1) | (2) | (3) | (4) |
| U.S. Total | $4,904.6[1] | 81.5 | 58.1 | $131 |
| Age: | | | | |
| 65-69 | 1,338.1 | 81.3 | 57.9 | 105 |
| 70-74 | 1,312.4 | 81.6 | 58.1 | 132 |
| 75-79 | 1,027.6 | 81.7 | 58.2 | 143 |
| 80-84 | 735.1 | 81.6 | 58.2 | 158 |
| 85 and Over | 491.4 | 81.5 | 57.7 | 159 |
| Sex: | | | | |
| Men | 2,085.5 | 81.4 | 58.9 | 140 |
| Women | 2,819.0 | 81.6 | 57.4 | 125 |
| Race: | | | | |
| White | 4,531.3 | 81.6 | 58.1 | 135 |
| Other | 301.4 | 81.0 | 57.3 | 98 |

[1] For beneficiaries who met the deductible and received reimbursements.

**TABLE 1-A**

U.S.: Reimbursement per Person Enrolled

| Age | White | | All Other Races | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Total | $135 | | $98 | |
| All Ages | $ 145 | $ 129 | $ 104 | $ 94 |
| 65-69 | 117 | 104 | 93 | 82 |
| 70-74 | 151 | 126 | 105 | 93 |
| 75-79 | 160 | 140 | 118 | 93 |
| 80-84 | 180 | 153 | 106 | 112 |
| 85 + | 177 | 158 | 127 | 117 |

South: Reimbursement per Person Enrolled

| Age | White | | All Other Races | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Total | $125 | | $76 | |
| All Ages | $ 137 | $ 118 | $ 80 | $ 73 |
| 65-69 | 113 | 98 | 73 | 68 |
| 70-74 | 141 | 115 | 74 | 70 |
| 75-79 | 148 | 131 | 101 | 76 |
| 80-84 | 175 | 141 | 75 | 84 |
| 85 + | 167 | 142 | 94 | 83 |

Differences by race in average reimbursements for physicians' services are offset, in part, by differences in use and reimbursement for hospital outpatient care. Data from the ongoing Medicare Statistical System for the U.S. indicate that 17 percent of white beneficiaries compared to 20 percent of non-white beneficiaries received Medicare reimbursement for hospital outpatient care in 1975; these reimbursements averaged $16 per white beneficiary and $28 per non-white beneficiary enrolled in Medicare. Comparable data for the South show that 14 percent of white and 16 percent of non-white beneficiaries received hospital outpatient reimbursements; average reimbursements were $11 for white beneficiaries and $18 for non-white.

### Census Region and State

Similar to the findings for age, sex, and race, the percentage of charges that were allowed and reimbursed varied very little by census region, although reimbursement per beneficiary varied considerably. As shown in Table 2, the highest reimbursements per beneficiary were in the West ($170), followed by the Northeast ($146), the South ($117), and the North Central region ($110).

The percent of charges allowed and reimbursed varied a little more by State of residence of the beneficiary (Table 2). Allowed charges ranged from 77.2 percent of total charges in Michigan to 85.7 percent in Nebraska. That is, physicians' charges were reduced an average of 22.8 percent for Michigan beneficiaries and 14.3 percent for Nebraska beneficiaries. Several factors can influence differences in the rate of reduction of physicians' charges, including differences in the rate of increase of charges over time and discretionary practices of carriers as they apply the CPR method (Schieber, *et al.*, 1976; Muller, 1979).

By State, variations in per beneficiary payments were dramatic. As indicated from the data below which show the States with the highest and lowest reimbursements, the highest mean for a State ($197 in California) was more than three times that of the lowest mean for a State ($65 in both Montana and Kentucky).

| Highest States: | Average Reimbursement Per Beneficiary[1] |
|---|---|
| California | $197 |
| Alaska | 188 |
| Arizona | 173 |
| New York | 173 |
| District of Columbia | 173 |
| **Lowest States:** | |
| Montana | $ 65 |
| Kentucky | 65 |
| West Virginia | 71 |
| South Dakota | 76 |
| South Carolina | 86 |

[1] Data presented in this report by State are crude rates. They have not been standardized by age or sex. Age-sex indexes developed for each State by HCFA's Office of the Actuary indicate that average reimbursements per person enrolled in Part B should differ from the U.S. average by no more than three percent because of differences in the proportionate distribution of beneficiaries by age and sex.

TABLE 2

**Medicare Beneficiaries: Total Physicians' Charges, Allowed Charges, and Medicare Reimbursements for Persons Aged 65 and over by State, 1975**

| Area of Residence | Total Physicians' Charges (in mil.) | Allowed Charges as Percent of Physicians' Charges | Medicare Reimbursements | |
|---|---|---|---|---|
| | | | Percent of Physicians' Charges | Per Beneficiary |
| | (1) | (2) | (3) | (4) |
| United States | $4,904.6 | 81.5 | 58.1 | $131 |
| Northeast | 1,386.4 | 80.2 | 57.2 | 146 |
| New England | 297.8 | 81.1 | 57.4 | 127 |
| Maine | 22.1 | 85.5 | 61.8 | 106 |
| New Hampshire | 15.3 | 81.4 | 56.9 | 98 |
| Vermont | 9.5 | 85.0 | 58.7 | 105 |
| Massachusetts | 146.9 | 79.7 | 56.5 | 127 |
| Rhode Island | 30.6 | 80.2 | 55.5 | 153 |
| Connecticut | 73.5 | 82.4 | 58.8 | 137 |
| Mid Atlantic | 1,088.6 | 80.0 | 57.2 | 152 |
| New York | 614.8 | 78.2 | 56.2 | 173 |
| New Jersey | 194.9 | 81.6 | 57.7 | 150 |
| Pennsylvania | 278.8 | 82.8 | 59.1 | 123 |
| North Central | 1,121.7 | 82.7 | 58.9 | 110 |
| East North Central | 760.1 | 81.8 | 58.9 | 112 |
| Ohio | 178.5 | 82.9 | 58.5 | 101 |
| Indiana | 87.2 | 83.6 | 58.7 | 99 |
| Illinois | 215.0 | 83.2 | 60.1 | 115 |
| Michigan | 174.5 | 77.2 | 57.0 | 122 |
| Wisconsin | 104.8 | 83.5 | 60.2 | 124 |
| West North Central | 361.6 | 84.5 | 59.1 | 106 |
| Minnesota | 80.2 | 85.0 | 60.3 | 111 |
| Iowa | 58.2 | 82.3 | 57.3 | 92 |
| Missouri | 112.8 | 84.9 | 58.8 | 114 |
| North Dakota | 13.1 | 83.0 | 56.2 | 102 |
| South Dakota | 11.2 | 83.0 | 56.9 | 76 |
| Nebraska | 32.2 | 85.7 | 61.9 | 105 |
| Kansas | 53.9 | 85.2 | 59.1 | 114 |
| South | 1,379.3 | 81.9 | 57.9 | 117 |
| South Atlantic | 735.1 | 81.6 | 58.2 | 126 |
| Delaware | 8.7 | 79.7 | 56.1 | 98 |
| Maryland | 58.6 | 82.3 | 59.0 | 107 |
| District of Columbia | 18.5 | 80.7 | 60.5 | 173 |
| Virginia | 69.9 | 82.8 | 58.6 | 101 |
| West Virginia | 25.5 | 83.4 | 58.1 | 71 |
| North Carolina | 77.1 | 84.4 | 58.7 | 94 |
| South Carolina | 33.6 | 83.5 | 57.1 | 86 |
| Georgia | 78.3 | 82.9 | 58.3 | 110 |
| Florida | 364.9 | 80.1 | 57.9 | 171 |
| East South Central | 210.7 | 81.7 | 56.4 | 84 |
| Kentucky | 42.9 | 79.9 | 54.8 | 85 |
| Tennessee | 67.1 | 81.1 | 55.8 | 87 |
| Alabama | 58.0 | 83.7 | 58.1 | 92 |
| Mississippi | 42.7 | 81.9 | 56.5 | 98 |
| West South Central | 433.5 | 82.6 | 58.2 | 124 |
| Arkansas | 50.4 | 83.3 | 58.4 | 112 |
| Louisiana | 57.6 | 83.3 | 58.6 | 106 |
| Oklahoma | 60.5 | 82.8 | 58.5 | 110 |
| Texas | 264.9 | 82.3 | 58.1 | 137 |
| West | 1,014.6 | 81.4 | 58.4 | 170 |
| Mountain | 185.4 | 82.3 | 58.7 | 133 |
| Montana | 8.4 | 79.8 | 57.2 | 65 |
| Idaho | 13.8 | 80.6 | 56.5 | 100 |
| Wyoming | 5.6 | 81.3 | 58.5 | 99 |
| Colorado | 46.4 | 84.0 | 59.2 | 133 |
| New Mexico | 21.4 | 84.4 | 60.7 | 147 |
| Arizona | 62.1 | 81.6 | 58.8 | 173 |
| Utah | 15.4 | 81.2 | 56.4 | 100 |
| Nevada | 12.3 | 82.2 | 59.6 | 171 |
| Pacific | 829.2 | 81.2 | 58.3 | 181 |
| Washington | 83.2 | 82.9 | 58.3 | 137 |
| Oregon | 53.7 | 82.5 | 58.1 | 125 |
| California | 676.7 | 80.9 | 58.4 | 197 |
| Alaska | 2.1 | 83.4 | 60.3 | 188 |
| Hawaii | 13.5 | 81.2 | 56.7 | 137 |

## PERCENTAGE OF BENEFICIARIES WHO EXCEEDED THE DEDUCTIBLE AND WERE REIMBURSED (P)

The percentage of beneficiaries who exceeded the deductible and were reimbursed for physicians' services are shown in Tables 3 and 4. Overall, 50 percent of aged beneficiaries received reimbursements for physicians' services. Beneficiaries who received reimbursements for physicians' services in 1975 represent only a fraction of the total number of Medicare beneficiaries who actually used physicians' services that year. A survey of Medicare beneficiaries in 1975 (the Current Medicare Survey, in effect from 1966-1977) found that over 80 percent of the aged beneficiaries used some Medicare-covered physicians' services. Thus, an estimated 30 percent of beneficiaries used physicians' services although they did not exceed the deductible and receive benefits. Variations by age, sex, race, and geographic area in the proportion that received reimbursements for physician's services are discussed next.

### Age, Sex, and Race

Not unexpectedly, the proportion that exceeded the deductible was substantially higher for older age groups—41 percent of the beneficiaries at ages 65 to 69 compared to 62 percent of beneficiaries 85 years and over. The proportion that met the deductible was a little greater for women (51 percent) compared to men (47 percent).

Of the total white beneficiary population, 51 percent met the deductible and received benefits for physicians' services. Of the total non-white population, the proportion was 43 percent. Differences in age composition, geographic area of residence, and the use of hospital outpatient services (discussed earlier) may explain some of the differences.

**TABLE 3**
**Medicare Beneficiaries: Number and Percent of Beneficiaries Who Met the Deductible and Received Reimbursements for Physicians' Services by Age, Sex, and Race, 1975**

| Age, Sex, Race | Number | Percent of Beneficiaries Exceeding the Deductible |
|---|---|---|
| U.S. Total | 10,821,900 | 50 |
| Age: | | |
| 65-69 | 3,027,800 | 41 |
| 70-74 | 2,892,600 | 50 |
| 75-79 | 2,237,500 | 54 |
| 80-84 | 1,560,800 | 58 |
| 85 & Over | 1,103,200 | 62 |
| Sex: | | |
| Men | 4,157,000 | 47 |
| Women | 6,664,900 | 51 |
| Race: | | |
| White | 9,889,900 | 51 |
| Other Races | 748,400 | 43 |

TABLE 4

**Medicare Beneficiaries: Percentage of Aged Part B Beneficiaries Who Met the Deductible and Received Reimbursements for Physicians' Services by State, 1975**

| Area of Residence | Percent of Beneficiaries Exceeding the Deductible |
|---|---|
| United States | 50 |
| Northeast | 52 |
| New England | 52 |
| Maine | 46 |
| New Hampshire | 49 |
| Vermont | 55 |
| Massachusetts | 51 |
| Rhode Island | 64 |
| Connecticut | 51 |
| Mid Atlantic | 52 |
| New York | 53 |
| New Jersey | 55 |
| Pennsylvania | 49 |
| North Central | 45 |
| East North Central | 45 |
| Ohio | 45 |
| Indiana | 46 |
| Illinois | 41 |
| Michigan | 49 |
| Wisconsin | 46 |
| West North Central | 45 |
| Minnesota | 47 |
| Iowa | 46 |
| Missouri | 45 |
| North Dakota | 55 |
| South Dakota | 38 |
| Nebraska | 40 |
| Kansas | 47 |
| South | 48 |
| South Atlantic | 49 |
| Delaware | 52 |
| Maryland | 42 |
| District of Columbia | 49 |
| Virginia | 44 |
| West Virginia | 38 |
| North Carolina | 46 |
| South Carolina | 44 |
| Georgia | 47 |
| Florida | 57 |
| East South Central | 42 |
| Kentucky | 35 |
| Tennessee | 42 |
| Alabama | 43 |
| Mississippi | 47 |
| West South Central | 51 |
| Arkansas | 50 |
| Louisiana | 45 |
| Oklahoma | 48 |
| Texas | 53 |
| West | 57 |
| Mountain | 50 |
| Montana | 44 |
| Idaho | 47 |
| Wyoming | 38 |
| Colorado | 53 |
| New Mexico | 51 |
| Arizona | 54 |
| Utah | 45 |
| Nevada | 54 |
| Pacific | 59 |
| Washington | 56 |
| Oregon | 51 |
| California | 61 |
| Alaska | 61 |
| Hawaii | 58 |

## Census Region and State

The range in the percentage of Part B beneficiaries with reimbursements for physicians' services by census region was from a low of 45 percent in the North Central region to a high of 57 percent in the West, as shown below.

| Census Region | Percent of Beneficiaries Exceeding the Deductible |
|---|---|
| United States | 50 |
| Northeast | 52 |
| North Central | 45 |
| South | 48 |
| West | 57 |

Variations by State in the percentage of beneficiaries who received reimbursements for physicians' services were striking (Table 4). In three States, over 60 percent of the aged met the deductible, while in four States, less than 40 percent were reimbursed. The highest and lowest States are shown below:

| | Percentage of Beneficiaries Exceeding the Deductible |
|---|---|
| Highest States | |
| Rhode Island | 64 |
| Alaska | 61 |
| California | 61 |
| Hawaii | 58 |
| Florida | 57 |
| Lowest States | |
| Kentucky | 35 |
| Wyoming | 38 |
| West Virginia | 38 |
| South Dakota | 38 |
| Nebraska | 40 |

To determine the strength of the relationship between the percentage of beneficiaries who exceeded the deductible and received Medicare benefits for physicians' services in each State and the amount of reimbursements per beneficiary in each State, a correlation coefficient was computed and shown to be significant, .78 ($P \leq .05$). This result indicates that there is a very strong relationship between the percentage of beneficiaries who met the deductible in each State and the amount reimbursed.

## AVERAGE ALLOWED CHARGE PER SERVICE (C)

Table 5 shows the average allowed charge by characteristics of the beneficiaries for all services combined and for the types of services that account for the highest percentage of allowed charges: medical care (40.2 percent); inpatient surgery (25.8 percent); diagnostic x-ray (6.7 percent); and diagnostic laboratory (8.2 percent). The average allowed charge for all services combined was $15.34; for medical care services, $10.83; for inpatient surgery, $272.63; for diagnostic x-ray, $15.46; and for diagnostic lab services, $6.60.

### Age, Sex, and Race

For all types of services combined and for diagnostic x-ray services, the average allowed charge per service decreased steadily as age increased. With the exception of inpatient surgery services, average allowed charges were higher for men than for women. These differences by age and sex very likely reflect differences in the mix of services. By race, with the exception of diagnostic x-ray services, average allowed charges were higher for white persons than for other races, perhaps reflecting, in part, the differences in allowed charges by geographic area discussed below.

### Census Region and State

For all services combined, the average allowed charge was highest in the West ($17.13), followed by the Northeast ($16.54), the North Central Region ($14.75), and the South ($13.74). The relatively low average allowed charge in the South probably explains some of the differences by race in average allowed charges. This pattern by region was generally true for each type of service except that the North Central region had the lowest average allowed charges for inpatient surgery, diagnostic x-ray, and laboratory services as shown in Table 6.

**TABLE 5**

**Medicare Beneficiaries: Average Allowed Charge per Service by Type of Service, and by Age, Sex, and Race, 1975**

| Age, Sex, Race | Total | Medical Care | Inpatient Surgery | Diagnostic X-Ray | Diagnostic Laboratory |
|---|---|---|---|---|---|
| U.S. Total | $15.34 | $10.83 | $272.63 | $15.46 | $6.60 |
| Age: | | | | | |
| 65-69 | 16.09 | 11.02 | 272.09 | 16.28 | 6.76 |
| 70-74 | 15.43 | 10.87 | 263.48 | 16.19 | 6.59 |
| 75-79 | 15.15 | 10.73 | 272.37 | 15.28 | 6.47 |
| 80-84 | 14.98 | 10.87 | 275.30 | 14.38 | 6.62 |
| 85 and Over | 14.20 | 10.49 | 300.76 | 12.86 | 6.37 |
| Sex: | | | | | |
| Men | 16.46 | 11.13 | 267.94 | 15.59 | 6.77 |
| Women | 14.60 | 10.65 | 277.06 | 15.38 | 6.49 |
| Race: | | | | | |
| White | 15.42 | 10.84 | 273.11 | 15.47 | 6.64 |
| Other Races | 14.07 | 10.55 | 254.90 | 15.55 | 6.02 |

TABLE 6

**Medicare Beneficiaries: Average Allowed Charge per Service for Aged Persons by Type of Service and by State, 1975**

| Area of Residence | Total | Medical Care | Inpatient Surgery | Diag. X-Ray | Diag. Lab |
|---|---|---|---|---|---|
| United States | $15.34 | $10.83 | $272.63 | $15.46 | $ 6.60 |
| Northeast | 16.54 | 11.67 | 278.13 | 19.23 | 7.33 |
| New England | 14.88 | 10.83 | 259.90 | 13.39 | 6.34 |
| Maine | 12.01 | 8.86 | 217.89 | 9.00 | 6.47 |
| New Hampshire | 10.78 | 8.07 | 245.62 | 8.97 | 5.55 |
| Vermont | 11.85 | 8.21 | 184.15 | 11.00 | 5.39 |
| Massachusetts | 14.98 | 11.23 | 249.69 | 12.55 | 6.70 |
| Rhode Island | 14.46 | 11.56 | 316.93 | 16.83 | 5.90 |
| Connecticut | 18.36 | 11.91 | 294.26 | 19.08 | 6.04 |
| Mid Atlantic | 17.06 | 11.91 | 283.92 | 22.85 | 7.63 |
| New York | 18.01 | 13.25 | 328.49 | 24.49 | 7.42 |
| New Jersey | 16.48 | 11.07 | 261.82 | 20.71 | 7.90 |
| Pennsylvania | 15.72 | 10.25 | 227.98 | 20.88 | 8.04 |
| North Central | 14.75 | 10.61 | 248.10 | 12.31 | 5.75 |
| East North Central | 15.14 | 11.23 | 257.45 | 11.57 | 5.28 |
| Ohio | 11.93 | 9.08 | 259.12 | 12.04 | 3.37 |
| Indiana | 13.38 | 8.91 | 240.01 | 8.77 | 6.42 |
| Illinois | 16.56 | 10.94 | 288.76 | 13.47 | 6.41 |
| Michigan | n.a. | n.a. | n.a. | 13.16 | 6.80 |
| Wisconsin | 12.88 | 9.44 | 250.93 | 12.57 | 5.68 |
| West North Central | 14.03 | 9.67 | 230.22 | 14.68 | 6.73 |
| Minnesota | 14.40 | 11.57 | 229.33 | 14.70 | 7.24 |
| Iowa | 13.54 | 9.80 | 252.68 | 16.75 | 6.51 |
| Missouri | 13.43 | 8.61 | 223.57 | 13.41 | 5.62 |
| North Dakota | 10.71 | 8.04 | 213.40 | 17.57 | 5.75 |
| South Dakota | 12.67 | 10.15 | 206.10 | 12.40 | 6.50 |
| Nebraska | 14.14 | 8.42 | 226.37 | 16.82 | 8.48 |
| Kansas | 17.22 | 11.02 | 238.85 | 14.54 | 6.95 |
| South | 13.74 | 9.55 | 271.66 | 14.61 | 6.03 |
| South Atlantic | 15.25 | 10.84 | 283.19 | 15.39 | 6.27 |
| Delaware | 11.52 | 10.48 | 203.70 | 15.28 | 7.27 |
| Maryland | 17.57 | 12.30 | 298.96 | 14.93 | 6.57 |
| District of Columbia | 19.30 | 14.42 | 305.47 | 25.97 | 12.21 |
| Virginia | 14.13 | 9.74 | 248.77 | 14.53 | 5.64 |
| West Virginia | 11.72 | 8.10 | 227.70 | 12.05 | 3.94 |
| North Carolina | 13.02 | 8.81 | 266.22 | 12.08 | 5.80 |
| South Carolina | 12.62 | 8.35 | 279.45 | 12.08 | 4.79 |
| Georgia | 13.49 | 9.29 | 242.67 | 15.33 | 4.99 |
| Florida | 16.95 | 12.85 | 314.90 | 16.67 | 6.62 |
| East South Central | 11.55 | 7.74 | 244.05 | 12.11 | 5.30 |
| Kentucky | 11.94 | 8.02 | 246.62 | 13.83 | 5.65 |
| Tennessee | 11.94 | 8.09 | 265.10 | 11.54 | 4.67 |
| Alabama | 13.36 | 8.86 | 250.02 | 12.62 | 6.49 |
| Mississippi | 9.10 | 6.22 | 203.87 | 11.41 | 4.39 |
| West South Central | 12.79 | 8.89 | 268.46 | 14.62 | 5.98 |
| Arkansas | 10.18 | 7.77 | 230.01 | 12.95 | 4.61 |
| Louisiana | 14.06 | 9.01 | 286.54 | 17.03 | 6.32 |
| Oklahoma | 13.07 | 8.89 | 264.53 | 13.92 | 5.98 |
| Texas | 13.12 | 9.14 | 273.48 | 14.80 | 6.27 |
| West | 17.13 | 12.07 | 305.41 | 19.45 | 7.80 |
| Mountain | 15.89 | 10.65 | 288.78 | 16.18 | 6.36 |
| Montana | 12.13 | 8.97 | 235.73 | 20.21 | 6.67 |
| Idaho | 11.89 | 8.44 | 224.51 | 17.36 | 3.44 |
| Wyoming | 13.61 | 8.95 | 248.95 | 11.22 | 5.70 |
| Colorado | 15.47 | 10.05 | 268.15 | 12.77 | 6.97 |
| New Mexico | 14.92 | 9.49 | 321.08 | 15.95 | 7.89 |
| Arizona | 16.85 | 11.58 | 352.48 | 18.18 | 6.61 |
| Utah | n.a. | 13.89 | 226.54 | 16.26 | 5.41 |
| Nevada | 21.55 | 13.34 | 347.10 | 25.27 | 8.76 |
| Pacific | 17.44 | 12.43 | 310.02 | 20.46 | 8.12 |
| Washington | 15.34 | 9.77 | 290.36 | 16.60 | 7.13 |
| Oregon | 14.98 | 10.29 | 105.74 | 14.08 | 6.40 |
| California | 18.02 | 12.98 | 388.05 | 22.61 | 8.44 |
| Alaska | 18.60 | 17.03 | 282.46 | 22.09 | 10.27 |
| Hawaii | 16.09 | 11.31 | 291.30 | 18.75 | 7.02 |

[1] Average is considerably below all other States; further study is needed to assess its accuracy.

The average allowed charge varied considerably by State, ranging from a low in Mississippi of $9.10 per service for all services combined to a high in Nevada of $21.55 (Table 6). The extent to which differences in billing practices affect the variations in average allowed charges cannot be determined from this data set. States with the highest and lowest average allowed charges are shown below.

| Highest States | Average Allowed Charge: All Types Combined |
|---|---|
| Nevada | $21.55 |
| District of Columbia | 19.30 |
| Alaska | 18.60 |
| Connecticut | 18.36 |
| California | 18.02 |
| **Lowest States** | |
| Mississippi | $ 9.10 |
| Arkansas | 10.18 |
| North Dakota | 10.71 |
| New Hampshire | 10.78 |
| Delaware | 11.52 |

For medical care, allowed charges ranged from a low of $6.22 in Mississippi to a high of $17.03 in Alaska—the figure in Alaska registering 174 percent above the average in Mississippi (Table 4). California had the highest allowed charge for inpatient surgery, $388.05. The average in Oregon for inpatient surgery was $105.74—a figure well outside the range for all other States.[2] Vermont had the next lowest average for surgery—$184.15.

The correlation of reimbursement per beneficiary with the average allowed charge for all services combined was computed and found to be significant at .76 ($P \leq .05$).

## Fee Levels Compared to Average Allowed Charges

Several studies have focused on the wide range in fees submitted by physicians for the same service. Muller and Otelsberg (1979) found that median fees of general practitioners for "Initial Limited Office Visits—New Patient" ranged from $25.00 in one locality to $7.00 in another locality and "Initial Comprehensive Office Visit—New Patient" ranged from $63.80 to $5.00; "Initial Brief Hospital Visit" median fees ranged from $42.00 to $6.00. For specialists, median fees for "Reduction of Fracture—Neck of Femur" ranged from $1,450.00 to $429.00 and for a "Chest X-ray" from $26.25 to $4.50.

[2] A special study is needed to assess the accuracy of allowed surgical charges in Oregon.

To analyze geographic variations in Medicare fee levels, Burney *et al.* (1978), constructed composite indexes for 1975 for every State to show prevailing fee levels of specialists for 29 frequently performed services. These indexes were constructed to show relative fee levels, with the U.S. index set at 100. They used a standard mix of services so that the fee indexes would reflect price differences only, not differences in the mix of services.

The average allowed charge reflects several factors: price levels for all physicians and for all services; the mix of services received; billing style practices (for example, whether a lab test charge is included in the office visit charge or billed separately); and the allowed charge from the CPR payment mechanism. Variations in all these factors affect average allowed charges.

To compare the indexes derived by Burney *et al.* for prevailing physicians' fees in each State with the average allowed charges per service found in this study, allowed charge indexes were constructed by dividing each State's average allowed charge by the U.S. average allowed charge of $15.34 (from Table 6).

The prevailing fee index derived by Burney *et al.*, and the allowed charge index computed from these data are given in Table 7. The fee indexes in New York and Alaska were highest at 132, or 32 percent above the U.S. average. In Mississippi it was lowest at 73, or 27 percent below average. The allowed charge index was highest in Nevada at 140, or 40 percent above average and lowest in Mississippi at 59, or 41 percent below average.

As expected, for many States the fee index and the allowed charge index are of a similar magnitude. A correlation coefficient was computed to determine the strength of the relationship between these two indexes. The correlation was found to be significant at .64 ($P \leq .05$). The similarity of the two indexes may be observed in the data below for the States with the highest and lowest physician fee indexes.

| Highest Fee Levels | Specialist Fee Index | Medicare Allowed Charge Index |
|---|---|---|
| New York | 132 | 117 |
| Alaska | 132 | 121 |
| Nevada | 125 | 140 |
| California | 120 | 117 |
| District of Columbia | 116 | 126 |
| Florida | 112 | 111 |
| New Jersey | 112 | 107 |
| Arizona | 109 | 110 |
| **Lowest Fee Levels** | **Specialist Fee Index** | **Medicare Allowed Charge Index** |
| Mississippi | 73 | 59 |
| Kentucky | 76 | 78 |
| South Dakota | 77 | 83 |
| North Dakota | 79 | 70 |
| Nebraska | 80 | 92 |
| West Virginia | 80 | 76 |
| Maine | 80 | 78 |
| Vermont | 80 | 76 |

TABLE 7

**Medicare Beneficiaries: Comparison of Prevailing Fee Indexes, FY 1975 with Medicare Average Allowed Charge Per Service Indexes, 1975**

| Area of Residence | Specialist Fee Index[1] | Average Allowed Charge Index[2] |
|---|---|---|
| United States | 100 | 100 |
| Northeast | 111 | 108 |
| New England | — | — |
| Maine | 80 | 78 |
| New Hampshire | 85 | 70 |
| Vermont | 80 | 76 |
| Massachusetts | 99 | 98 |
| Rhode Island | 95 | 94 |
| Connecticut | 103 | 120 |
| Mid Atlantic | — | — |
| New York | 132 | 117 |
| New Jersey | 112 | 107 |
| Pennsylvania | 94 | 102 |
| North Central | 90 | 96 |
| East North Central | — | — |
| Ohio | 88 | 78 |
| Indiana | 83 | 87 |
| Illinois | 103 | 108 |
| Michigan | 91 | n.a. |
| Wisconsin | 86 | 84 |
| West North Central | — | — |
| Minnesota | 85 | 94 |
| Iowa | 84 | 88 |
| Missouri | 88 | 88 |
| North Dakota | 79 | 70 |
| South Dakota | 77 | 83 |
| Nebraska | 80 | 92 |
| Kansas | 86 | 112 |
| South | 93 | 90 |
| South Atlantic | — | — |
| Delaware | 94 | 75 |
| Maryland | 101 | 115 |
| District of Columbia | 116 | 126 |
| Virginia | 87 | 92 |
| West Virginia | 80 | 76 |
| North Carolina | 86 | 85 |
| South Carolina | 85 | 82 |
| Georgia | 98 | 88 |
| Florida | 112 | 111 |
| East South Central | — | — |
| Kentucky | 76 | 78 |
| Tennessee | 86 | 78 |
| Alabama | 99 | 87 |
| Mississippi | 73 | 59 |
| West South Central | — | — |
| Arkansas | 89 | 66 |
| Louisiana | 94 | 92 |
| Oklahoma | 93 | 85 |
| Texas | 95 | 86 |
| West | 111 | 112 |
| Mountain | — | — |
| Montana | 87 | 79 |
| Idaho | 85 | 78 |
| Wyoming | 84 | 89 |
| Colorado | 87 | 101 |
| New Mexico | 87 | 97 |
| Arizona | 109 | 110 |
| Utah | 85 | n.a. |
| Nevada | 125 | 140 |
| Pacific | — | — |
| Washington | 96 | 100 |
| Oregon | 92 | 98 |
| California | 120 | 117 |
| Alaska | 132 | 121 |
| Hawaii | 95 | 105 |

[1] Burney, I. L., G. J. Schieber, M. O. Blaxall, and J. R. Gabel, "Geographic Variations in Physicians' Fees," JAMA, September 22, 1978 - Vol. 240, No. 13.

[2] Derived from Table 6 by dividing each State's average allowed charge by $15.34, the average allowed charge in the U.S.

It is interesting to observe that the range in average allowed charges was greater than the range in physicians' fees. The highest fee level areas (New York and Alaska) had indexes that were 81 percent greater than the index in the lowest fee level area (Mississippi). In comparison, the highest allowed charge area (Nevada) had an allowed charge index that was 137 percent greater than the lowest allowed charge area (Mississippi). Evidently prevailing fee levels, as well as other factors including the mix of services, billing practices, etc., play an important role in the variation in average allowed charges.

## Relationship Between Allowed Charges in an Area (C) and Percentage of Beneficiaries who Exceed the Deductible (P)

Clearly, beneficiaries in areas with low average allowed charges have a lower probability of reaching the deductible and receiving Medicare benefits than do beneficiaries in areas with high average allowed charges. For example, allowed charges for medical care services averaged $6.22 in Mississippi, so on the average 10 such services are needed in Mississippi to exceed the deductible. In contrast, allowed charges for medical care services averaged $12.98 in California and $12.85 in Florida, so only five services are needed in those States to exceed the deductible. No doubt these differences are reflected in the fact that in Mississippi 47 percent of the beneficiaries exceeded the deductible in 1975, while 57 percent did so in Florida and 61 percent in California.

The correlation coefficient between C (for all types of services) and P was .39 ($P \leq .05$); for $C_m$ (for medical care services) and P the correlation coefficient was .52 ($P \leq .05$).

## AVERAGE NUMBER OF SERVICES PER REIMBURSED USER ($S_u$)[3]

Table 8, (col. a) shows that the average number of services per reimbursed user was 24.1, with the number of services received per reimbursed user rising only slightly with older age groups. Neither sex, race, nor census region had much influence on the number of services per reimbursed user. Similarly, the average number of services per reimbursed user in each census region was relatively constant: Northeast, 23.8 services; North Central, 23.2; South, 25.1; and West, 24.2.

[3] Reimbursed users are persons who met the Part B deductible and received reimbursements. For these users, their total number of services are counted, including those which may have gone toward meeting the deductible. Users who did not exceed the deductible and receive reimbursements are not included in these data. Complete counts of their services are unavailable from the data system.

Although there were wide variations in the number of services per reimbursed user by State (Table 9, col a), a comparison of States with the highest reimbursements per beneficiary and the number of services per reimbursed user shows no obvious pattern. A correlation coefficient was computed using data for all States to determine if there was a correlation between reimbursement per beneficiary and average number of services per reimbursed user. The correlation was only .10.

**TABLE 8**
**Medicare Beneficiaries: Average Number of Services per Reimbursed User and Average Number of Reimbursed Services per Beneficiary for Persons Aged 65 Years and Over, by Age, Sex, and Race, 1975**

| Age, Sex, Race | Average Number of Services per Reimbursed User | Average Number of Reimbursed Services per Beneficiary |
|---|---|---|
| | (a) | (b) |
| Total | 24.1 | 12.0 |
| Age: | | |
| 65-69 | 22.3 | 9.2 |
| 70-74 | 24.0 | 12.0 |
| 75-79 | 24.8 | 13.3 |
| 80-84 | 25.6 | 14.8 |
| 85 and Over | 25.6 | 15.8 |
| Sex: | | |
| Men | 24.8 | 11.7 |
| Women | 23.8 | 12.1 |
| Race: | | |
| White | 24.2 | 12.3 |
| Other Races | 23.2 | 9.9 |

## AVERAGE NUMBER OF REIMBURSED SERVICES PER BENEFICIARY[4]

The average number of reimbursed services per beneficiary is the product of two factors discussed above: the proportion of beneficiaries who exceeded the deductible and received reimbursements (P) and the average number of services per reimbursed user ($S_u$). This variable is discussed below.

### Age, Sex, and Race

Table 8 (col. b) shows the average number of reimbursed services per beneficiary by age, sex, and race. The average was 12.0 services, with the number rising steadily for older age groups. Little difference was found in the average number of reimbursed services per beneficiary for men in comparison to women. By race the difference was substantial, with white beneficiaries averaging 12.3 reimbursed services and non-white beneficiaries averaging 9.9 reimbursed services.

[4] The average number of reimbursed services per beneficiary does not reflect services of the total beneficiary population but rather the total services used by persons who received Medicare reimbursement spread out over the entire beneficiary population.

### Census Region and State

A difference of over three reimbursed services per beneficiary is evident between the highest census region—the West, with an average of 13.8 reimbursed services per beneficiary—and the lowest region—the North Central, with an average of 10.5 reimbursed services per beneficiary (Table 9, col. b).

By State, the range was from a low of 7.5 reimbursed services per beneficiary in Montana to a high of 15.7 reimbursed services per beneficiary in Arkansas. The States with the highest and lowest average number of reimbursed services per beneficiary were:

| | Average Number of Reimbursed Services Per Beneficiary |
|---|---|
| Highest States | |
| Arkansas | 15.7 |
| Mississippi | 15.6 |
| California | 15.2 |
| Rhode Island | 15.2 |
| Texas | 14.8 |
| Lowest States | |
| Montana | 7.5 |
| Kentucky | 7.9 |
| Maryland | 8.5 |
| South Dakota | 8.7 |
| West Virginia | 8.7 |

A correlation coefficient was computed between reimbursement per beneficiary and the average number of reimbursed services per beneficiary and was found significant at .61 ($P \leq .05$).[5]

[5] The finding that average Medicare reimbursements by State do not correlate with the number of services per reimbursed user but rather with the number of reimbursed services per beneficiary is consistent with reimbursement patterns generally observed in Medicare Part A and Part B data. Variations in reimbursements per user—by demographic characteristics or by geographic area—are generally much less than variations in reimbursement per beneficiary. For example, in 1975, information from the hospital insurance program shows that reimbursements per user 85 years of age and over ($1,892) were only 10 percent above the average reimbursement per user in the group 65-66 years of age ($1,719). But there were far more users 85 years of age and over, so that reimbursement per beneficiary ($574) was 85 percent greater than the average reimbursement per beneficiary ($310) in the group 65-66 years of age. Another example (from these data): in California the average number of services per reimbursed user (24.8) was only 10 percent above the average number of services per reimbursed user in Kentucky (22.5). However, there were far more reimbursed users (those who exceeded the deductible) in California than in Kentucky so that the average number of reimbursed services per beneficiary in California (15.2) was more than 90 percent higher than the average number of reimbursed services per beneficiary in Kentucky (7.9).

TABLE 9

**Medicare Beneficiaries: Average Number of Services per Reimbursed User and Average Number of Reimbursed Services per Beneficiary for Persons Aged 65 Years and Over, by State, 1975**

| Area of Residence | Average Number of Services per Reimbursed User | Average Number of Reimbursed Services per Beneficiary |
|---|---|---|
| | (a) | (b) |
| United States | 24.1 | 12.0 |
| Northeast | 23.8 | 12.4 |
| New England | 23.3 | 12.0 |
| Maine | 26.8 | 12.3 |
| New Hampshire | 26.7 | 13.0 |
| Vermont | 24.0 | 13.1 |
| Massachusetts | 23.4 | 11.9 |
| Rhode Island | 23.6 | 15.2 |
| Connecticut | 20.5 | 10.5 |
| Mid Atlantic | 24.0 | 12.5 |
| New York | 25.1 | 13.4 |
| New Jersey | 23.3 | 12.9 |
| Pennsylvania | 22.5 | 10.9 |
| North Central | 23.2 | 10.5 |
| East North Central | 22.8 | 10.3 |
| Ohio | 26.5 | 12.0 |
| Indiana | 22.9 | 10.5 |
| Illinois | 23.1 | 9.6 |
| Michigan | n.a. | n.a. |
| Wisconsin | 28.9 | 13.4 |
| West North Central | 24.0 | 10.9 |
| Minnesota | 23.1 | 10.9 |
| Iowa | 21.5 | 9.8 |
| Missouri | 27.5 | 12.2 |
| North Dakota | 25.5 | 14.0 |
| South Dakota | 22.6 | 8.7 |
| Nebraska | 25.9 | 10.3 |
| Kansas | 20.3 | 9.6 |
| South | 25.1 | 12.0 |
| South Atlantic | 23.6 | 11.5 |
| Delaware | 23.4 | 12.1 |
| Maryland | 20.3 | 8.5 |
| District of Columbia | 24.4 | 12.0 |
| Virginia | 23.1 | 10.1 |
| West Virginia | 22.9 | 8.7 |
| North Carolina | 22.6 | 10.4 |
| South Carolina | 22.6 | 10.0 |
| Georgia | 24.5 | 11.6 |
| Florida | 24.7 | 14.0 |
| East South Central | 25.4 | 10.6 |
| Kentucky | 22.5 | 7.9 |
| Tennessee | 24.9 | 10.6 |
| Alabama | 22.9 | 9.9 |
| Mississippi | 33.1 | 15.6 |
| West South Central | 27.2 | 13.8 |
| Arkansas | 31.4 | 15.7 |
| Louisiana | 24.0 | 10.7 |
| Oklahoma | 24.8 | 11.9 |
| Texas | 27.7 | 14.8 |
| West | 24.2 | 13.8 |
| Mountain | 23.3 | 11.7 |
| Montana | 17.1 | 7.5 |
| Idaho | 25.8 | 12.0 |
| Wyoming | 26.4 | 10.1 |
| Colorado | 22.9 | 12.2 |
| New Mexico | 26.8 | 13.7 |
| Arizona | 26.4 | 14.3 |
| Utah | n.a. | n.a. |
| Nevada | 20.5 | 11.0 |
| Pacific | 24.4 | 14.5 |
| Washington | 22.7 | 12.6 |
| Oregon | 23.4 | 11.9 |
| California | 24.8 | 15.2 |
| Alaska | 22.9 | 14.0 |
| Hawaii | 21.1 | 12.2 |

n.a. Not available. Counts of services were unreliable for Michigan and Utah.

## SUMMARY OF FACTORS SIGNIFICANTLY CORRELATED WITH $R_b$

Reimbursement per beneficiary in an area is highly correlated with the proportion of beneficiaries who met the deductible, with the average allowed charge per service, and with the average number of services per beneficiary, as summarized below:

Correlation of Reimbursement per Beneficiary with:

| | |
|---|---|
| a) Percentage who met the deductible | .78 |
| b) Average allowed charge | .76 |
| c) Average number of reimbursed services per beneficiary | .61 |

## Summary and Discussion

This study indicates that several factors are related to the geographic and demographic variations found in Medicare reimbursements for physicians' services. The range in average allowed charges across States was greater than the range found in a previous study of prevailing specialist fee levels for 29 frequently performed procedures. Evidently, factors that are not reflected in the specialist fee index—including non-specialist fees, the mix of services, and billing and carrier practices—have a significant impact on average allowed charges. This finding is important in light of the economic index which was designed to limit the allowed charge for specific services reimbursed. If there is a shift in the mix of services to higher priced services, or if the number of services increases, total Medicare reimbursements per beneficiary could continue to rise at an inflationary rate.

Differences in average allowed charges are very important because they have a multiplicative effect on differences in Medicare reimbursements. That is, average allowed charges affect reimbursements and also affect the proportion of beneficiaries who reach the deductible. In low price areas, beneficiaries have a lower probability of reaching the $60 of allowed charges and receiving benefits compared to beneficiaries in high price areas. This result raises the question of equity, especially as it relates to disparities by State which are likely to persist year after year. The highest priced areas tend to be the same areas each year, and these areas will have the highest percentage of Medicare beneficiaries who receive benefit payments each year; the reverse is also true. Some areas will have the lowest percentage of beneficiaries who receive Medicare benefits year after year.

The results of a tabulation (from the ongoing Medicare Statistical System) of beneficiaries who met the Part B deductible in 1975, 1976, 1977, and 1978 are shown in Table 10. States are ranked according to the percentage of beneficiaries who met the Part B deductible, 1975-1978.

TABLE 10

**Medicare Beneficiaries: Percent of Aged Persons Ever Enrolled Each Year, Who Met the Part B Deductible, and Rank, by State, 1975-1978[1]**

| Area of Residence | 1975 | | 1976 | | 1977 | | 1978 | |
|---|---|---|---|---|---|---|---|---|
| | Percent | Rank | Percent | Rank | Percent | Rank | Percent | Rank |
| United States | 50.0 | — | 52.7 | — | 54.8 | — | 56.6 | — |
| Northeast | 52.8 | — | 55.9 | — | 57.9 | — | 59.9 | — |
| New England | — | — | — | — | — | — | — | — |
| Maine | 45.9 | 34 | 50.4 | 28 | 54.2 | 23 | 56.6 | 21 |
| New Hampshire | 49.9 | 21 | 52.0 | 23 | 55.8 | 19 | 57.7 | 17 |
| Vermont | 51.3 | 17 | 54.5 | 18 | 58.6 | 11 | 58.9 | 16 |
| Massachusetts | 52.0 | 15 | 55.4 | 14 | 57.7 | 14 | 60.0 | 12 |
| Rhode Island | 58.7 | 2 | 63.3 | 1 | 66.3 | 1 | 68.9 | 1 |
| Connecticut | 50.7 | 20 | 54.9 | 15 | 57.3 | 15 | 59.4 | 15 |
| Mid Atlantic | — | — | — | — | — | — | — | — |
| New York | 55.5 | 7 | 58.6 | 6 | 60.2 | 7 | 61.7 | 7 |
| New Jersey | 53.2 | 10 | 56.1 | 11 | 58.1 | 12 | 60.0 | 10 |
| Pennsylvania | 49.6 | 22 | 52.5 | 21 | 54.5 | 22 | 56.9 | 19 |
| North Central | 46.1 | — | 48.9 | — | 51.0 | — | 52.9 | — |
| East North Central | — | — | — | — | — | — | — | — |
| Ohio | 45.4 | 36 | 47.8 | 37 | 49.9 | 36 | 51.8 | 36 |
| Indiana | 45.0 | 37 | 48.0 | 36 | 49.3 | 41 | 51.0 | 41 |
| Illinois | 42.7 | 46 | 45.6 | 45 | 47.8 | 46 | 49.3 | 46 |
| Michigan | 52.6 | 13 | 55.6 | 12 | 57.9 | 13 | 60.1 | 9 |
| Wisconsin | 44.5 | 39 | 47.6 | 38 | 49.4 | 39 | 51.7 | 38 |
| West North Central | — | — | — | — | — | — | — | — |
| Minnesota | 47.9 | 26 | 51.4 | 24 | 53.4 | 28 | 55.0 | 27 |
| Iowa | 44.1 | 42 | 45.7 | 44 | 49.4 | 40 | 51.8 | 37 |
| Missouri | 45.8 | 35 | 48.6 | 35 | 50.0 | 35 | 51.5 | 39 |
| North Dakota | 53.1 | 11 | 56.7 | 10 | 58.9 | 9 | 59.6 | 14 |
| South Dakota | 40.1 | 50 | 42.7 | 50 | 44.4 | 50 | 47.8 | 50 |
| Nebraska | 41.0 | 48 | 44.0 | 48 | 45.8 | 48 | 48.2 | 49 |
| Kansas | 52.2 | 14 | 55.5 | 13 | 57.2 | 16 | 60.0 | 10 |
| South | 47.8 | — | 50.4 | — | 52.6 | — | 54.5 | — |
| South Atlantic | — | — | — | — | — | — | — | — |
| Delaware | 47.4 | 29 | 50.7 | 26 | 54.2 | 23 | 55.9 | 24 |
| Maryland | 50.9 | 19 | 54.7 | 17 | 56.0 | 17 | 56.9 | 20 |
| District of Columbia | 56.7 | 3 | 59.8 | 3 | 61.9 | 3 | 63.3 | 4 |
| Virginia | 43.3 | 45 | 46.9 | 41 | 49.5 | 38 | 52.1 | 35 |
| West Virginia | 40.8 | 49 | 43.7 | 49 | 45.8 | 48 | 50.7 | 42 |
| North Carolina | 43.5 | 43 | 45.5 | 46 | 48.3 | 44 | 50.4 | 45 |
| South Carolina | 43.4 | 44 | 46.9 | 42 | 49.2 | 42 | 50.7 | 42 |
| Georgia | 47.1 | 30 | 48.9 | 32 | 52.0 | 30 | 53.6 | 32 |
| Florida | 55.7 | 6 | 58.4 | 7 | 60.6 | 6 | 62.7 | 6 |
| East South Central | — | — | — | — | — | — | — | — |
| Kentucky | 37.4 | 51 | 41.1 | 51 | 42.7 | 51 | 44.5 | 51 |
| Tennessee | 42.3 | 47 | 45.3 | 47 | 48.0 | 45 | 49.3 | 46 |
| Alabama | 46.5 | 33 | 48.8 | 33 | 51.1 | 34 | 53.8 | 30 |
| Mississippi | 44.4 | 40 | 47.4 | 39 | 49.6 | 37 | 51.4 | 40 |
| West South Central | — | — | — | — | — | — | — | — |
| Arkansas | 47.1 | 31 | 50.4 | 27 | 52.5 | 29 | 54.4 | 28 |
| Louisiana | 44.8 | 38 | 47.4 | 40 | 48.6 | 43 | 50.6 | 44 |
| Oklahoma | 47.5 | 28 | 49.8 | 30 | 51.7 | 32 | 52.3 | 34 |
| Texas | 51.3 | 18 | 52.6 | 19 | 54.6 | 21 | 55.9 | 26 |
| West | 56.6 | — | 59.0 | — | 60.8 | — | 61.9 | — |
| Mountain | — | — | — | — | — | — | — | — |
| Montana | 48.4 | 25 | 52.3 | 22 | 54.0 | 25 | 54.4 | 29 |
| Idaho | 46.5 | 32 | 48.8 | 34 | 51.5 | 33 | 53.7 | 31 |
| Wyoming | 44.1 | 41 | 46.4 | 43 | 47.4 | 47 | 48.4 | 48 |
| Colorado | 54.2 | 9 | 57.5 | 8 | 59.4 | 8 | 61.1 | 8 |
| New Mexico | 48.5 | 24 | 51.2 | 25 | 53.5 | 27 | 56.0 | 23 |
| Arizona | 54.5 | 8 | 56.8 | 9 | 58.9 | 9 | 60.0 | 13 |
| Utah | 47.6 | 27 | 49.9 | 29 | 51.7 | 31 | 53.5 | 33 |
| Nevada | 52.9 | 12 | 54.9 | 16 | 56.0 | 18 | 57.5 | 18 |
| Pacific | — | — | — | — | — | — | — | — |
| Washington | 56.6 | 5 | 58.9 | 5 | 61.0 | 5 | 63.0 | 5 |
| Oregon | 49.2 | 23 | 52.6 | 20 | 55.3 | 20 | 56.5 | 22 |
| California | 59.8 | 1 | 61.9 | 2 | 63.5 | 2 | 64.3 | 2 |
| Alaska | 51.8 | 16 | 49.6 | 31 | 53.8 | 26 | 55.9 | 25 |
| Hawaii | 56.6 | 4 | 59.8 | 4 | 61.3 | 4 | 63.7 | 3 |

[1] Information is derived from the master health insurance enrollment file, based on a five-percent sample of enrolled persons. Percent meeting the Part B deductible each year was calculated by dividing the total number of persons who met the Part B deductible by the total number of persons enrolled that year. (All other tables shown in this report use a July 1 enrollment count to derive the percent that met the deductible and to derive per beneficiary amounts.) The State with the highest percentage meeting the deductible is ranked "1" and the lowest is ranked "51."

As indicated below, the five top ranked areas in 1975 (California, Rhode Island, District of Columbia, Hawaii, and Washington) hardly varied in their respective positions in 1976, 1977, or 1978. This was also true of the States ranking lowest in the percentage of beneficiaries who met the deductible in 1975 (Kentucky, South Dakota, West Virginia, Nebraska, and Tennessee). Their respective ranks hardly changed in the following years. In the highest ranking State in 1978—Rhode Island—a Medicare beneficiary had a probability of nearly seven out of 10 of exceeding the deductible whereas in the lowest ranking State—Kentucky—the probability was 4.5 out of 10.

The consistency in the results on meeting the deductible has implications not only for the Medicare program but for other public health insurance programs that may be enacted. Most of the proposals for national health insurance, and especially for catastrophic insurance, include nationally-set premiums, deductibles, and coinsurance. Yet, as these data show, the deductible feature can result in wide geographic disparities in benefit payments.

Some policy analysts have suggested that the geographic variations in Medicare reimbursements should be reduced. For Medicare's Part B program, one remedy could be to vary the monthly premiums, setting the premium higher in high price areas and lower in low price areas. This solution could make cost-sharing more equitable but would have no impact on the proportion of beneficiaries who reach the deductible and receive reimbursements.

Another option would be to vary the deductible by area. To determine the effect of this option a special tabulation was run to see what changes would occur in reimbursements in California (the highest reimbursement area) if the deductible were raised to $120. The impact of this change would be very significant on the percentage of beneficiaries who exceeded the deductible. The percentage would fall from 61 percent with the deductible as it is at $60 to only 45 percent with the deductible at $120. Reimbursement per beneficiary would drop from the actual $197 with the deductible at $60 to $171 with the deductible at $120.

Another factor that has a significant impact on Medicare reimbursements—the number of services received—requires more study. This analysis of the average number of services is limited because the claims system does not have information about the number of services used by persons who did not receive Medicare reimbursements. Some of the differences in the number of reimbursed services per beneficiary shown in this study reflect the differential impact of the deductible. Yet, it cannot be assumed that if the deductible were eliminated, Medicare beneficiaries would have access to and receive a relatively similar number of Medicare covered physicians' services throughout the nation. Future study is needed to determine demographic and geographic variations in use of physicians' services by the total beneficiary population and to analyze the factors that influence variations in the number of services received by beneficiaries, including the demand for services and the supply of services available to the beneficiary population.

*Acknowledgement*

*The authors wish to acknowledge the assistance of Jill M. Hare in coordinating the preparation and typing of this report.*

Percentage of Aged Beneficiaries Ever Enrolled Who Met the Part B Deductible and Rank by State

| | 1975 | | 1976 | | 1977 | | 1978 | |
|---|---|---|---|---|---|---|---|---|
| State | Percent | Rank | Percent | Rank | Percent | Rank | Percent | Rank |
| California | 59.8 | 1 | 61.9 | 2 | 63.5 | 2 | 64.3 | 2 |
| Rhode Island | 58.7 | 2 | 63.3 | 1 | 66.3 | 1 | 68.9 | 1 |
| District of Columbia | 56.7 | 3 | 59.8 | 3 | 61.9 | 3 | 63.3 | 4 |
| Hawaii | 56.6 | 4 | 59.8 | 4 | 61.3 | 4 | 63.7 | 3 |
| Washington | 56.6 | 5 | 58.9 | 5 | 61.0 | 5 | 63.0 | 5 |

Percentage of Aged Beneficiaries Ever Enrolled Who Met the Part B Deductible and Rank by State

| | 1975 | | 1976 | | 1977 | | 1978 | |
|---|---|---|---|---|---|---|---|---|
| State | Percent | Rank | Percent | Rank | Percent | Rank | Percent | Rank |
| Kentucky | 37.4 | 51 | 41.1 | 51 | 42.7 | 51 | 44.5 | 51 |
| South Dakota | 40.1 | 50 | 42.7 | 50 | 44.4 | 50 | 47.8 | 50 |
| West Virginia | 40.8 | 49 | 43.7 | 49 | 45.8 | 48 | 50.7 | 42 |
| Nebraska | 41.0 | 48 | 44.0 | 48 | 45.8 | 48 | 48.2 | 49 |
| Tennessee | 42.3 | 47 | 45.3 | 47 | 48.0 | 45 | 49.3 | 46 |

## NON-SAMPLING ERROR

Differences between data from the Bill Summary record system and from the administrative payment record system reflect sampling and non-sampling errors as well as the omission in the Bill Summary data of claims submitted on the 1554 and 1556 claims forms. On a national basis, the average reimbursement from the Bill Summary ($131) was 6.3 percent lower than the average reimbursement from the payment records ($139; see Table A). It is estimated that about three percent of reimbursements are made from the 1554 and 1556 claims forms nationally. On a State level, the 1554 and 1556 claims could account for more or less than three percent. Although estimates are not available for each State, it is known that over 20 percent of reimbursements made by the District of Columbia carrier are based on the 1554 and 1556 claims forms. To alert the reader to reimbursement figures in the Bill Summary columns that appear low (arbitrarily defined as 14 percent below reimbursement from the payment record system) they have an asterisk. In such cases, the percentage of persons who received reimbursements generally appears low also. If the reimbursement from the Bill Summary does not appear low but the percentage of persons who received reimbursements is low, that figure has an asterisk also. It can be observed that most of the States with asterisks are small States which are likely to have higher sampling errors.

## SAMPLING ERROR*

The data used in this paper are estimates based on a one percent sample of the enrolled population and hence are subject to sampling variability. Tables B through H will enable the reader to obtain approximate standard errors for the estimates in this paper. The standard error is primarily a measure of sampling variability—that is, of the variation that occurs by chance because a sample rather than the whole population is used. To calculate the standard errors at a reasonable cost for the wide variety of estimates in this paper, it was necessary to use approximation methods. Thus, these tables should be used only as indicators of the order of magnitude of the standard errors for specific estimates.

The sample estimate and an estimate of its standard error permit us to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples (for a given sampling rate).

To illustrate, if all possible samples were selected, if each of these were surveyed under essentially the same conditions, *and if an estimate and its estimated standard error were calculated from each sample,* then:

i. Approximately 2/3 of the intervals from one standard error below the estimate to one standard error above the estimate would include the average value of all possible samples. We call an interval from one standard error below the estimate to one standard error above the estimate a 2/3 confidence interval.
ii. Approximately 9/10 of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average value of all possible samples. We call an interval from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate a 90 percent confidence interval.
iii. Approximately 19/20 of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average value of all possible samples. We call an interval from two standard errors below the estimate to two standard errors above the estimate a 95 percent confidence interval.
iv. Almost all intervals from three standard errors below the sample estimate to three standard errors above the sample estimate would include the average value of all possible samples.

The average value of all possible samples may or may not be contained in any particular computed interval. But for a *particular* sample, one can say *with specified confidence* that the average of all possible samples is included in the constructed interval.

The relative standard error is defined as the standard error of the estimate divided by the value being estimated. In general, small estimates, estimates for small subgroups, and percentages or means with small bases tend to be relatively unreliable. The reader should be aware that some of the estimates in this paper may have high relative standard errors.

The use of Tables B and C is straightforward. For example, the standard error of an estimated $100 million reimbursement is found to be $3.5 million. Simple linear interpolation may be used for values not tabled.

*Prepared by James C. Beebe, Statistical and Research Services Branch, Office of Research.

**TABLE A**

**Comparison of Percentage of Beneficiaries with Reimbursements for Physicians' Services and Average Reimbursement per Person Enrolled: From the Administrative Payment Record system and from the Bill Summary, 1975.**

| State | Payment Record[1] | | Bill Summary[2] | |
|---|---|---|---|---|
| | Percent of Persons Enrolled Exceeding the Deductible | Average Reimbursement per Person Enrolled | Percent of Persons Enrolled Exceeding the Deductible | Average Reimbursement per Person Enrolled |
| United States | 52 | $ 139 | 50 | $ 131 |
| Northeast | 54 | 151 | 52 | 146 |
| New England | 53 | 132 | 52 | 127 |
| Maine | 46 | 105 | 46 | 106 |
| New Hampshire | 52 | 110 | 49 | 98 |
| Vermont | 54 | 112 | 55 | 105 |
| Massachusetts | 52 | 135 | 51 | 127 |
| Rhode Island | 64 | 152 | 64 | 153 |
| Connecticut | 53 | 139 | 51 | 137 |
| Mid Atlantic | 55 | 157 | 52 | 152 |
| New York | 57 | 181 | 53 | 173 |
| New Jersey | 56 | 154 | 55 | 150 |
| Pennsylvania | 51 | 124 | 49 | 123 |
| North Central | 48 | 117 | 45 | 110 |
| East North Central | 48 | 119 | 45 | 112 |
| Ohio | 47 | 107 | 45 | 101 |
| Indiana | 47 | 98 | 46 | 99 |
| Illinois | 44 | 124 | 41 | 115 |
| Michigan | 54 | 137 | 49 | 122 |
| Wisconsin | 48 | 125 | 46 | 124 |
| West North Central | 49 | 112 | 45 | 106 |
| Minnesota | 51 | 130 | 47 | 111 * |
| Iowa | 45 | 90 | 46 | 92 |
| Missouri | 48 | 111 | 45 | 114 |
| North Dakota | 57 | 121 | 55 | 102 * |
| South Dakota | 43 | 87 | 38 | 76 |
| Nebraska | 43 | 108 | 40 | 105 |
| Kansas | 54 | 123 | 47 * | 114 |
| South | 50 | 128 | 48 | 117 |
| South Atlantic | 51 | 137 | 49 | 126 |
| Delaware | 52 | 123 | 52 | 98 * |
| Maryland | 52 | 138 | 42 * | 107 * |
| District of Columbia | 58 | 199 | 49 * | 173 |
| Virginia | 45 | 106 | 44 | 101 |
| West Virginia | 40 | 81 | 38 | 71 |
| North Carolina | 46 | 98 | 46 | 94 |
| South Carolina | 45 | 90 | 44 | 86 |
| Georgia | 50 | 118 | 47 | 110 |
| Florida | 59 | 185 | 57 | 171 |
| East South Central | 45 | 97 | 42 | 84 |
| Kentucky | 39 | 76 | 35 | 65 * |
| Tennessee | 45 | 98 | 42 | 87 |
| Alabama | 49 | 115 | 43 | 92 * |
| Mississippi | 48 | 100 | 47 | 98 |
| West South Central | 52 | 135 | 51 | 124 |
| Arkansas | 51 | 118 | 50 | 112 |
| Louisiana | 47 | 111 | 45 | 106 |
| Oklahoma | 50 | 125 | 48 | 110 |
| Texas | 54 | 150 | 53 | 137 |
| West | 59 | 182 | 57 | 170 |
| Mountain | 53 | 143 | 50 | 133 |
| Montana | 49 | 113 | 44 | 65 * |
| Idaho | 50 | 112 | 47 | 100 |
| Wyoming | 45 | 103 | 38 * | 99 |
| Colorado | 55 | 144 | 53 | 133 |
| New Mexico | 51 | 136 | 51 | 147 |
| Arizona | 56 | 175 | 54 | 173 |
| Utah | 49 | 119 | 45 | 100 * |
| Nevada | 54 | 175 | 54 | 171 |
| Pacific | 61 | 194 | 59 | 181 |
| Washington | 58 | 144 | 56 | 137 |
| Oregon | 52 | 129 | 51 | 125 |
| California | 63 | 213 | 61 | 197 |
| Alaska | 61 | 195 | 61 | 188 |
| Hawaii | 56 | 139 | 58 | 137 |

[1] Based on a five-percent sample. Data are from the administrative payment record system from HCFA claim forms 1490 (and its variations); 1491; 1554, and 1556. Nationally, combined reimbursements from the 1554 and 1556 are approximately three percent of total reimburse ments shown.

[2] Based on a one-percent sample. Data are from the Bill Summary record system based on HCFA claim forms: 1490 (and its variations) and the 1491.

NOTE: For an explanation of the asterisks, see section on Non-Sampling Errors in the Technical Note.

**TABLE B**

**Approximate Standard Error of Estimated Dollars**

**[in thousands]**

| Estimated Dollars | Standard Error |
|---|---|
| $1,000 | $330 |
| 2,000 | 470 |
| 3,000 | 580 |
| 5,000 | 750 |
| 7,000 | 900 |
| 10,000 | 1,100 |
| 20,000 | 1,500 |
| 30,000 | 1,900 |
| 50,000 | 2,500 |
| 70,000 | 2,900 |
| 100,000 | 3,500 |
| 200,000 | 5,000 |
| 300,000 | 6,200 |
| 500,000 | 8,100 |
| 700,000 | 9,600 |
| 1,000,000 | 12,000 |
| 2,000,000 | 16,000 |
| 3,000,000 | 20,000 |
| 5,000,000 | 26,000 |

**TABLE C**

**Approximate Standard Error of Estimated Number of Persons**

| Estimated Number of Persons | Standard Error |
|---|---|
| 100 | 100 |
| 200 | 140 |
| 300 | 170 |
| 500 | 220 |
| 700 | 260 |
| 1,000 | 320 |
| 2,000 | 450 |
| 3,000 | 550 |
| 5,000 | 710 |
| 7,000 | 840 |
| 10,000 | 1,000 |
| 20,000 | 1,400 |
| 30,000 | 1,700 |
| 50,000 | 2,200 |
| 70,000 | 2,600 |
| 100,000 | 3,200 |
| 200,000 | 4,500 |
| 300,000 | 5,400 |
| 500,000 | 7,000 |
| 700,000 | 8,200 |
| 1,000,000 | 9,800 |
| 2,000,000 | 14,000 |
| 3,000,000 | 16,000 |
| 5,000,000 | 20,000 |
| 7,000,000 | 22,000 |
| 10,000,000 | 24,000 |
| 12,000,000 | 24,000 |

Table D contains the relative standard error of dollars per service and requires knowledge of the number of services in the base. The number of services can be derived by multiplying the number of users in Table I or J by the number of services per user in Table 8 or 9. To illustrate its use, assume we have an estimate of $18 per service based on 7,000,000 services. The relative standard error is .020 and the standard error .020 × $18 = $.36.

Tables D through G are for estimated percentages or means and also require knowledge of the number in the base of the estimate. The number of beneficiaries enrolled can be found in HCFA Publication No. 062, *MEDICARE: Health Insurance for the Aged and Disabled, 1975, Section 2: Persons Enrolled in the Health Insurance Program*. Other bases can be found in the appropriate table of this report. To illustrate their use, Table 8 shows the average number of services per user for age group 65-69 to be 22.3. The following steps, using double linear interpolation, show how to obtain the standard error of this estimate.

1. Table H shows the number of users in the base to be 3,027,800.
2. In Table F we find:
   a. Standard error for 20 services per user and three million users - .19.
   b. Standard error for 30 services per user and three million users - .24.
3. The interpolated standard error for 22.3 services per user and three million is .20.
4. Again in Table F we find:
   a. Standard error for 20 services per user and 5 million users - .15.
   b. Standard error for 30 services per user and 5 million users - .18.
5. The interpolated standard error for $23.06 and 10 million is .16.
6. Interpolating between .20 and .16 for the 3,027,800 users in the base, we find the standard error of the estimate to be .199 which rounds to .20 services per user.

**TABLE D**

**Approximate Relative Standard Error of Dollars per Service**

| Base of Rate (service in thousands) | Relative Standard Error |
|---|---|
| 10 | .51 |
| 20 | .38 |
| 30 | .29 |
| 50 | .22 |
| 70 | .20 |
| 100 | .17 |
| 200 | .12 |
| 300 | .096 |
| 500 | .076 |
| 700 | .063 |
| 1,000 | .054 |
| 2,000 | .038 |
| 3,000 | .031 |
| 5,000 | .025 |
| 7,000 | .020 |
| 10,000 | .017 |
| 20,000 | .012 |
| 30,000 | .010 |
| 50,000 | .0076 |
| 70,000 | .0065 |
| 100,000 | .0054 |
| 200,000 | .0038 |

**TABLE E**

**Approximate Standard Error of Estimated Dollars per Beneficiary**

| Base of Rate (beneficiaries in thousands) | Dollars per Beneficiary | | | |
|---|---|---|---|---|
| | $50 | $70 | $100 | $200 |
| 1 | 50 | 70 | 100 | 140 |
| 2 | 50 | 60 | 72 | 100 |
| 3 | 41 | 49 | 59 | 84 |
| 5 | 32 | 38 | 46 | 66 |
| 7 | 27 | 33 | 39 | 56 |
| 10 | 23 | 27 | 33 | 47 |
| 20 | 16 | 20 | 24 | 34 |
| 30 | 14 | 16 | 19 | 28 |
| 50 | 11 | 13 | 15 | 22 |
| 70 | 9.0 | 11 | 13 | 18 |
| 100 | 7.5 | 9.0 | 11 | 15 |
| 200 | 5.4 | 6.4 | 7.7 | 11 |
| 300 | 4.4 | 5.3 | 6.3 | 9.0 |
| 500 | 3.5 | 4.1 | 4.9 | 7.1 |
| 700 | 2.9 | 3.5 | 4.2 | 6.0 |
| 1,000 | 2.5 | 2.9 | 3.5 | 5.0 |
| 2,000 | 1.8 | 2.1 | 2.5 | 3.6 |
| 3,000 | 1.5 | 1.7 | 2.1 | 3.0 |
| 5,000 | 1.1 | 1.3 | 1.6 | 2.3 |
| 7,000 | .96 | 1.1 | 1.4 | 2.0 |
| 10,000 | .81 | .96 | 1.2 | 1.7 |
| 20,000 | .58 | .69 | .82 | 1.2 |

**TABLE F**

**Approximate Standard Error of Percent Distribution of Dollars**

| Percent | Base of percent (dollars in millions) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $1 | $2 | $3 | $5 | $7 | $10 | $20 | $30 | $50 | $70 | $100 | $200 | $300 | $500 | $700 | $1,000 | $2,000 | $3,000 | $5,000 |
| 1 or 99 | 3.3 | 2.4 | 2.0 | 1.5 | 1.3 | 1.0 | .78 | .64 | .50 | .42 | .36 | .26 | .21 | .17 | .14 | .12 | .088 | .075 | .061 |
| 2 or 98 | 4.7 | 3.3 | 2.7 | 2.1 | 1.8 | 1.5 | 1.1 | .90 | .70 | .60 | .50 | .36 | .30 | .23 | .20 | .17 | .12 | .10 | .086 |
| 3 or 97 | 5.7 | 4.1 | 3.3 | 2.6 | 2.2 | 1.9 | 1.3 | 1.1 | .86 | .73 | .61 | .44 | .36 | .28 | .24 | .21 | .15 | .13 | .10 |
| 5 or 95 | 7.3 | 5.2 | 4.3 | 3.3 | 2.8 | 2.4 | 1.7 | 1.4 | 1.1 | .93 | .78 | .56 | .46 | .36 | .31 | .26 | .19 | .16 | .13 |
| 7 or 93 | 8.5 | 6.1 | 5.0 | 3.9 | 3.3 | 2.8 | 2.0 | 1.6 | 1.3 | 1.1 | .91 | .66 | .54 | .42 | .36 | .31 | .23 | .19 | .16 |
| 10 or 90 | 10 | 7.2 | 5.9 | 4.6 | 3.9 | 3.3 | 2.3 | 1.9 | 1.5 | 1.3 | 1.1 | .77 | .63 | .50 | .43 | .36 | .26 | .22 | .18 |
| 20 or 80 | 13 | 9.5 | 7.8 | 6.1 | 5.2 | 4.4 | 3.1 | 2.6 | 2.0 | 1.7 | 1.4 | 1.0 | .84 | .66 | .56 | .48 | .35 | .29 | .24 |
| 30 or 70 | 15 | 11 | 8.9 | 7.0 | 5.9 | 5.0 | 3.6 | 2.9 | 2.3 | 1.9 | 1.6 | 1.2 | .96 | .75 | .64 | .54 | .40 | .33 | .27 |
| 50 | 16 | 12 | 9.7 | 7.5 | 6.4 | 5.4 | 3.9 | 3.2 | 2.5 | 2.1 | 1.8 | 1.3 | 1.0 | .81 | .69 | .59 | .43 | .36 | .29 |

## TABLE G

### Approximate Standard Error of Number of Services per Beneficiary or per User

| Base of Rate (persons in thousands) | Services per Person | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 7 | 10 | 20 | 30 | 40 |
| 1 | 5.0 | 5.9 | 7.1 | 10 | 12 | 14 |
| 2 | 3.5 | 4.2 | 5.0 | 7.1 | 8.8 | 10 |
| 3 | 2.9 | 3.4 | 4.1 | 5.8 | 7.2 | 8.3 |
| 5 | 2.3 | 2.7 | 3.2 | 4.5 | 5.6 | 6.5 |
| 7 | 1.9 | 2.3 | 2.7 | 3.8 | 4.7 | 5.5 |
| 10 | 1.6 | 1.9 | 2.3 | 3.2 | 4.0 | 4.6 |
| 20 | 1.1 | 1.3 | 1.6 | 2.3 | 2.8 | 3.3 |
| 30 | .93 | 1.1 | 1.3 | 1.9 | 2.3 | 2.7 |
| 50 | .72 | .86 | 1.0 | 1.5 | 1.8 | 2.1 |
| 70 | .61 | .73 | .87 | 1.2 | 1.5 | 1.8 |
| 100 | .51 | .61 | .73 | 1.0 | 1.3 | 1.5 |
| 200 | .36 | .43 | .52 | .73 | .90 | 1.0 |
| 300 | .30 | .35 | .42 | .60 | .74 | .85 |
| 500 | .23 | .27 | .33 | .47 | .57 | .66 |
| 700 | .20 | .23 | .28 | .40 | .49 | .56 |
| 1,000 | .16 | .19 | .23 | .33 | .41 | .47 |
| 2,000 | .12 | .14 | .17 | .24 | .29 | .33 |
| 3,000 | .096 | .11 | .14 | .19 | .24 | .27 |
| 5,000 | .074 | .088 | .11 | .15 | .18 | .21 |
| 7,000 | .063 | .075 | .089 | .13 | .16 | .18 |
| 10,000 | .053 | .063 | .075 | .11 | .13 | .15 |
| 20,000 | .037 | .044 | .053 | .075 | .093 | .11 |

## TABLE H

### Approximate Standard Error of Percent Distribution of Persons

**Base of Percent** (persons in thousands)

| Percent | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 | 50 | 70 | 100 | 200 | 300 | 500 | 700 | 1,000 | 2,000 | 3,000 | 5,000 | 7,000 | 10,000 | 20,000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 or 99 | 3.2 | 2.2 | 1.8 | 1.4 | 1.2 | 1.0 | .71 | .58 | .45 | .38 | .32 | .22 | .18 | .14 | .12 | .10 | .071 | .058 | .045 | .038 | .032 | .022 |
| 2 or 98 | 4.5 | 3.2 | 2.6 | 2.0 | 1.7 | 1.4 | 1.0 | .82 | .63 | .53 | .45 | .32 | .26 | .20 | .17 | .14 | .10 | .082 | .063 | .053 | .045 | .031 |
| 3 or 97 | 5.5 | 3.9 | 3.2 | 2.5 | 2.1 | 1.7 | 1.2 | 1.0 | .78 | .66 | .55 | .39 | .32 | .25 | .21 | .17 | .12 | .10 | .077 | .065 | .054 | .038 |
| 4 or 96 | 6.3 | 4.5 | 3.7 | 2.8 | 2.4 | 2.0 | 1.4 | 1.2 | .89 | .76 | .63 | .45 | .37 | .28 | .24 | .20 | .14 | .12 | .089 | .075 | .063 | .044 |
| 5 or 95 | 7.1 | 5.0 | 4.1 | 3.2 | 2.7 | 2.2 | 1.6 | 1.3 | 1.0 | .85 | .71 | .50 | .41 | .32 | .27 | .22 | .16 | .13 | .099 | .084 | .070 | .049 |
| 7 or 93 | 8.4 | 5.9 | 4.8 | 3.7 | 3.2 | 2.6 | 1.9 | 1.5 | 1.2 | 1.0 | .84 | .59 | .48 | .37 | .32 | .26 | .19 | .15 | .12 | .099 | .082 | .057 |
| 10 or 90 | 10 | 7.1 | 5.8 | 4.5 | 3.8 | 3.2 | 2.2 | 1.8 | 1.4 | 1.2 | 1.0 | .71 | .58 | .45 | .38 | .32 | .22 | .18 | .14 | .12 | .098 | .067 |
| 20 or 80 | 14 | 10 | 8.2 | 6.3 | 5.3 | 4.5 | 3.2 | 2.6 | 2.0 | 1.7 | 1.4 | 1.0 | .82 | .63 | .53 | .45 | .31 | .28 | .20 | .16 | .14 | .090 |
| 30 or 70 | 17 | 12 | 10 | 7.8 | 6.5 | 5.5 | 3.9 | 3.2 | 2.4 | 2.1 | 1.7 | 1.2 | 1.0 | .77 | .65 | .54 | .38 | .31 | .24 | .20 | .16 | .10 |
| 40 or 60 | 20 | 14 | 12 | 8.9 | 7.6 | 6.3 | 4.5 | 3.7 | 2.8 | 2.4 | 2.0 | 1.4 | 1.2 | .89 | .75 | .63 | .44 | .36 | .27 | .22 | .18 | .11 |
| 50 | 22 | 16 | 13 | 10 | 8.5 | 7.1 | 5.0 | 4.1 | 3.2 | 2.7 | 2.2 | 1.6 | 1.3 | .99 | .84 | .70 | .49 | .39 | .30 | .25 | .20 | .12 |

**TABLE I**

**Number of Users by Age, Race, and Sex**

| Age, Race, and Sex | Number of Users |
|---|---|
| Total | 10,821,900 |
| Age: | |
| 65-69 | 3,027,800 |
| 70-74 | 2,892,600 |
| 75-79 | 2,237,500 |
| 80-84 | 1,560,800 |
| 85 and over | 1,103,200 |
| Race: | |
| White | 9,889,900 |
| Other races | 748,400 |
| Sex: | |
| Men | 4,157,000 |
| Women | 6,664,900 |

**TABLE J**

**Number of Users by Area of Residence**

| Area of Residence | Number of Users |
|---|---|
| United States | 10,821,900 |
| Northeast | 2,827,800 |
| New England | 697,400 |
| Maine | 58,700 |
| New Hampshire | 43,100 |
| Vermont | 28,900 |
| Massachusetts | 334,500 |
| Rhode Island | 71,800 |
| Connecticut | 160,400 |
| Mid Atlantic | 2,130,400 |
| New York | 1,062,800 |
| New Jersey | 413,800 |
| Pennsylvania | 654,000 |
| North Central | 2,713,500 |
| East North Central | 1,805,600 |
| Ohio | 467,800 |
| Indiana | 237,900 |
| Illinois | 467,500 |
| Michigan | 397,400 |
| Wisconsin | 235,000 |
| West North Central | 907,900 |
| Minnesota | 205,000 |
| Iowa | 164,100 |
| Missouri | 259,900 |
| North Dakota | 40,000 |
| South Dakota | 32,100 |
| Nebraska | 75,300 |
| Kansas | 131,500 |
| South | 3,278,400 |
| South Atlantic | 1,664,300 |
| Delaware | 25,700 |
| Maryland | 135,200 |
| District of Columbia | 31,700 |
| Virginia | 177,000 |
| West Virginia | 79,300 |
| North Carolina | 221,200 |
| South Carolina | 98,700 |
| Georgia | 196,400 |
| Florida | 699,100 |
| East South Central | 585,800 |
| Kentucky | 127,700 |
| Tennessee | 183,400 |
| Alabama | 158,500 |
| Mississippi | 116,200 |
| West South Central | 1,028,300 |
| Arkansas | 131,700 |
| Louisiana | 142,500 |
| Oklahoma | 154,300 |
| Texas | 599,800 |
| West | 1,996,400 |
| Mountain | 412,600 |
| Montana | 32,500 |
| Idaho | 36,300 |
| Wyoming | 12,700 |
| Colorado | 109,800 |
| New Mexico | 45,200 |
| Arizona | 114,100 |
| Utah | 39,100 |
| Nevada | 22,900 |
| Pacific | 1,583,800 |
| Washington | 197,700 |
| Oregon | 126,100 |
| California | 1,223,600 |
| Alaska | 4,200 |
| Hawaii | 32,200 |

## References


Burney, I. L., G. J. Schieber, M. O. Blaxall, and J. R. Gabel, "Geographic Variation in Physicians Fees," JAMA, September 22, 1978 - Vol. 240, No. 13.

Gibson, Robert M. and Charles R. Fisher, "Age Differences in Health Care Spending, Fiscal Year 1977," Social Security Bulletin, January 1979.

Muller, Charlotte and Jonah Otelsberg, "Carrier Discretionary Practices and Physician Payment Under Medicare Part B: A Preliminary Report," *Medical Care*, Volume 17, No. 6, June 1979.

Schieber, G. J., I. L. Burney, J. B. Golden, and W. A. Knaus: Physician Fee Patterns Under Medicare: A Descriptive Analysis. *New England Journal of Medicine*, Vol. 294, No. 20, 1976.