APPENDIX A

ACTUARIAL METHODOLOGY AND PRINCIPAL ASSUMPTIONS FOR COST ESTIMATES FOR THE SUPPLEMENTARY MEDICAL INSURANCE PROGRAM

1. ESTIMATES UNDER ALTERNATIVE II ASSUMPTIONS FOR AGED AND DISABLED (EXCLUDING ESRD) ENROLLEES

a. Introduction

Estimates under alternative II assumptions for aged and disabled enrollees--excluding disabled persons with ESRD--are prepared by calculating allowed charges incurred per enrollee in a recent year (the 12-month period ending June 30, 1989, for this report) and projecting these charges through the estimating period. The per enrollee charges are then converted to reimbursement amounts by subtracting 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 smaller amounts for other services such as laboratory tests, durable medical equipment and supplies) are paid through organizations acting for HCFA, referred to as "carriers." The carriers determine whether billed services are covered under the program and determine the allowed charges for the services. A record of the amount reimbursed after reduction 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 5.0 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 fluctuations 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.

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 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 the SMI program are paid by the same fiscal intermediaries that pay for HI services. The principal institutional services covered under the SMI program are outpatient hospital care 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). However, the cost of laboratory tests in outpatient departments of hospitals is no longer determined on a reasonable-cost basis but on a fee-schedule basis. 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 plans, which are not reimbursed through carriers, are reimbursed directly by HCFA on a reasonable cost or on a capitation basis. Comprehensive data on such direct reimbursements are available on a cash basis. Certain approximations must be made to allocate 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 for each of the 12-month periods ending June 30, through 1989. 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 allowed 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 incurred charges or costs per enrollee corresponding to the reimbursement values shown in Table A1.

c. Per Enrollee Increases

(1) Physician Services

Per enrollee charges for physician services are affected by a variety of factors. One factor, increase in average charge per service, can be identified explicitly. Others can be recognized only by the fact that the increase in the average charge per service does not explain all of the increase in per enrollee charges year-to-year.

The increase in the average charge per service is one of the most important factors creating the increase in charges per enrollee. The physician fee component of the Consumer Price Index (CPI) provides an approximation of the historical increases in submitted charge per service. Increases in this index are shown in the first column of Table A3.

Bills submitted to the carriers during a specified period, the fee-screen year, are subject by statute to certain limitations on the level of fees to be allowed by the program for reimbursement purposes. The fee-screen-year period has changed over the history of the program. For 1984 and earlier, the fee-screen year was the 12-month period ending June 30. Beginning with 1987, the fee-screen year is on the calendar-year basis. Fee-screen years 1985 and 1986 were each 15-month periods allowing for the transition of the fee-screen years from the 12-month periods ending June 30 to the 12-month periods ending December 30. The fee level allowed 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 base period, the 12-month period ending 6 months prior to the beginning of the fee-screen year. This median charge is called the "customary charge." Fees are subject to further reduction if they exceed the prevailing charges 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 the Medicare Economic Index. The customary and prevailing charge limits maintained by the carriers are called "fee screens." Allowed charges are charges after they have been reduced by the fee screens and are the charges on which reimbursement is based.

Public Law 101-239 provides for the replacement of customary and prevailing charges with fee schedules for physician services starting in CY 1992. The fee schedules will be based on a resource-based relative value scale. The fee schedule amount will be equal to the product of the procedure's relative value, a conversion factor and a geographic adjustment factor. Payments will be based on the lower of the actual charge and the fee schedule amount. For the four-year period from 1992 to 1995, the fee schedule amounts will be adjusted to reflect the prevailing charges in each fee screen area.

Certain services included with the physician services are not subject to the same fee-screen reduction process as described above. Beginning July 1, 1984 a unique fee schedule was established for laboratory tests performed in physician offices and independent laboratories. Since that time other unique fee schedules or reimbursement mechanisms have been established for other

services. The list of the services includes radiology, anesthesiology, certified registered nurse anesthetists, and durable medical equipment.

Since legislation has twice changed the time span of the fee-screen year, and since the two transitional fee-screen years (1985 and 1986) cover 15-month periods, data presented in Tables A1 through A9 will be displayed for the same 12-month basis for all years. This basis will be the 12-month periods ending June 30.

The average reduction in submitted fees has increased almost every year due both to administrative actions and to differentials in the rate of increase in fees between the period in which the fee screens are established and the 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 allowed for reimbursement purposes) has been less than the increase in submitted fees. The second column of Table A3 shows this increase in per enrollee charges due to price changes.

Per capita charges also have increased each year as a result of a number of possible factors including more physician visits per enrollee, the aging of the Medicare enrollment, greater use of specialists and more expensive techniques, and certain administrative actions. The third column of Table A3 shows the increases in charges per enrollee resulting from these residual causes. Because the measurement of increased allowed charges per service is subject to error, this error is included implicitly under residual causes.

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

Projected increases in total allowed charges per enrollee are shown in Table A4. It compares with the corresponding historical data shown in Table A3. Column 1 of Table A4 shows the projected increases in the physician fee component of the CPI in each of the years ending June 30, 1990 through June 30, 2001. It represents an estimate of projected increases in the charges for all physician services (not only Medicare services). Column 2 shows the projected net increases in allowed charges, and column 3 shows the increases due to residual causes.

(2) Institutional and Other Services

The historical increases in charges and costs per enrollee for institutional and other services are shown in Table A5, and the projected increases are shown in Table A6. 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.

d. Projected Charges and Costs

Table A7 shows projections of per enrollee incurred charges and costs based on the assumptions in Tables A4 and A6. Table A8 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 A7. The aggregate reimbursement amounts shown are derived by multiplying average enrollment by average reimbursement per enrollee.

2. ESTIMATES UNDER ALTERNATIVE II ASSUMPTIONS FOR PERSONS SUFFERING FROM ESRD

Certain persons suffering from ESRD have been eligible to enroll for SMI coverage since July 1973 (under Section 299I of Public Law 92-603). For analytical 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 alternative II estimates reflect the unique payment mechanism through which ESRD services are reimbursed under Medicare. Also, the estimates assume a continued increase in enrollment. The historical and projected enrollment and costs for SMI benefits are shown in Table A9.

3. SUMMARY OF AGGREGATE REIMBURSEMENT AMOUNTS ON A CASH BASIS UNDER ALTERNATIVE II ASSUMPTIONS

Table A10 shows aggregate historical and projected reimbursement amounts on a cash basis under alternative II assumptions, 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.

4. ADMINISTRATIVE EXPENSES

The ratio of administrative expenses to benefit payments has been under 5 percent in recent years and is projected to decline in future years. Projections of administrative costs are based on estimates of changes in average annual wages.

5. CASH DISBURSEMENTS AS A PERCENT OF THE GNP

Cash disbursements (benefit payments and administrative expenses) for alternative I and III assumptions were developed by examining the alternative II cash disbursements as a percentage of GNP. Alternative I and III cash disbursements are assumed to be the same as alternative II through CY 1991. Beginning in CY 1992, the rate of growth of the alternative I cash benefits as a percentage of the GNP is assumed to be 2 percent less than the rate of growth of the alternative II benefits as a percentage of the GNP. Similarly, the rate of growth of the alternative III cash benefits as a percentage of the GNP is assumed to be 2 percent more than the rate of growth of the alternative II cash benefits as a percentage of the GNP. Projections of the administrative expenses for alternatives I and III are based on the estimates of the changes in average annual wage assumptions for alternative I and III, respectively. Based on the above methodology, cash disbursements as a percentage of the GNP were calculated for all three alternatives and are displayed in Table A11.

Table A1.--INCURRED REIMBURSEMENT AMOUNTS PER ENROLLEE: HISTORICAL

Year ending June 30,	Average enrollment (millions)	All services	Physician	Outpatient hospital	Home health agency	Group practice prepayment plan	Independent lab
Aged:							
1967	17.750	$ 62.51	$ 59.12	$ 1.41	$0.79	$ 0.89	$ 0.30
1968	18.038	80.06	74.47	2.40	1.49	1.35	0.35
1969	18.833	93.74	85.67	4.21	1.92	1.54	0.40
1970	19.312	99.91	90.03	5.91	1.99	1.50	0.48
1971	19.664	106.25	95.05	7.53	1.67	1.40	0.60
1972	20.043	114.22	101.63	8.55	1.60	1.66	0.78
1973	20.428	122.39	107.98	9.43	2.17	1.87	0.94
1974	20.988	134.38	117.48	11.32	2.03	2.35	1.20
1975	21.504	160.26	136.28	15.45	3.83	3.06	1.64
1976	22.089	188.60	156.27	21.26	5.19	3.86	2.02
1977	22.604	221.38	179.30	28.68	6.52	4.41	2.47
1978	23.133	254.19	207.05	33.38	6.82	4.02	2.92
1979	23.693	289.55	233.99	40.51	6.86	4.87	3.32
1980	24.287	343.02	277.24	47.10	7.58	7.04	4.06
1981	24.827	407.45	328.14	56.75	8.04	9.13	5.39
1982	25.363	465.33	381.02	66.40	0.52	10.92	6.47
1983	25.873	559.60	456.24	81.73	0.77	13.53	7.33
1984	26.433	637.33	512.88	97.32	0.99	16.84	9.30
1985	26.914	685.00	536.72	112.67	1.05	19.46	15.10
1986	27.453	785.15	595.96	135.03	1.19	31.71	21.26
1987	28.013	907.56	671.65	165.76	0.98	42.60	26.57
1988	28.467	1,021.01	741.92	186.19	1.53	61.43	29.94
1989	28.870	1,118.39	798.68	211.30	1.51	72.28	34.62
Disabled (excluding ESRD):							
1974	1.638	116.65	97.59	13.88	3.45	1.08	0.65
1975	1.817	149.42	125.62	17.31	3.57	1.86	1.06
1976	2.019	178.77	148.31	21.69	5.12	2.19	1.46
1977	2.231	220.45	174.81	36.44	4.79	2.41	2.00
1978	2.423	256.27	202.91	42.76	5.53	2.47	2.60
1979	2.563	301.57	240.73	50.49	5.13	2.05	3.17
1980	2.644	363.06	288.20	60.65	6.08	4.30	3.83
1981	2.691	434.37	340.15	77.10	7.21	5.22	4.69
1982	2.689	514.11	394.88	107.11	0.00	6.25	5.87
1983	2.630	629.08	485.46	128.76	0.00	7.55	7.31
1984	2.596	676.07	529.42	129.34	0.00	8.34	8.97
1985	2.594	708.52	553.22	132.35	0.00	9.27	13.68
1986	2.630	776.98	593.93	151.23	0.00	12.77	19.05
1987	2.679	887.09	680.83	166.92	0.00	16.19	23.15
1988	2.729	954.71	712.64	195.33	0.00	21.81	24.93
1989	2.771	1,013.40	747.65	212.28	0.00	24.95	28.52

Table A2.--INCURRED CHARGES OR COSTS PER ENROLLEE: HISTORICAL

Year ending June 30,	Average enrollment (millions)	All services	Physician	Outpatient hospital	Home health agency	Group practice prepayment plan	Independent lab
Aged:							
1967	17.750	$ 108.58	$102.70	$ 2.45	$1.37	$ 1.54	$ 0.52
1968	18.038	128.08	119.02	3.89	2.42	2.18	0.57
1969	18.833	145.18	132.22	6.77	3.08	2.47	0.64
1970	19.312	153.63	137.86	9.43	3.17	2.40	0.77
1971	19.664	162.10	144.41	11.89	2.64	2.21	0.95
1972	20.043	172.75	153.15	13.32	2.49	2.58	1.21
1973	20.428	186.21	163.99	14.79	3.02	2.94	1.47
1974	20.988	204.19	178.33	17.75	2.54	3.69	1.88
1975	21.504	236.59	201.27	23.51	4.66	4.66	2.49
1976	22.089	272.01	225.46	31.62	6.18	5.74	3.01
1977	22.604	313.23	253.83	41.77	7.60	6.43	3.60
1978	23.133	354.26	288.64	47.86	7.82	5.76	4.18
1979	23.693	398.80	322.19	57.28	7.76	6.88	4.69
1980	24.287	465.76	376.35	65.52	8.44	9.80	5.65
1981	24.827	545.32	438.85	77.76	8.81	12.51	7.39
1982	25.363	628.98	513.48	91.11	0.52	14.99	8.88
1983	25.873	754.99	614.97	110.94	0.77	18.36	9.95
1984	26.433	854.01	686.95	130.91	0.99	22.65	12.53
1985	26.914	909.85	715.63	151.47	1.05	26.16	15.54
1986	27.453	1,035.39	789.74	180.27	1.19	42.33	21.86
1987	28.013	1,188.68	884.01	219.62	0.98	56.44	27.63
1988	28.467	1,334.71	974.46	246.18	1.54	81.22	31.31
1989	28.870	1,449.81	1,040.18	277.08	1.51	94.78	36.26
Disabled (excluding ESRD):							
1974	1.638	171.06	143.27	20.99	4.17	1.64	0.99
1975	1.817	212.07	178.40	25.25	4.17	2.71	1.54
1976	2.019	250.18	207.77	31.24	5.90	3.16	2.11
1977	2.231	303.48	240.42	51.43	5.41	3.40	2.82
1978	2.423	349.58	276.50	59.80	6.19	3.45	3.64
1979	2.563	406.70	324.15	69.68	5.66	2.83	4.38
1980	2.644	483.87	383.58	82.60	6.62	5.86	5.21
1981	2.691	572.53	447.61	103.80	7.77	7.03	6.32
1982	2.689	683.34	522.79	144.23	0.00	8.41	7.91
1983	2.630	835.22	643.56	171.83	0.00	10.08	9.75
1984	2.596	896.47	701.39	172.06	0.00	11.09	11.93
1985	2.594	934.50	731.64	176.44	0.00	12.36	14.06
1986	2.630	1,019.77	782.53	200.72	0.00	16.75	19.57
1987	2.679	1,156.74	891.39	219.97	0.00	21.33	24.05
1988	2.729	1,245.82	933.45	257.55	0.00	28.76	26.06
1989	2.771	1,313.22	972.62	278.05	0.00	32.68	29.87

Table A3.--COMPONENTS OF INCREASES IN TOTAL ALLOWED CHARGES PER ENROLLEE FOR PHYSICIAN SERVICES: HISTORICAL
(In percent)

Year ending June 30,	Increase due to price changes		Residual factors	Total increase in allowed charges per enrollee
	Increase in physician fee component of CPI	Net increase in allowed fees		
Aged:				
1967	7.6			
1968	5.9	4.8	10.6	15.9
1969	6.2	4.7	6.2	11.2
1970	6.7	3.9	0.4	4.3
1971	7.5	4.5	0.3	4.8
1972	5.2	3.9	2.0	6.0
1973	2.6	2.0	5.0	7.1
1974	5.0	3.2	5.4	8.8
1975	12.8	8.9	3.6	12.8
1976	11.4	8.2	3.5	12.0
1977	10.2	9.0	3.3	12.6
1978	8.9	9.0	4.3	13.7
1979	8.6	7.8	3.6	11.7
1980	11.5	8.6	7.6	16.8
1981	11.1	7.7	8.3	16.6
1982	9.9	10.8	5.8	17.0
1983	8.2	8.9	10.0	19.8
1984	7.5	7.2	4.2	11.7
1985	6.0	0.8	3.3	4.1
1986	6.7	0.3	10.0	10.3
1987	7.5	5.4	6.2	11.9
1988	7.2	3.1	6.9	10.2
1989	7.4	1.4	5.3	6.8
Disabled (excluding ESRD):				
1974	5.0			
1975	12.8	8.9	14.3	24.5
1976	11.4	8.2	7.6	16.4
1977	10.2	9.0	6.2	15.7
1978	8.9	9.0	5.5	15.0
1979	8.6	7.8	8.8	17.3
1980	11.5	8.6	9.0	18.3
1981	11.1	7.7	8.4	16.7
1982	9.9	10.8	5.4	16.8
1983	8.2	8.9	13.0	23.1
1984	7.5	7.2	1.6	8.9
1985	6.0	0.8	3.5	4.3
1986	6.7	0.3	6.6	6.9
1987	7.5	5.4	8.1	13.9
1988	7.2	3.1	1.6	4.7
1989	7.4	1.4	2.8	4.2

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		Residual factors	Total increase in allowed charges per enrollee
	Increase in physician fee component of CPI	Net increase in allowed fees		
Aged:				
1990	7.1	0.9	8.4	9.4
1991	7.8	-2.6	8.7	5.9
1992	7.7	-1.4	11.1	9.5
1993	7.1	1.9	7.0	9.0
1994	8.0	1.6	7.5	9.2
1995	7.4	1.7	8.0	9.8
1996	6.6	2.0	7.9	10.1
1997	6.9	1.8	8.3	10.2
1998	7.0	1.5	8.3	9.9
1999	6.7	1.3	8.3	9.7
2000	6.0	1.3	8.3	9.7
2001	6.0	1.3	8.3	9.7
Disabled (excluding ESRD):				
1990	7.1	0.9	10.6	11.6
1991	7.8	-2.6	8.8	6.0
1992	7.7	-1.4	10.3	8.8
1993	7.1	1.9	5.7	7.7
1994	8.0	1.6	7.6	9.3
1995	7.4	1.7	8.0	9.8
1996	6.6	2.0	10.6	12.8
1997	6.9	1.8	9.0	11.0
1998	7.0	1.5	9.0	10.6
1999	6.7	1.3	9.0	10.4
2000	6.0	1.3	9.0	10.4
2001	6.0	1.3	9.0	10.4

Table A5.--INCREASES IN RECOGNIZED CHARGES AND COSTS PER ENROLLEE FOR INSTITUTIONAL AND OTHER SERVICES: HISTORICAL
(In percent)

Year ending June 30,	Outpatient hospital	Home health agency	Group practice prepayment plan	Independent lab
Aged:				
1968	58.8	76.6	41.6	9.6
1969	74.0	27.3	13.3	12.3
1970	39.3	2.9	-2.8	20.3
1971	26.1	-16.7	-7.9	23.4
1972	12.0	-5.7	16.7	27.4
1973	11.0	21.3	14.0	21.5
1974	20.0	-15.9	25.5	27.9
1975	32.5	83.5	26.3	32.4
1976	34.5	32.6	23.2	20.9
1977	32.1	23.0	12.0	19.6
1978	14.6	2.9	-10.4	16.1
1979	19.7	-0.8	19.4	12.2
1980	14.4	8.8	42.4	20.5
1981	18.7	4.4	27.7	30.8
1982	17.2	-94.1	19.8	20.2
1983	21.8	48.1	22.5	12.0
1984	18.0	28.6	23.4	25.7
1985	15.7	6.1	15.5	24.2
1986	19.0	13.3	61.8	40.7
1987	21.8	-17.6	33.3	26.4
1988	12.1	57.1	43.9	13.3
1989	12.6	-1.9	16.7	15.8
Disabled (excluding ESRD):				
1975	20.3	0.0	65.2	55.6
1976	23.7	41.5	16.6	37.0
1977	64.6	-8.3	7.6	33.6
1978	16.3	14.4	1.5	29.1
1979	16.5	-8.6	-18.0	20.3
1980	18.5	17.0	107.1	18.9
1981	25.7	17.4	20.0	21.3
1982	38.9	0.0	19.6	25.2
1983	19.1	0.0	19.9	23.3
1984	0.1	0.0	10.0	22.4
1985	2.5	0.0	11.5	17.9
1986	13.8	0.0	37.1	39.2
1987	9.6	0.0	25.8	22.9
1988	17.1	0.0	34.8	8.4
1989	8.0	0.0	13.6	14.6

Table A6.--INCREASES IN INCURRED CHARGES AND COSTS PER ENROLLEE FOR INSTITUTIONAL AND OTHER SERVICES: PROJECTED
(In percent)

Year ending June 30,	Outpatient hospital	Home health agency	Group practice prepayment plan	Independent lab
Aged:				
1990	11.7	10.0	18.6	15.6
1991	15.7	10.7	17.3	14.4
1992	13.0	9.4	15.3	17.2
1993	14.7	10.4	14.9	20.4
1994	15.0	10.6	15.0	20.3
1995	16.2	9.4	15.1	20.7
1996	17.6	10.9	15.0	20.3
1997	15.1	9.8	15.1	20.6
1998	15.1	9.8	15.1	20.6
1999	15.1	9.8	15.1	20.6
2000	15.1	9.8	15.1	20.5
2001	15.1	9.8	15.1	20.5
Disabled (excluding ESRD):				
1990	7.8	0.0	17.4	15.7
1991	15.5	0.0	12.4	13.7
1992	7.9	0.0	8.8	16.8
1993	11.3	0.0	9.1	17.3
1994	13.3	0.0	12.9	17.7
1995	14.4	0.0	12.5	20.0
1996	18.3	0.0	20.4	22.7
1997	14.3	0.0	15.1	20.3
1998	14.3	0.0	15.1	20.3
1999	14.3	0.0	15.1	20.3
2000	14.3	0.0	15.1	20.3
2001	14.3	0.0	15.1	20.3

Table A7.--INCURRED CHARGES OR COSTS PER ENROLLEE: PROJECTED

Year ending June 30,	All services	Physician	Outpatient hospital	Home health agency	Group practice prepayment plan	Independent lab
Aged:						
1990	$1,603.16	$1,137.82	$ 309.41	$1.66	$112.36	$ 41.91
1991	1,744.21	1,204.66	358.03	1.84	131.75	47.93
1992	1,934.09	1,319.41	404.53	2.01	151.97	56.17
1993	2,146.57	1,438.24	463.90	2.22	174.60	67.61
1994	2,388.91	1,570.65	533.71	2.46	200.75	81.34
1995	2,677.87	1,725.79	620.26	2.69	230.97	98.16
1996	3,016.30	1,900.34	729.32	2.98	265.56	118.10
1997	3,384.38	2,093.77	839.29	3.27	305.62	142.43
1998	3,793.09	2,300.22	965.85	3.59	351.72	171.71
1999	4,249.38	2,522.17	1,111.49	3.94	404.78	207.00
2000	4,764.33	2,765.54	1,279.09	4.33	465.84	249.53
2001	5,346.00	3,032.39	1,471.96	4.75	536.11	300.79
Disabled (excluding ESRD):						
1990	1,458.02	1,085.43	299.67	0.00	38.36	34.56
1991	1,578.56	1,150.04	346.11	0.00	43.11	39.30
1992	1,716.83	1,250.51	373.48	0.00	46.92	45.92
1993	1,867.87	1,347.12	415.71	0.00	51.17	53.87
1994	2,064.59	1,472.50	470.95	0.00	57.76	63.38
1995	2,298.38	1,618.48	538.85	0.00	65.01	76.04
1996	2,635.07	1,825.76	637.72	0.00	78.27	93.32
1997	2,956.56	2,025.42	728.77	0.00	90.10	112.27
1998	3,311.96	2,240.42	832.87	0.00	103.71	135.01
1999	3,706.94	2,473.48	951.7	0.00	119.38	162.35
2000	4,151.06	2,730.79	1,087.62	0.00	137.42	195.23
2001	4,650.72	3,014.86	1,242.91	0.00	158.18	234.77

Table A8.--INCURRED REIMBURSEMENT AMOUNTS: PROJECTED

Year ending June 30,	Average enrollment (millions)	Reimbursement amounts	
		Per enrollee	Aggregate (millions)
Aged:			
1990	29.311	$1,234.55	$ 36,186
1991	29.772	1,340.19	39,900
1992	30.228	1,495.83	45,216
1993	30.688	1,668.08	51,190
1994	31.138	1,864.60	58,060
1995	31.543	2,099.01	66,209
1996	31.903	2,373.60	75,725
1997	32.205	2,672.72	86,075
1998	32.437	3,005.12	97,477
1999	32.626	3,376.72	110,169
2000	32.823	3,796.42	124,610
2001	33.038	4,271.11	141,109
Disabled (excluding ESRD):			
1990	2.812	1,123.04	3,158
1991	2.874	1,211.90	3,483
1992	2.934	1,324.81	3,887
1993	2.993	1,447.04	4,331
1994	3.063	1,606.59	4,921
1995	3.142	1,796.31	5,644
1996	3.231	2,069.02	6,685
1997	3.328	2,329.63	7,753
1998	3.438	2,618.38	9,002
1999	3.556	2,940.10	10,455
2000	3.680	3,301.09	12,148
2001	3.801	3,708.50	14,096

Table A9.--ENROLLMENT AND INCURRED REIMBURSEMENT FOR END-STAGE RENAL DISEASE

Year ending June 30,	Average Enrollment (thousands)		Reimbursement (millions)	
	Disabled ESRD	ESRD Only	Disabled ESRD	ESRD Only
1974	4	8	$ 46	$ 91
1975	7	11	84	131
1976	11	13	137	163
1977	14	15	181	194
1978	16	16	231	231
1979	18	20	262	290
1980	19	23	303	368
1981	20	25	340	434
1982	22	28	374	483
1983	24	31	411	545
1984	27	34	369	493
1985	30	38	399	539
1986	32	41	430	595
1987	34	45	456	652
1988	35	49	490	738
1989	37	54	527	819
1990	40	57	582	908
1991	43	61	656	1,018
1992	45	65	725	1,116
1993	48	69	786	1,206
1994	50	72	852	1,307
1995	53	75	925	1,416
1996	55	78	1,012	1,548
1997	56	81	1,106	1,688
1998	58	83	1,202	1,829
1999	59	85	1,302	1,979
2000	60	86	1,412	2,142
2001	61	88	1,530	2,319

Table A10.--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	2,537	$ 196	$ 141	2,874
1975	3,289	258	218	3,765
1976	4,037	346	289	4,672
T.Q.	1,078	109	82	1,269
1977	5,005	493	369	5,867
1978	5,785	617	450	6,852
1979	6,929	782	548	8,259
1980	8,485	973	686	10,144
1981	10,362	1,197	786	12,345
1982	12,404	1,495	907	14,806
1983	14,783	1,734	970	17,487
1984	16,803	1,772	898	19,473
1985	19,080	1,801	927	21,808
1986	22,070	2,070	1,029	25,169
1987	26,353	2,439	1,145	29,937
1988	29,799	2,639	1,244	33,682
1989	32,751	2,780	1,336	36,867
1990	38,840	3,156	1,502	41,498
Projected:				
1991	40,551	3,523	1,693	45,767
1992	46,105	3,950	1,867	51,922
1993	52,107	4,413	2,019	58,539
1994	59,173	5,017	2,189	66,379
1995	67,494	5,792	2,379	75,665
1996	77,055	6,803	2,598	86,456
1997	87,559	7,908	2,830	98,297
1998	99,142	9,181	3,068	111,391
1999	112,094	10,665	3,322	126,081
2000	126,816	12,385	3,598	142,799

* For 1967 through 1976, fiscal years cover the interval from July 1 through June 30; the three month interval from July 1, 1976, through September 30, 1976, is labeled "T.Q.", the transition quarter; fiscal years 1977-2000 cover the interval from October 1 through September 30.

Table A11.--SMI CASH DISBURSEMENTS AS A PERCENT OF THE GNP FOR CALENDAR YEARS 1990-2000 •

Calendar year	Alternatives		
	I	II	III
1990	0.81	0.81	0.81
1991	0.86	0.86	0.88
1992	0.89	0.91	0.95
1993	0.93	0.96	1.01
1994	0.97	1.03	1.09
1995	1.02	1.10	1.21
1996	1.07	1.18	1.31
1997	1.12	1.26	1.42
1998	1.17	1.34	1.55
1999	1.22	1.43	1.68
2000	1.27	1.52	1.83

• Disbursements are the sum of benefit payments and administrative expenses.

APPENDIX B

STATEMENT OF ACTUARIAL ASSUMPTIONS AND BASES EMPLOYED IN DETERMINING THE MONTHLY ACTUARIAL RATES AND THE MONTHLY PREMIUM RATE FOR THE SUPPLEMENTARY MEDICAL INSURANCE PROGRAM BEGINNING JANUARY 1991 *

1. ACTUARIAL STATUS OF THE SUPPLEMENTARY MEDICAL INSURANCE TRUST FUND

Under the law, the starting point for determining the monthly premium is the amount that would be necessary to finance the SMI program on an incurred basis; that is, the amount of income that would be sufficient to pay for services furnished during that year (including associated administrative costs) even though payment for some of these services will not be made until after the close of the year. The portion of income required to cover benefits not paid until after the close of the calendar year is added to the trust fund and used when needed.

The rates are established prospectively and are therefore subject to projection error. Additionally, legislation enacted after the financing has been established, but effective for the periods for which the financing has been set, may affect program costs. As a result, the income to the program may not equal incurred costs. Therefore, trust fund assets should be maintained at a level that is adequate to cover a moderate degree of variation between actual and projected costs in addition to the amount of incurred but unpaid expenses. Table B1 summarizes the estimated actuarial status of the trust fund as of the end of the financing period for 1989 through 1990.

2. MONTHLY ACTUARIAL RATE FOR ENROLLEES AGE 65 AND OLDER

The monthly actuarial rate is one-half of the monthly projected cost of benefits and administrative expenses for each enrollee age 65 and older, adjusted to allow for interest earnings on assets in the trust fund and a contingency margin. The contingency margin is an amount appropriate to provide for a moderate degree of variation between actual and projected costs and to amortize unfunded liabilities.

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* This statement appeared in the Federal Register of February 27, 1991. However, it was originally approved September 27, 1990, and, since that date, it was modified to reflect the impact of section 4301 of the Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508). This section legislated the premium rate for 1991. The other provisions of Public Law 101-508 are not reflected in this statement. Projections shown in this statement differ from the projections shown in the rest of the report because of changes in assumptions since the preparation of this statement.

The monthly actuarial rates for enrollees age 65 and older for calendar year 1991 was determined by projecting per-enrollee cost for the 12-month periods ending June 30, 1991 and June 30, 1992, by type of service. Although the actuarial rates are now applicable for calendar years, projections of per-enrollee costs were determined on a July to June period, consistent with the July annual fee screen update used for benefits prior to the passage of section 2308(b) of Public Law 98-369. The values for the 12-month period ending June 30, 1988, were established from program data. Subsequent periods were projected using a combination of program data and data from external sources. The projection factors used are shown in Table B2. Those per-enrollee values are then adjusted to apply to a calendar year period. The projected values for financing periods from January 1, 1988, through December 31, 1991, are shown in Table B3.

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 CY 1991 is $64.76. The monthly actuarial rate of $62.60 provides an adjustment of -$1.46 for interest earnings and -$0.70 for a contingency margin. Based on current estimates, it appears that the assets are more than sufficient to cover the amount of incurred but unpaid expenses and to provide for a moderate degree of projection error. Thus, a negative contingency margin is needed to reduce assets toward a more appropriate level.

An appropriate level for assets depends on numerous factors. The most important of these factors are: (1) The difference from prior years in the actual performance of the program and estimates made at the time financing was established and (2) the expected relationship between incurred and cash expenditures. Ongoing analysis is made of the former as the trends in the differences vary over time.

3. MONTHLY ACTUARIAL RATE FOR DISABLED ENROLLEES

Disabled enrollees are those persons enrolled in SMI because of entitlement (before age 65) to disability benefits for more than 24 months or because of entitlement to Medicare under the end-stage renal disease program. Projected monthly costs for disabled enrollees (other than those suffering from end-stage renal disease) are prepared in a fashion exactly parallel to projection for the aged, using appropriate actuarial assumptions (see Table B2). Costs for the end-stage renal disease program are projected differently because of the complex demographic problems involved. The combined results for all disabled enrollees are shown in Table B4.

The projected monthly rate required to pay for one-half of the total of benefits and administrative costs for disabled enrollees for CY 1991 is $71.10. The monthly actuarial rate of $56.00 provides an adjustment of -$3.08 for interest earnings and a -$12.02 for a contingency margin. Based on current estimates, it appears that assets are more than sufficient to cover the amount of incurred but unpaid expenses and to provide for a moderate degree of variation between

actual and projected costs. Thus, a negative contingency margin is needed to reduce assets to more appropriate levels.

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 of the rates announced here using alternative assumptions. The most unpredictable factors that contribute significantly to future costs are outpatient hospital costs, physician residual (as defined in Table B2), 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 B5. One set represents increases that are lower and is, therefore, more optimistic than the current estimate. The other set represents increases that are higher and is, therefore, more pessimistic than the current version. The values for the alternative assumptions were determined from a study on the average historical variation between actual and projected increases in the respective increase factors. All assumptions now shown in Table B5 are the same as in Table B2.

Table B5 indicates that, under the assumptions used in preparing this report, the monthly actuarial rates will result in an excess of assets over liabilities of $6,623 million by the end of December 1991. This amounts to 11.2 percent of the estimated total incurred expenditures for the following year. Assumptions which are somewhat more pessimistic (and, therefore, test the adequacy of the assets to accommodate projection errors) produce a deficit of $3,199 million by the end of December 1991, which amounts to 4.8 percent of the estimated total incurred expenditures for the following year. Under these more pessimistic assumptions, assets will be insufficient to cover outstanding liabilities. However, the cash balances in the trust fund should remain positive, allowing claims to be paid. Under fairly optimistic assumptions, the monthly actuarial rates will result in a surplus of $15,678 million by the end of December, 1991, which amounts to 29.9 percent of the estimated total incurred expenditures for the following year.

5. PREMIUM RATE

Section 4301 of Public Law 101-508 added section 1839(e)(1)(B)(i) to the Act, which provides that the monthly premium rate for 1991, for both aged and disabled enrollees, is $29.90.

Table B1.--ESTIMATED ACTUARIAL STATUS OF THE SMI TRUST FUND AS OF THE END OF THE FINANCING PERIODS, JANUARY 1, 1989--DECEMBER 31, 1990
(In Millions of Dollars)

Financing Period Ending	Assets	Liabilities	Assets Less Liabilities
December 31, 1989	$13,541	$4,566	$8,975
December 31, 1990	13,499	4,994	8,505

Table B2.-- PROJECTION FACTORS 1/
12-MONTH PERIODS ENDING JUNE 30 OF 1988-1992
(In percent)

12-month period ending June 30	Physicians' services		Outpatient hospital services	Home health agency services 4/	Group practice prepayment plans	Independent lab services
	Fees 2/	Residual 3/				
Aged:						
1988	2.4	7.0	12.6	56.1	45.4	18.2
1989	1.3	6.4	11.0	1.7	16.3	14.5
1990	0.7	11.0	15.2	10.9	15.0	19.9
1991	2.5	8.5	12.8	9.5	11.6	20.1
1992	3.4	8.2	12.9	8.9	15.0	20.5
Disabled:						
1988	2.4	1.4	17.2	0.0	41.9	9.3
1989	1.3	3.0	4.3	0.0	14.6	7.5
1990	0.7	9.4	12.0	0.0	15.0	15.2
1991	2.5	6.6	12.5	0.0	12.3	15.4
1992	3.4	6.6	12.3	0.0	15.1	14.4

1/ All values are per enrollee.
2/ As recognized for payment under the program.
3/ Increase in the number of services received per enrollee and greater relative use of more expensive services.
4/ Since July 1, 1981, home health agency services have been almost exclusively provided by the Medicare hospital insurance (HI) program. However, for those SMI enrollees not entitled to HI, the coverage of these services is provided by the SMI program. Since all SMI disabled enrollees are entitled to HI, their coverage of these services is provided by the HI program.

Table B3.--DERIVATION OF MONTHLY ACTUARIAL RATE FOR ENROLLEES AGE 65 AND OVER FINANCING PERIODS ENDING DECEMBER 31, 1988 THROUGH DECEMBER 31, 1991

	Financing Periods			
	CY 1988	CY 1989	CY 1990	CY 1991
Covered services (at level recognized):				
Physicians' reasonable charges	$41.94	$46.09	$51.40	$57.37
Outpatient hospital and other institutions	10.84	12.27	13.98	15.78
Home health agencies	0.06	0.07	0.08	0.08
Group practice prepayment plans	3.80	4.40	4.98	5.64
Independent lab	1.41	1.65	1.99	2.39
Total services	$58.05	$64.48	$72.43	$81.26
Cost-sharing:				
Deductible	-2.71	-2.72	-2.72	-2.68
Coinsurance	-10.83	-12.20	-13.80	-15.15
FY 1991 Sequester	0.00	0.00	0.00	-0.61
Total benefits	$44.51	$49.56	$55.91	$62.82
Administrative expenses	1.70	1.98	1.85	1.94
Incurred expenditures	$46.21	$51.54	$57.76	$64.76
Value of interest	-0.55	-1.09	-1.55	-1.46
Contingency margin for projection error and to amortize the surplus or deficit	3.94	5.35	0.99	-0.70
Monthly actuarial rate	$49.60	$55.80	$57.20	$62.60

Table B4.-- DERIVATION OF MONTHLY ACTUARIAL RATE FOR DISABLED ENROLLEES FINANCING PERIODS ENDING DECEMBER 31,1988 THROUGH DECEMBER 31, 1991

	Financing Periods			
	CY 1988	CY 1989	CY 1990	CY 1991
Covered services (at level recognized):				
Physicians' reasonable charges	$42.24	$45.35	$49.83	$54.74
Outpatient hospital and other institutions	24.36	25.89	28.16	30.57
Home health agencies	0.00	0.00	0.00	0.00
Group practice prepayment plans	1.31	1.50	1.70	1.93
Independent lab	1.28	1.42	1.64	1.86
Total services	$69.19	$74.16	$81.33	$89.10
Cost-sharing:				
Deductible	-2.42	-2.43	-2.44	-2.45
Coinsurance	-13.19	-14.28	-15.73	-16.95
FY 1991 Sequester	0.00	0.00	0.00	-0.68
Total benefits	$53.58	$57.45	$63.16	$69.02
Administrative expenses	1.92	2.13	2.15	2.08
Incurred expenditures	$55.50	$59.58	$65.31	$71.10
Value of interest	-7.12	-6.60	-4.92	-3.08
Contingency margin for projection error and to amortize the surplus or deficit	0.22	-18.68	-16.29	-12.02
Monthly actuarial rate	$48.60	$34.30	$44.10	$56.00

Table B5.-- ACTUARIAL STATUS OF THE SMI TRUST FUND UNDER THREE SETS OF ASSUMPTIONS FOR FINANCING PERIODS THROUGH DECEMBER 31, 1991

	This projection			Low cost projection			High cost projection		
	12-Month period ending June 30,			12-Month period ending June 30,			12-Month period ending June 30,		
	1990	1991	1992	1990	1991	1992	1990	1991	1992
Projection factors (in percent):									
Physician fees 1/									
Aged	0.7	2.5	3.4	-0.1	1.5	1.6	1.5	3.5	5.2
Disabled	0.7	2.5	3.4	-0.1	1.5	1.6	1.5	3.5	5.2
Utilization of physician services 2/									
Aged	11.0	8.5	8.2	9.5	4.6	4.3	12.5	12.3	12.1
Disabled	9.4	6.6	6.6	6.7	3.3	4.3	12.1	10.0	8.8
Outpatient hospital services per enrollee									
Aged	15.2	12.8	12.9	10.7	10.1	8.6	19.7	15.5	17.2
Disabled	12.0	12.5	12.3	5.8	5.9	9.4	18.2	19.1	15.1
	As of December 31,			As of December 31,			As of December 31,		
	1989	1990	1991	1989	1990	1991	1989	1990	1991
Actuarial status (in millions):									
Assets	$13,541	$13,499	$12,739	$13,541	$15,869	$19,992	$13,541	$11,005	$4,798
Liabilities	4,566	4,994	6,116	3,259	3,495	4,314	5,893	6,529	7,997
Assets less liabilities	$ 8,975	$ 8,505	$ 6,623	$10,282	$12,374	$15,678	$ 7,648	$ 4,476	-$3,199
Ratio of assets less liabilities to expenditures (in percent) 3/	19.7	16.4	11.2	23.9	26.2	29.9	15.9	7.8	-4.8

1/ As recognized for payment under the program.
2/ Increase in the number of services received per enrollee 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.

APPENDIX C

STATEMENT OF ACTUARIAL OPINION

It is my opinion that (1) the methodology used herein is based upon sound principles of actuarial practice and (2) all the assumptions used and the resulting cost estimates are in the aggregate reasonable for the purpose of evaluating the actuarial and financial status of the Federal Supplementary Medical Insurance Trust Fund, taking into account the experience and expectations of the program.

Roland E. King
Fellow of the Society of Actuaries
Member of the American Academy of Actuaries
Chief Actuary,
Health Care Financing Administration