# APPENDIX A.—ACTUARIAL METHODOLOGY AND PRINCIPAL ASSUMPTIONS FOR COST ESTIMATES FOR THE SUPPLEMENTARY MEDICAL INSURANCE PROGRAM [1]

## 1. Estimates for Aged and Disabled (Excluding ESRD) Enrollees

### *a. Introduction*

Estimates for aged and disabled enrollees—excluding disabled persons with end stage renal disease (ESRD)—are prepared by establishing, as accurately as possible, reasonable charges incurred per enrollee in a recent year (fiscal 1976 for this report) and projecting these charges through the estimating period. The per enrollee charges are then converted to reimbursement amounts by subtracting out the per enrollee values of the deductible and coinsurance. Aggregate reimbursement amounts are calculated by multiplying the per enrollee reimbursement amounts by the projected enrollment. In order to estimate cash disbursements, an allowance is made for the delay between receipt of service and payment therefor.

Disabled persons with ESRD have per enrollee costs which are higher and quite different in nature from those of most other disabled persons. Hence, program costs for them have been excluded from the analysis in this section and are included in a later section.

### *b. Establishing a projection base*

#### *(1) Physician services*

Reimbursement amounts for physician services (and small amounts for other services) are paid through fiscal intermediaries, referred to as carriers. The carriers determine whether billed services are covered under the program and determine the reasonable charges for the services. A record of the amount reimbursed after reductions for coinsurance and the deductible is transmitted to the central office in the form of a "payment record".

Payment records for 0.1 percent of aged beneficiaries and 1.0 percent of disabled beneficiaries are tabulated by date of service, thus providing a data base which is constructed on an incurred basis. Certain minor adjustments are made to the tabulated sample data to correct for biases and random fluctuation inherent in the sampling process. Having the data on an incurred basis is necessary to meet the statutory requirement that the program be financed on this basis; it also makes possible a comparison of program experience with non-program data sources.

As a check on the validity of the projection base, incurred reimbursement amounts are compared with cash expenditures reported by the carriers through an independent reporting system. In a program with

[1] Prepared by the Office of the Actuary, Social Security Administration.

continuously increasing incurred reimbursement amounts, cash payments are expected to be slightly lower than incurred expenses (except in the first year of coverage of a service or group of beneficiaries, when the difference should be substantial). These differences between cash and incurred reimbursement amounts occur because of the lag between receipt of services and payment therefor.

*(2) Institutional and other services*

Reimbursement amounts for institutional services under Part B are paid by the same fiscal intermediaries that pay for Part A services. The principal institutional services covered under Part B are outpatient hospital care and home health agency services.

Reimbursements for institutional services occur in two stages. Provider bills are submitted to the intermediaries, and interim payments are made on the basis of these bills. The bills are then submitted to the central office, and tabulations for a sample of beneficiaries are prepared in a manner parallel to that for payment records.

At the close of a provider's accounting period, a cost report is submitted and lump-sum payments or recoveries are made to correct for the difference between interim payments made to the provider and the retroactively determined reasonable cost for providing covered services (net of coinsurance and deductible amounts). The amounts of these retroactive settlements are reported on a cash basis, and approximations are necessary to allocate these payments to the time of service.

Group practice prepayment plans are reimbursed directly by the Health Care Financing Administration on a reasonable cost basis. Data are available for these payments only on a cash basis, and approximations must be made to assign expenses to the period when services were rendered.

*(3) Summary of historical data*

Table A1 summarizes the incurred reimbursement amounts per enrollee for the various services through fiscal year 1976. Also shown are average enrollment figures for these years. In order to analyze the historical trends in prices and use of services, these reimbursement amounts are converted to the reasonable charges or reasonable costs on which reimbursement was based. This process is necessary largely because the fixed deductible becomes a smaller percentage of charges each year and thus causes reimbursement to rise faster than charges or costs. Table A2 shows the reasonable charges or costs per enrollee corresponding to the reimbursement values shown in Table A1.

TABLE A1.—INCURRED REIMBURSEMENT AMOUNTS PER ENROLLEE: HISTORICAL

| Year ending June 30— | Average enrollment (millions) | All services | Physician | Inpatient radiology and pathology [1] | Outpatient hospital | Home health agency | Group practice prepayment plan | Independent lab |
|---|---|---|---|---|---|---|---|---|
| Aged: | | | | | | | | |
| 1967 | 17.750 | $63.25 | $59.18 | ---------- | $1.41 | $.79 | $1.64 | $0.23 |
| 1968 | 18.038 | 80.21 | 72.56 | $1.89 | 2.40 | 1.49 | 1.52 | .35 |
| 1969 | 18.833 | 93.87 | 79.06 | 6.57 | 4.23 | 1.92 | 1.69 | .40 |
| 1970 | 19.312 | 99.95 | 82.82 | 7.14 | 5.88 | 1.97 | 1.66 | .48 |
| 1971 | 19.664 | 106.25 | 87.79 | 7.21 | 7.53 | 1.64 | 1.48 | .60 |
| 1972 | 20.043 | 114.01 | 94.79 | 6.77 | 8.54 | 1.59 | 1.54 | .78 |
| 1973 | 20.428 | 122.46 | 101.03 | 6.99 | 9.41 | 2.15 | 1.94 | .94 |
| 1974 | 20.988 | 134.86 | 110.06 | 7.78 | 11.35 | 2.03 | 2.44 | 1.20 |
| 1975 | 21.504 | 159.60 | 127.32 | 8.56 | 15.51 | 3.82 | 2.76 | 1.63 |
| 1976 | 22.082 | 189.13 | 146.31 | 10.91 | 21.42 | 5.14 | 3.31 | 2.04 |

See footnote at end of table.

TABLE A1.—INCURRED REIMBURSEMENT AMOUNTS PER ENROLLEE: HISTORICAL—Continued

| Year ending June 30— | Average enrollment (millions) | All services | Physician | Inpatient radiology and pathology [1] | Outpatient hospital | Home health agency | Group practice prepayment plan | Independent lab |
|---|---|---|---|---|---|---|---|---|
| Disabled (excluding ESRD): | | | | | | | | |
| 1974 | 1.639 | 119.51 | 89.91 | 7.54 | 13.89 | 3.46 | 4.16 | .55 |
| 1975 | 1.818 | 148.85 | 116.27 | 8.43 | 17.01 | 3.54 | 2.56 | 1.04 |
| 1976 | 2.016 | 177.76 | 136.37 | 9.97 | 21.73 | 5.03 | 3.24 | 1.42 |

[1] Amounts shown are for April 1968, and later when inpatient radiology and pathology charges are reimbursed at 100 percent.

TABLE A2.—INCURRED REASONABLE CHARGES OR COSTS PER ENROLLEE: HISTORICAL

| Year ending June 30— | Average enrollment (millions) | All services | Physician | Inpatient radiology and pathology [1] | Outpatient hospital | Home health agency | Group practice prepayment plan | Independent lab |
|---|---|---|---|---|---|---|---|---|
| Aged: | | | | | | | | |
| 1967 | 17.750 | $109.25 | $102.20 | ---------- | $2.43 | $1.36 | $2.84 | $0.41 |
| 1968 | 18.038 | 128.84 | 117.60 | $1.89 | 3.89 | 2.42 | 2.47 | .57 |
| 1969 | 18.833 | 145.99 | 126.25 | 6.57 | 6.76 | 3.07 | 2.70 | .64 |
| 1970 | 19.312 | 154.01 | 131.06 | 7.14 | 9.30 | 3.12 | 2.63 | .76 |
| 1971 | 19.664 | 162.56 | 137.70 | 7.21 | 11.82 | 2.57 | 2.31 | .95 |
| 1972 | 20.043 | 172.79 | 146.74 | 6.77 | 13.22 | 2.46 | 2.39 | 1.21 |
| 1973 | 20.428 | 186.26 | 157.12 | 6.99 | 14.63 | 3.04 | 3.01 | 1.47 |
| 1974 | 20.988 | 204.87 | 171.13 | 7.78 | 17.65 | 2.65 | 3.80 | 1.86 |
| 1975 | 21.504 | 236.52 | 192.96 | 8.56 | 23.51 | 4.84 | 4.18 | 2.47 |
| 1976 | 22.082 | 273.64 | 216.75 | 10.91 | 31.73 | 6.32 | 4.91 | 3.02 |
| Disabled (excluding ESRD): | | | | | | | | |
| 1974 | 1.639 | 180.91 | 139.91 | 7.54 | 21.62 | 4.51 | 6.47 | .86 |
| 1975 | 1.818 | 219.32 | 175.35 | 8.43 | 25.66 | 4.46 | 3.86 | 1.56 |
| 1976 | 2.016 | 255.95 | 200.93 | 9.97 | 32.02 | 6.16 | 4.78 | 2.09 |

[1] Amounts shown are for April 1968, and later when inpatient radiology and pathology charges are reimbursed at 100 percent.

*c. Per enrollee increases*

*(1) Physician services*

Per enrollee charges for physician services are affected by a variety of factors. Some of these can be identified explicitly. Others can be recognized only by the fact that the explicitly quantifiable factors do not explain all of the increase in per enrollee charges year-to-year.

Increases in average charge per service are one of the most important elements creating increasing charges per enrollee. The physician fee component of the consumer price index provides an estimate of the historical increases in average charge per service. Increases in this index are shown in the first column of table A3.

Bills submitted to the carriers during a 12-month period beginning July 1 are subject, by statute, to certain limitations on the level of fees to be recognized by the program for reimbursement purposes. The fee level recognized for a particular service by a physician is subject to reduction if it exceeds the median charge that the physician assessed for the same service in the preceding calendar year. This median charge is called the "customary" charge. Fees are subject to further reduction if they exceed the "prevailing" charge for the locality. The prevailing charge is defined as the 75th percentile of customary charges for a particular service in a particular locality. Since July 1, 1975, the rate of increase in prevailing charges has been limited further by the application of an "economic index". The customary and pre-

vailing charge limits maintained by the carriers are called "fee screens". Reasonable charges are charges on which reimbursement is based, after they have been reduced by the fee screens.

The average reduction in submitted fees has increased each year due both to deliberate administrative actions and to differentials in the rate of increase in fees between the calendar year in which the fee screens are established and the July to June period in which the screens are applied. The result is that the net increase in per enrollee charges due to price changes (i.e., the increase in fee levels recognized for reimbursement purposes) has been less than the increase in submitted fees. The second column of table A3 shows the reduction of charges due to the impact of the fee screen operation to date. The year-to-year changes in this impact are shown in the third column.

Per enrollee charges also have increased each year as a result of more physician visits per enrollee, increasing use of specialists and more expensive techniques, and other factors. The fifth column of table A3 shows the increase in charges per enrollee resulting from these residual causes. Because the measurement of increased recognized charges per service is subject to error, this error is included implicitly under residual causes.

The proportion of charges that have been denied as non-covered care has increased in most years. To the extent that this increase in denials reflects the effect of administrative actions defining covered services, it will cause a non-recurring distorting effect on the increase due to net residual factors. The gross residual factor, as adjusted for the impact of changes in denials, is shown in the sixth column of table A3. This column is used in the projection to indicate the amount of cost increases to be expected in the future from residual causes. The seventh column shows the net increase due to residual factors.

The last column of table A3 shows the total increase in charges per enrollee for physician services. It includes the effects of all the items discussed above.

Projected increases in total recognized charges per enrollee are shown in table A4. Column 1 of table A4 shows the projected average increase in customary charges in each of the years ending June 30, 1977 through 1981. As described above, each of these increases depends on the increases in fees actually submitted during the preceding calendar year. Thus, this column represents actual and projected average increases in physicians' fees for calendar years 1975 through 1979, respectively. In principle, further adjustments should be made for the year-to-year variations created by the process of selecting the 75th percentile of customary charges for each service in each locality to establish prevailing charges and for the fact that, of necessity, some fees are not screened in exactly the manner described (e.g., when new categories of services arise for which there is no historical data base). The impact on year-to-year increases in reasonable charges of these two factors is treated as negligible (although, of course, they have a substantial effect on the absolute level of fees). The effects of the economic index on the average charge increase is shown in column 2. The projected net increase in reasonable charges is shown in column 3; this compares with the corresponding historical data shown in column 4 of table A3.

The projection of residual factors assumes no further changes in the proportion of claims denied consistent with the very small changes observed in the last few years (see table A3).

TABLE A3.—COMPONENTS OF INCREASES IN TOTAL RECOGNIZED CHARGES PER ENROLLEE FOR PHYSICIAN SERVICES: HISTORICAL

[In percent]

| Year ending June 30— | Increase due to price changes | | | | Increase due to residual factors | | | Total increase in recognized charges per enrollee |
|---|---|---|---|---|---|---|---|---|
| | Increase in physician fee component of CPI | Reduction due to fee screens: Cumulative effect | Reduction due to fee screens: Yearly changes | Net increase in reasonable charges | Gross residual factors | Effects of denials | Net residual factors | |
| Aged: | | | | | | | | |
| 1967 | 7.6 | −2.6 | | | | | | |
| 1968 | 5.9 | −3.6 | −0.6 | 5.3 | 11.2 | −1.4 | 9.8 | 15.1 |
| 1969 | 6.2 | −5.0 | −1.4 | 4.8 | 3.0 | −.4 | 2.6 | 7.4 |
| 1970 | 6.7 | −7.5 | −2.8 | 3.9 | 3.0 | −3.1 | −.1 | 3.8 |
| 1971 | 7.5 | −10.1 | −3.0 | 4.5 | 3.8 | −3.2 | .6 | 5.1 |
| 1972 | 5.2 | −11.2 | −1.2 | 4.0 | 2.2 | .4 | 2.6 | 6.6 |
| 1973 | 2.6 | −11.7 | −.5 | 2.1 | 5.6 | −.6 | 5.0 | 7.1 |
| 1974 | 5.0 | −13.2 | −1.6 | 3.4 | 6.1 | −.6 | 5.5 | 8.9 |
| 1975 | 12.8 | −16.2 | −3.6 | 9.2 | 3.9 | −.3 | 3.6 | 12.8 |
| 1976 | 11.4 | −18.6 | −2.9 | 8.5 | 3.7 | .1 | 3.8 | 12.3 |
| Disabled (excluding ESRD): | | | | | | | | |
| 1974 | 5.0 | −13.2 | | | | | | |
| 1975 | 12.8 | −16.2 | −2.6 | 10.2 | 15.4 | −.3 | 15.1 | 25.3 |
| 1976 | 11.4 | −18.6 | −2.7 | 8.7 | 5.8 | .1 | 5.9 | 14.6 |

TABLE A4.—COMPONENTS OF INCREASES IN TOTAL RECOGNIZED CHARGES PER ENROLLEE FOR PHYSICIAN SERVICES: PROJECTED

[In percent]

| Year ending June 30— | Increase due to price changes | | | Increase due to residual factors | | | Total increase in recognized charges per enrollee |
|---|---|---|---|---|---|---|---|
| | Increase before effect of economic index | Reduction due to economic index | Net increase in reasonable charges | Gross residual factors | Effects of denials | Net residual factors | |
| Aged: | | | | | | | |
| 1977 | 12.3 | −1.5 | 10.8 | 3.3 | 0 | 3.3 | 14.1 |
| 1978 | 11.3 | −2.5 | 8.8 | 2.2 | 0 | 2.2 | 11.0 |
| 1979 | 9.4 | −1.5 | 7.9 | 3.2 | 0 | 3.2 | 11.1 |
| 1980 | 8.3 | −1.4 | 6.9 | 3.2 | 0 | 3.2 | 10.1 |
| 1981 | 8.4 | −1.7 | 6.7 | 3.2 | 0 | 3.2 | 9.9 |
| Disabled (excluding ESRD): | | | | | | | |
| 1977 | 12.3 | −1.5 | 10.8 | 3.3 | 0 | 3.3 | 14.1 |
| 1978 | 11.3 | −2.5 | 8.8 | 2.2 | 0 | 2.2 | 11.0 |
| 1979 | 9.4 | −1.5 | 7.9 | 3.2 | 0 | 3.2 | 11.1 |
| 1980 | 8.3 | −1.4 | 6.9 | 3.2 | 0 | 3.2 | 10.1 |
| 1981 | 8.4 | −1.7 | 6.7 | 3.2 | 0 | 3.2 | 9.9 |

*(2) Institutional and other services*

The historical and projected increases in charges or costs per enrollee for institutional and other services are shown in table A5. The year-to-year changes in some services have been quite erratic. At best, these series provide only a rough indication of future trends in costs.

TABLE A5.—INCREASES IN RECOGNIZED CHARGES AND COSTS PER ENROLLEE FOR INSTITUTIONAL AND OTHER SERVICES

[In percent]

| Year ending June 30 — | Inpatient radiology and pathology | Outpatient hospital | Home health agency | Group practice prepayment plan | Independent lab |
|---|---|---|---|---|---|
| Aged: | | | | | |
| Historical: | | | | | |
| 1968 | | 60.1 | 77.9 | −13.0 | 39.0 |
| 1969 | −13.1 | 73.8 | 26.9 | 9.3 | 12.3 |
| 1970 | 8.7 | 37.6 | 1.6 | −2.6 | 18.8 |
| 1971 | 1.0 | 27.1 | −17.6 | −12.2 | 25.0 |
| 1972 | −6.1 | 11.8 | −4.3 | 3.5 | 27.4 |
| 1973 | 3.2 | 10.7 | 23.6 | 25.9 | 21.5 |
| 1974 | 11.3 | 20.6 | −12.8 | 26.2 | 26.5 |
| 1975 | 10.0 | 33.2 | 82.6 | 10.0 | 32.8 |
| 1976 | 27.5 | 35.0 | 30.6 | 17.5 | 22.3 |
| Projected: | | | | | |
| 1977 | 15.0 | 25.0 | 25.0 | 15.0 | 18.0 |
| 1978 | 15.0 | 25.0 | 25.0 | 15.0 | 15.0 |
| 1979 | 15.0 | 25.0 | 25.0 | 15.0 | 15.0 |
| 1980 | 15.0 | 20.0 | 20.0 | 15.0 | 15.0 |
| 1981 | 15.0 | 20.0 | 20.0 | 15.0 | 15.0 |
| Disabled (excluding ESRD): | | | | | |
| Historical: | | | | | |
| 1975 | 11.8 | 18.7 | −1.1 | −40.3 | 81.4 |
| 1976 | 18.3 | 24.8 | 38.1 | 23.8 | 34.0 |
| Projected: | | | | | |
| 1977 | 15.0 | 30.0 | 12.0 | 15.0 | 18.0 |
| 1978 | 15.0 | 25.0 | 25.0 | 15.0 | 15.0 |
| 1979 | 15.0 | 25.0 | 25.0 | 15.0 | 15.0 |
| 1980 | 15.0 | 20.0 | 20.0 | 15.0 | 15.0 |
| 1981 | 15.0 | 20.0 | 20.0 | 15.0 | 15.0 |

*d. Projected charges and costs*

Table A6 shows projections of per enrollee incurred charges and costs based on the assumptions in tables A4 and A5. Table A7 shows the total reimbursement amounts per enrollee that result from subtracting the average amounts of copayment per enrollee from the total covered charges in table A6. The aggregate reimbursement amounts shown are derived by multiplying average enrollment by average reimbursement per enrollee.

TABLE A6.—INCURRED REASONABLE CHARGES OR COSTS PER ENROLLEE: PROJECTED

| Year ending June 30— | All services | Physician | Inpatient radiology and pathology | Outpatient hospital | Home health agency | Group practice prepayment plan | Independent lab |
|---|---|---|---|---|---|---|---|
| Aged: | | | | | | | |
| 1977 | $313.07 | [1] $243.75 | $12.55 | $39.66 | $7.90 | $5.65 | $3.56 |
| 1978 | 358.99 | 274.51 | 14.43 | 49.58 | 9.88 | 6.50 | 4.09 |
| 1979 | 408.18 | 305.08 | 16.59 | 61.98 | 12.35 | 7.48 | 4.70 |
| 1980 | 458.20 | 335.91 | 19.08 | 74.38 | 14.82 | 8.60 | 5.41 |
| 1981 | 514.26 | 369.17 | 21.94 | 89.26 | 17.78 | 9.89 | 6.22 |
| Disabled (excluding ESRD): | | | | | | | |
| 1977 | 293.93 | [1] 225.96 | 11.47 | 41.63 | 6.90 | 5.50 | 2.47 |
| 1978 | 337.51 | 254.48 | 13.19 | 52.04 | 8.63 | 6.33 | 2.84 |
| 1979 | 384.38 | 282.82 | 15.17 | 65.05 | 10.79 | 7.28 | 3.27 |
| 1980 | 431.99 | 311.40 | 17.45 | 78.06 | 12.95 | 8.37 | 3.76 |
| 1981 | 485.46 | 342.23 | 20.07 | 93.67 | 15.54 | 9.63 | 4.32 |

[1] This figure reflects a 3-mo delay in updating the fee screens.

TABLE A7.—INCURRED REIMBURSEMENT AMOUNTS: PROJECTED

| Year ending June 30— | Average enrollment (millions) | Reimbursement amounts per enrollee | Reimbursement amounts Aggregate (millions) |
|---|---|---|---|
| Aged: | | | |
| 1977 | 22.575 | $220.97 | $4,988 |
| 1978 | 23,029 | 257.88 | 5,938 |
| 1979 | 23.538 | 297.74 | 7,007 |
| 1980 | 24.055 | 338.44 | 8,141 |
| 1981 | 24.525 | 384.21 | 9,423 |
| Disabled (excluding ESRD): | | | |
| 1977 | 2.229 | 208.32 | 464 |
| 1978 | 2.397 | 243.32 | 584 |
| 1979 | 2.572 | 281.27 | 723 |
| 1980 | 2.739 | 319.98 | 877 |
| 1981 | 2.909 | 363.57 | 1,057 |

## 2. ESTIMATES FOR PERSONS SUFFERING FROM END STAGE RENAL DISEASE

Certain persons suffering from end stage renal disease (ESRD) have been eligible to enroll for Part B coverage since July 1973 (under Section 299I of Public Law 92-603). For analysis purposes those enrollees suffering from ESRD who are also eligible as disability insurance beneficiaries are included in this section because their per enrollee costs are both higher and different in nature from those of most other disabled persons.

The estimates assume per enrollee cost increases of five percent annually and a continued rapid increase in enrollment. The historical and projected enrollment and costs are shown in table A8.

TABLE A8.—INCURRED REIMBURSEMENT AMOUNTS FOR END STAGE RENAL DISEASE

| Year ending June 30— | Average enrollment (thousands) | Reimbursement amounts: Disabled ESRD and ESRD only — Per enrollee | Disabled ESRD and ESRD only — Aggregate (millions) | ESRD only, aggregate (millions) |
|---|---|---|---|---|
| 1974 | 11 | $11,091 | $122 | $84 |
| 1975 | 17 | 12,824 | 218 | 140 |
| 1976 | 23 | 13,826 | 318 | 207 |
| 1977 | 28 | 15,429 | 432 | 286 |
| 1978 | 34 | 16,206 | 551 | 369 |
| 1979 | 40 | 16,725 | 669 | 453 |
| 1980 | 45 | 17,689 | 796 | 538 |
| 1981 | 50 | 18,540 | 927 | 626 |

## 3. SUMMARY OF AGGREGATE REIMBURSEMENT AMOUNTS ON A CASH BASIS

Table A9 shows aggregate historical and projected reimbursement amounts on a cash basis, by type of beneficiary. The difference between reimbursement amounts on a cash basis and incurred reimbursement amounts results from the lag between the time of service and the time of payment.

TABLE A9.—AGGREGATE REIMBURSEMENT AMOUNTS ON A CASH BASIS

[In millions]

| Fiscal year | Aged | Disabled (excluding ESRD) | Disabled ESRD and ESRD only | Total |
|---|---|---|---|---|
| Historical: | | | | |
| 1967 | $664 | | | $664 |
| 1968 | 1,390 | | | 1,390 |
| 1969 | 1,645 | | | 1,645 |
| 1970 | 1,979 | | | 1,979 |
| 1971 | 2,035 | | | 2,035 |
| 1972 | 2,255 | | | 2,255 |
| 1973 | 2,391 | | | 2,391 |
| 1974 | 2,639 | $134 | $101 | 2,874 |
| 1975 | 3,319 | 256 | 190 | 3,765 |
| 1976 | 4,045 | 336 | 290 | 4,671 |
| Interim | 1,078 | 99 | 91 | 1,268 |
| 1977 | 4,987 | 456 | 424 | 5,867 |
| Projected: | | | | |
| 1978 | 5,936 | 587 | 552 | 7,075 |
| 1979 | 7,014 | 725 | 672 | 8,411 |
| 1980 | 8,165 | 882 | 800 | 9,847 |
| 1981 | 9,436 | 1,064 | 932 | 11,432 |

## 4. ADMINISTRATIVE EXPENSES

The ratio of administrative expenses to benefit payments has been approximately 10 percent in recent years and is projected to decline slowly in future years. Projections of administrative costs are based on estimates of workloads and approved budgets for carriers, intermediaries, and Federal administration agencies.

# APPENDIX B.—STATEMENT OF ACTUARIAL ASSUMPTIONS AND BASES EMPLOYED IN DETERMINING THE MONTHLY ADEQUATE ACTUARIAL RATES AND THE STANDARD MONTHLY PREMIUM RATE FOR THE SUPPLEMENTARY MEDICAL INSURANCE PROGRAM BEGINNING JULY 1978[1]

This is a statement of actuarial assumptions and bases employed in determining the adequate actuarial rates and the standard monthly premium rate for the supplementary medical insurance program (SMI) for the period July 1978 through June 1979. The monthly adequate actuarial rate for enrollees age 65 and over is $13.40. The monthly adequate actuarial rate for disabled enrollees is $25.00. The standard monthly premium rate for both types of enrollees is $8.20.

## 1. ACTUARIAL STATUS OF THE SUPPLEMENTARY MEDICAL INSURANCE TRUST FUND

The law requires that the SMI program be financed on an incurred basis. That is, the income to the program during the 12-month period for which adequate rates are effective must be sufficient to pay for services (including associated administrative costs) rendered during that period even though payment for some of these services will not be made until after the close of the period.

The portion of income required to cover those benefits not paid until after the close of the year is added to the trust fund until needed. Thus, the amount of assets in the trust fund at any time should be no less than the cost of the benefits and administration incurred but not yet paid. Because the adequate rates are established prospectively, they are subject to projection error. As a result, the income to the program may not be equal to incurred costs; therefore, trust fund assets should be maintained at a level which is adequate to cover the impact of a moderate degree of projection error as well as the value of incurred but unpaid expenses. Table 1 summarizes the estimated actuarial status of the trust fund as of June 30 for each of the years 1976–78.

TABLE 1.—ACTUARIAL STATUS OF THE SMI TRUST FUND YEARS ENDING JUNE 30, OF 1976–78

[In millions]

| Year ending June 30— | Assets | Liabilities | Assets less liabilities |
|---|---|---|---|
| 1976 | $1,324 | $1,570 | −$246 |
| 1977 | 2,258 | 1,947 | 311 |
| 1978 | 3,320 | 2,314 | 1,006 |

[1] This statement appeared in the Federal Register of Dec. 30, 1977. Projections shown in this statement differ slightly from the projections shown in the rest of this report because of minor changes in assumptions since the rates were promulgated.

## 2. MONTHLY ADEQUATE ACTUARIAL RATE FOR ENROLLEES AGE 65 AND OLDER

The monthly adequate actuarial rate is one-half the monthly projected per capita cost for benefits and administrative expenses—adjusted to allow for interest earnings on assets in the trust fund, to allow for a contingency margin, and to allow for amortization of unfunded liabilities.

The monthly adequate actuarial rate for enrollees age 65 and older for the year ending June 30, 1979, was determined by projecting the fiscal year 1976 per capita cost by type of service. The projected costs for the years ending June 30 of 1976–79 are shown in Table 2. The 1976 values were established from program data. Subsequent years were projected using a combination of program data and data from external sources. The projection factors used are shown in Table 3.

The projected monthly rate required to pay for one-half of the total of benefits and administrative costs for enrollees age 65 and over for the year ending June 30, 1979, is $13.48. The monthly adequate actuarial rate of $13.40 provides an adjustment for interest earnings and a small margin for contingencies.

TABLE 2.—DERIVATION OF PROMULGATED MONTHLY RATE FOR ENROLLEES AGE 65 AND OVER, YEARS ENDING JUNE 30 OF 1976–79

| | 1976 | 1977 | 1978 | 1979 |
|---|---|---|---|---|
| Covered services (at level recognized): | | | | |
| Physicians' reasonable charges | $9.03 | $10.16 | $11.44 | $12.71 |
| Radiology and pathology | .45 | .52 | .60 | .69 |
| Group practice plans | .20 | .24 | .27 | .31 |
| Independent lab | .13 | .15 | .17 | .20 |
| Home health agencies | .26 | .34 | .43 | .54 |
| Outpatient hospital and other institutions | 1.32 | 1.72 | 2.15 | 2.69 |
| Total services | 11.39 | 13.13 | 15.06 | 17.14 |
| Cost sharing: | | | | |
| Deductible | −1.72 | −1.74 | −1.77 | −1.79 |
| Coinsurance | −1.80 | −2.11 | −2.46 | −2.84 |
| Total benefits | 7.87 | 9.28 | 10.83 | 12.51 |
| Administrative expenses | .89 | .80 | .91 | .97 |
| Incurred expenditures | 8.76 | 10.08 | 11.74 | 13.48 |
| Value of interest on fund | −.18 | −.23 | −.29 | −.38 |
| Margin for contingencies and to amortize unfunded liabilities | −1.08 | .85 | .85 | .30 |
| Promulgated monthly rate | 7.50 | 10.70 | 12.30 | 13.40 |

TABLE 3.—PROJECTION FACTORS YEARS ENDING JUNE 30 OF 1977–79

[In percent]

| | 1977 | 1978 | 1979 |
|---|---|---|---|
| Physicians' services: | | | |
| Fees [1] | [2] 10.8 | 8.8 | 7.9 |
| Utilization [3] | 3.0 | 2.0 | 3.0 |
| Outpatient hospital services per capita | 30.0 | 25.0 | 25.0 |
| Home health agency services per capita | 30.0 | 25.0 | 25.0 |
| Group practice plan services per capita | 15.0 | 15.0 | 15.0 |
| Other services per capita | 15.0 | 15.0 | 15.0 |

[1] As recognized for payment under the program.
[2] Reasonable charges were updated later than July 1, 1976 in most areas so the average cost increase shown in Table 2 is less than 10.8 percent.
[3] Increase in the number of services received per capita and greater relative use of more expensive services.

### 3. MONTHLY ADEQUATE ACTUARIAL RATE FOR DISABLED ENROLLEES

The monthly adequate actuarial rate for disabled enrollees applies to persons eligible to enroll because they have been entitled to disability insurance benefits for not less than 24 consecutive months or because they are suffering from end stage renal disease. Projections for disabled enrollees (other than those suffering from end stage renal disease) are prepared in a fashion exactly parallel to projections for the aged, using the same actuarial assumptions. Costs for the end stage renal disease program are projected using a computer model because of the complex demographic problems involved. The combined results for all disabled enrollees are shown in Table 4.

The projected monthly rate required to pay for one-half of the total of benefits and administrative costs for disabled enrollees for the year ending June 30, 1979, is $24.34. The monthly adequate actuarial rate of $25.00 provides an adjustment for interest earnings and a small margin for contingencies.

TABLE 4.—DERIVATION OF PROMULGATED MONTHLY RATE FOR DISABLED ENROLLEES YEARS ENDING JUNE 30 OF 1976–79

| | 1976 | 1977 | 1978 | 1979 |
|---|---|---|---|---|
| Total benefits | $13.85 | $16.82 | $19.78 | $22.60 |
| Administrative expenses | 1.57 | 1.45 | 1.66 | 1.74 |
| Incurred expenditures | 15.42 | 18.27 | 21.44 | 24.34 |
| Value of interest on fund | −.31 | −.41 | −.53 | −.68 |
| Margin for contingencies and to amortize unfunded liabilities | 3.39 | 1.14 | 4.09 | 1.34 |
| Promulgated monthly rate | 18.50 | 19.00 | 25.00 | 25.00 |

### 4. SENSITIVITY TESTING

Several factors contribute to uncertainty about future trends in medical care costs. In view of this, it seems appropriate to test the adequacy under alternate assumptions of the rates promulgated here. The most unpredictable factors which contribute significantly to future costs are outpatient hospital costs, physician utilization (measured indirectly and reflecting the use of more visits per capita, the use of more expensive services, and other factors not explained by simple price per service increases), and increases in physician fees as constrained by the program's reasonable charge screens and economic index. Two alternative sets of assumptions and the results of those assumptions are shown in Table 5. All assumptions not shown in Table 5 are the same as in Table 3.

Table 5 indicates that, under the assumptions used in preparing this report, the promulgated monthly rates will result in an excess of assets over liabilities of $1,212 million by the end of June 1979. This amounts to 12 percent of the estimated total incurred expenditures for the following year. Assumptions which are somewhat more pessimistic produce a deficit of $68 million by the end of June 1979, although the balance in the trust fund remains positive allowing the program to continue paying claims as presented. Under fairly optimistic assumptions, the promulgated monthly rates will result in an excess of assets over liabilities of $2,169 million, which amounts to 25 percent of the estimated total incurred expenditures for the following year.

TABLE 5.—PROJECTION FACTORS AND THE ACTUARIAL STATUS OF THE SMI TRUST FUND UNDER ALTERNATIVE SETS OF ASSUMPTIONS YEARS ENDING JUNE 30 OF 1978–79

| | This projection | | Low assumption | | High assumption | |
|---|---|---|---|---|---|---|
| | 1978 | 1979 | 1978 | 1979 | 1978 | 1979 |
| Projection factors (in percent): | | | | | | |
| Physicians' fees [1] | 8.8 | 7.9 | 7.3 | 6.4 | 10.3 | 9.4 |
| Utilization of physicians' services [2] | 2.0 | 3.0 | 0.5 | 1.0 | 4.0 | 50.0 |
| Outpatient hospital services per capita | 25.0 | 25.0 | 15.0 | 15.0 | 40.0 | 40.0 |
| Home health agency services per capita | 25.0 | 25.0 | 15.0 | 15.0 | 40.0 | 40.0 |
| Actuarial status (in millions): | | | | | | |
| Assets | $3,320 | $3,939 | $3,522 | $4,711 | $3,059 | $2,917 |
| Liabilities | 2,314 | 2,727 | 2,242 | 2,542 | 2,415 | 2,985 |
| Assets less liabilities | 1,006 | 1,212 | 1,280 | 2,169 | 644 | −68 |
| Ratio of assets less liabilities to expenditures (in percent) [3] | 11 | 11 | 15 | 23 | 6 | −1 |

[1] As recognized for payment under the program.
[2] Increase in the number of services received per capita and greater relative use of more expensive services.
[3] Ratio of assets less liabilities at the end of the year to total incurred expenditures during the following year, expressed as a percent.

### 5. STANDARD PREMIUM RATE

The law provides that the standard monthly premium rate, promulgated to apply for both aged and disabled enrollees, shall be the lesser of:

(a) The adequate actuarial rate for enrollees age 65 and older; or

(b) The current standard monthly premium, increased by the same percentage that the level of old-age survivors, and disability insurance (OASDI) benefits has been increased since the May preceding the promulgation (and rounded to the nearer dime).

The standard monthly premium rate for the 12-month period ending with June 30, 1978, is $7.70. The OASDI benefit table was increased 5.9 percent in June 1977. The $7.70 rate increased by 5.9 percent, and rounded to the nearer ten cent multiple, is $8.20. Since this is less than the adequate actuarial rate, the standard premium rate is $8.20 for the twelve months ending with June 1979.

○