APPENDIX A

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

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 calculating allowed charges incurred per enrollee in a recent year (the 12-month period ending June 30, 1988, 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 the Health Care Financing Administration, 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 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 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 the Health Care Financing Administration 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 1988. 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

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	559.57	456.25	81.69	0.77	13.53	7.33
1984	26.433	637.34	512.95	97.23	0.99	16.85	9.32
1985	26.914	687.11	538.89	112.68	1.05	19.37	15.12
1986	27.453	785.11	595.93	135.49	1.19	31.22	21.28
1987	28.013	907.43	672.14	166.53	0.98	42.15	25.63
1988	28.467	1,027.89	747.15	188.04	1.53	61.44	29.73
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	363.08	288.20	60.65	6.09	4.31	3.83
1981	2.691	434.40	340.15	77.10	7.22	5.24	4.69
1982	2.689	514.14	394.86	107.11	0.00	6.30	5.87
1983	2.630	629.06	485.44	128.74	0.00	7.57	7.31
1984	2.596	676.09	529.41	129.33	0.00	8.38	8.97
1985	2.594	708.55	553.22	132.41	0.00	9.24	13.68
1986	2.630	777.20	593.57	151.81	0.00	12.62	19.20
1987	2.679	861.48	654.79	167.82	0.00	16.07	22.80
1988	2.729	915.28	672.64	194.05	0.00	23.23	25.36

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	754.95	614.98	110.89	0.77	18.36	9.95
1984	26.433	854.01	687.04	130.78	0.99	22.67	12.53
1985	26.914	910.49	716.27	151.61	1.05	26.06	15.50
1986	27.453	1,029.06	782.95	181.33	1.19	41.79	21.80
1987	28.013	1,177.73	873.15	221.34	0.98	56.02	26.24
1988	28.467	1,325.11	963.78	248.26	1.53	81.12	30.42
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	483.89	383.58	82.60	6.63	5.87	5.21
1981	2.691	572.56	447.61	103.80	7.78	7.05	6.32
1982	2.689	683.40	522.78	144.23	0.00	8.48	7.91
1983	2.630	835.24	643.57	171.82	0.00	10.10	9.75
1984	2.596	896.49	701.37	172.04	0.00	11.15	11.93
1985	2.594	932.45	729.44	176.67	0.00	12.33	14.01
1986	2.630	1,013.69	775.32	201.92	0.00	16.79	19.66
1987	2.679	1,114.29	847.51	222.17	0.00	21.28	23.33
1988	2.729	1,180.20	867.46	256.13	0.00	30.66	25.95

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 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. Prior to the passage of Public Law 98-369, the fee-screen year was the 12-month period ending June 30. Public Law 98-369 changed the fee-screen year to the 12-month period ending September 30, effective on October 1, 1985, and Public Law 99-272 changed the fee-screen year to a calendar-year basis effective January 1, 1987. 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. Public Law 98-369 changed the base period from the preceding calendar year to the preceding 12-month period ending March 31, and Public Law 99-272 changed the base period to the preceding 12-month period ending June 30. 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 MEI. The customary and prevailing charge

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	4.8	10.6	15.9
1968	5.9	4.6	6.2	11.1
1969	6.2	3.9	0.4	4.3
1970	6.7	4.5	0.3	4.8
1971	7.5	3.9	2.0	6.0
1972	5.2	2.0	5.0	7.1
1973	2.6	3.2	5.4	8.8
1974	5.0	8.9	3.6	12.8
1975	12.8	8.2	3.5	12.0
1976	11.4	9.0	3.3	12.6
1977	10.2	9.0	4.3	13.7
1978	8.9	7.8	3.6	11.7
1979	8.6	8.6	7.6	16.8
1980	11.5	7.7	8.3	16.6
1981	11.1	10.8	5.6	17.0
1982	9.9	8.9	10.0	19.8
1983	8.2	7.2	4.2	11.7
1984	7.5	0.8	3.4	4.2
1985	6.0	0.0	9.3	9.3
1986	6.7	5.4	5.8	11.5
1987	7.5	3.1	7.0	10.3
1988	7.2			
Disabled (excluding ESRD):				
1974	5.0	8.9	14.3	24.5
1975	12.8	8.2	7.6	16.4
1976	11.4	9.0	6.2	15.7
1977	10.2	9.0	5.5	15.0
1978	8.9	7.8	8.8	17.3
1979	8.6	8.6	9.0	18.3
1980	11.5	7.7	8.3	16.6
1981	11.1	10.8	5.4	16.8
1982	9.9	8.9	13.0	23.1
1983	8.2	7.2	1.6	8.9
1984	7.5	0.8	3.2	4.0
1985	6.0	0.0	6.3	6.3
1986	6.7	5.4	3.7	9.3
1987	7.5	3.1	-0.8	2.3
1988	7.2			

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. Effective October 1, 1985, there is an additional screen considered for nonphysician services, supplies, and equipment. After applying the customary and prevailing charge screens, fees are further reduced if they exceed the inflation-indexed charge (IIC). The IIC represents the lowest of the allowed charge screens from the preceding fee-screen year as adjusted by an inflation factor. Effective January 1, 1989 charges for durable medical equipment, prosthetics and orthotics are determined on the basis of a fee schedule updated by an inflation factor. Effective July 1, 1984 charges for laboratory tests performed in physician offices and independent laboratories are determined by fee schedules. These fee schedules are updated at the beginning of the fee-screen year by an inflation adjustment factor.

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 A8 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, 1989 through June 30, 1993. 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 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. Because these series provide only a rough indication of future trends in costs, identical series of increase factors are used for alternative A and alternative B.

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 A4.-- COMPONENTS OF INCREASES IN TOTAL ALLOWED 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		
Alternative A:				
Aged:				
1989	7.4	2.6	5.4	8.1
1990	7.3	1.8	6.7	8.6
1991	8.0	3.7	6.9	10.9
1992	6.6	2.8	7.3	10.3
1993	7.2	2.2	6.9	9.3
Disabled (excluding ESRD):				
1989	7.4	2.6	3.7	6.4
1990	7.3	1.8	6.0	7.9
1991	8.0	3.7	6.0	9.9
1992	6.6	2.8	6.7	9.7
1993	7.2	2.2	6.2	8.5
Alternative B:				
Aged:				
1989	7.4	2.6	5.4	8.1
1990	7.5	1.8	6.7	8.6
1991	8.5	3.7	6.9	10.9
1992	7.2	2.9	7.3	10.4
1993	7.8	2.4	6.9	9.5
Disabled (excluding ESRD):				
1989	7.4	2.6	3.7	6.4
1990	7.5	1.8	6.0	7.9
1991	8.5	3.7	6.0	9.9
1992	7.2	2.9	6.7	9.8
1993	7.8	2.4	6.2	8.7

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

Year ending June 30,	Outpatient hospital	Home health agency	Group practice prepayment plan	Independent lab
Aged:				
Historical:				
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	21.7	48.1	22.5	12.0
1984	17.9	28.6	23.5	25.9
1985	15.9	6.1	15.0	23.7
1986	19.6	13.3	60.4	40.6
1987	22.1	-17.6	34.1	20.4
1988	12.2	56.1	44.8	15.9
Projected:				
1989	9.3	27.9	16.9	16.6
1990	16.0	17.1	13.6	17.6
1991	15.2	15.7	15.4	19.7
1992	15.2	15.6	14.8	20.9
1993	14.8	15.4	15.0	20.2
Disabled (excluding ESRD):				
Historical:				
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	17.1	107.4	18.9
1981	25.7	17.3	20.1	21.3
1982	38.9	0.0	20.3	25.2
1983	19.1	0.0	19.1	23.3
1984	0.1	0.0	10.4	22.4
1985	2.7	0.0	10.6	17.4
1986	14.3	0.0	36.2	40.3
1987	10.0	0.0	26.7	18.7
1988	15.3	0.0	44.1	11.2
Projected:				
1989	-6.2	0.0	23.5	13.0
1990	10.5	0.0	14.2	15.8
1991	14.5	0.0	15.3	17.0
1992	13.9	0.0	15.2	17.4
1993	13.3	0.0	13.9	19.0

Table A6.-- 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
Alternative A:						
Aged:						
1989	$1,445.89	$1,042.35	$271.25	$1.96	$ 94.87	$35.46
1990	1,598.55	1,132.06	314.74	2.30	107.75	41.70
1991	1,794.12	1,254.77	362.46	2.66	124.30	49.93
1992	2,008.27	1,384.64	417.70	3.07	142.68	60.18
1993	2,231.79	1,512.77	479.64	3.54	164.02	71.82
Disabled (excluding ESRD):						
1989	1,231.12	923.67	240.26	0.00	37.86	29.33
1990	1,339.52	996.80	265.52	0.00	43.22	33.98
1991	1,488.78	1,095.19	304.01	0.00	49.83	39.75
1992	1,651.18	1,201.13	346.12	0.00	57.40	46.53
1993	1,817.08	1,304.43	392.24	0.00	65.40	55.01
Alternative B:						
Aged:						
1989	1,445.89	1,042.35	271.25	1.96	94.87	35.46
1990	1,598.55	1,132.06	314.74	2.30	107.75	41.70
1991	1,794.12	1,254.77	362.46	2.66	124.30	49.93
1992	2,009.92	1,386.12	417.70	3.07	142.68	60.35
1993	2,236.61	1,516.90	479.64	3.54	164.02	72.51
Disabled (excluding ESRD):						
1989	1,231.12	923.67	240.26	0.00	37.86	29.33
1990	1,339.52	996.80	265.52	0.00	43.22	33.98
1991	1,488.78	1,095.19	304.01	0.00	49.83	39.75
1992	1,652.59	1,202.42	346.12	0.00	57.40	46.65
1993	1,821.15	1,308.00	392.24	0.00	65.40	55.51

Table A7.-- INCURRED REIMBURSEMENT AMOUNTS: PROJECTED

Year ending June 30,	Average enrollment (millions)	Reimbursement amounts	
		Per enrollee	Aggregate (millions)
Alternative A:			
Aged:			
1989	28.870	$1,127.29	$32,545
1990	29.296	1,252.94	36,706
1991	29.684	1,414.47	41,987
1992	30.055	1,593.05	47,879
1993	30.415	1,777.87	54,074
Disabled (excluding ESRD):			
1989	2.771	957.78	2,654
1990	2.808	1,047.01	2,940
1991	2.843	1,170.59	3,328
1992	2.878	1,304.73	3,755
1993	2.913	1,441.81	4,200
Alternative B:			
Aged:			
1989	28.870	1,127.29	32,545
1990	29.296	1,252.94	36,706
1991	29.684	1,414.47	41,987
1992	30.055	1,594.41	47,920
1993	30.415	1,781.88	54,196
Disabled (excluding ESRD):			
1989	2.771	957.78	2,654
1990	2.808	1,047.01	2,940
1991	2.843	1,170.59	3,328
1992	2.878	1,305.77	3,758
1993	2.913	1,445.25	4,210

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

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 estimates reflect the unique payment mechanism through which ESRD dialysis 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 A8.

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.

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.

Table A8.--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	$ 40	$ 96
1975	7	11	68	144
1976	11	13	101	190
1977	14	15	137	229
1978	16	16	173	273
1979	18	20	216	322
1980	19	23	240	408
1981	20	25	300	470
1982	22	28	394	475
1983	25	32	450	491
1984	27	35	456	397
1985	30	38	445	389
1986	32	42	446	404
1987	34	45	482	444
1988	36	50	547	505
1989	37	54	563	551
1990	40	56	703	719
1991	43	59	773	784
1992	45	62	830	852
1993	48	66	902	934

Table A9.--AGGREGATE REIMBURSEMENT AMOUNTS ON A CASH BASIS
(In millions)

Fiscal year 1/	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	$ 200	$ 137	2,874
1975	3,289	263	213	3,765
1976	4,037	350	285	4,672
T.Q.	1,078	110	81	1,269
1977	5,005	499	363	5,867
1978	5,785	625	442	6,852
1979	6,929	792	538	8,259
1980	8,485	994	665	10,144
1981	10,362	1,193	790	12,345
1982	12,404	1,466	936	14,806
1983	14,783	1,725	979	17,487
1984	16,803	1,795	875	19,473
1985	19,080	1,886	842	21,808
1986	22,070	2,173	926	25,169
1987	26,353	2,560	1,024	29,937
1988	29,797	2,752	1,133	33,682
1989	32,746	2,886	1,234	36,867
Projected:				
Alternative A:				
1990	38,066	3,009	1,427	42,502
1991	42,331	3,417	1,478	47,226
1992	48,678	4,000	1,492	54,170
Alternative B:				
1990	38,066	3,009	1,427	42,502
1991	42,339	3,418	1,479	47,236
1992	48,731	4,005	1,493	54,229

1/ 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 1977-1992 cover the interval from October 1 through September 30.

Projections of administrative costs are based on estimates of changes in average annual wages.

APPENDIX B

Statement of Actuarial Assumptions and Bases
Employed in Determining the Monthly Actuarial Rates
and the Standard Monthly Premium Rate for the
Supplementary Medical Insurance Program
Beginning January 1990*

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 for non-catastrophic expenses on an incurred basis, i.e., the amount of income that would be sufficient to pay for non-catastrophic 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 period 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

*This statement appeared in the Federal Register of October 27, 1989. However, since the publication of this notice, two laws affecting the SMI program were enacted that modified the premium rates announced in this notice. The Medicare Catastrophic Coverage Repeal Act of 1989 (Public Law 101-234) was enacted on December 13, 1989. Also, the Omnibus Budget Reconciliation Act of 1989 (Public Law 101-239) was enacted on December 19, 1989. A statement is being prepared that will appear in a future Federal Register which will announce the revised premium rate of $28.60. Projections shown in this statement differ from the projections shown in the rest of the report because of changes in assumptions since the rates were announced.

expenses. Table 1 summarizes the estimated actuarial status of the trust fund as of the end of the financing period for 1988 through 1989.

TABLE 1--ESTIMATED ACTUARIAL STATUS OF THE SMI TRUST FUND AS OF THE END OF THE FINANCING PERIODS, JANUARY 1, 1988--DECEMBER 31, 1989
(In Millions of Dollars)

Financing Period Ending	Assets	Liabilities	Assets Less Liabilities
December 31, 1988	$ 8,990	$4,905	$4,085
December 31, 1989	12,401	6,045	6,356

2. Monthly Actuarial Rate for Enrollees Age 65 and Older

The monthly actuarial rate is one-half of the monthly projected non-catastrophic cost of benefits and administrative expenses for each enrollee age 65 and older, adjusted to allow for interest earnings on non-catastrophic 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.

The monthly actuarial rate for enrollees age 65 and older for calendar year 1990 was determined by projecting per-enrollee non-catastrophic cost for the 12-month periods ending June 30, 1990 and June 30, 1991 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 1 annual fee screen update used for benefits before the passage of section 2306(b) of Pub. L. 98-369. The values for the 12-month period ending June 30, 1987 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 2. Those per-enrollee values are then adjusted to apply to a calendar year period. The projected values for financing periods from January 1, 1987, through December 31, 1990, are shown in Table 3.

The projected monthly rate required to pay for one-half of the total of non-catastrophic benefits and administrative costs for enrollees age 65 and over for calendar year 1990 is $58.36. The monthly actuarial rate of $57.20 provides an adjustment of -$1.32 for interest earnings and $0.16 for a contingency margin. Based on current estimates, it appears that with respect to enrollees age 65 and over the assets are 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, only a small positive contingency margin is needed to maintain assets at an 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 disabiltiy benefits for more than 24 months or because of entitlement to Medicare under the end-stage renal disease program. Projected monthly non-catastrophic costs for disabled enrollees

Table 2.-- PROJECTION FACTORS 1/
12-MONTH PERIODS ENDING JUNE 30 OF 1987-1991
(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:						
1987	4.4	7.0	22.2	-17.6	34.0	20.4
1988	3.7	6.6	12.8	65.4	44.4	18.9
1989	2.5	4.7	10.2	16.0	17.1	10.5
1990	3.2	6.2	18.2	16.0	20.7	24.1
1991	4.1	6.9	19.6	16.0	21.5	25.0
Disabled:						
1987	4.4	5.0	10.8	0.0	26.7	19.0
1988	3.7	5.9	17.2	0.0	44.9	15.3
1989	2.5	4.2	6.0	0.0	22.9	6.9
1990	3.2	5.9	15.5	0.0	20.1	22.4
1991	4.1	6.8	17.1	0.0	21.0	23.7

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 3.--DERIVATION OF MONTHLY ACTUARIAL RATE FOR ENROLLEES AGE 65 AND OVER FINANCING PERIODS ENDING DECEMBER 31, 1987 THROUGH DECEMBER 31, 1990

	Financing Periods			
	CY 1987	CY 1988	CY 1989	CY 1990
Covered services (at level recognized):				
Physicians' reasonable charges	$38.35	$41.74	$45.32	$50.10
Outpatient hospital and other institutions	9.81	10.93	12.51	14.88
Home health agencies	0.05	0.07	0.08	0.10
Group practice prepayment plans	2.85	3.66	4.36	5.28
Independent lab	1.20	1.37	1.61	2.01
Total services	$52.26	$57.77	$63.88	$72.37
Cost-sharing:				
Deductible	-2.70	-2.71	-2.72	-2.73
Coinsurance	-9.13	-10.12	-11.22	-12.75
Total benefits	$40.43	$44.94	$49.94	$56.89
Administrative expenses	1.32	1.36	1.41	1.47
Incurred expenditures	$41.75	$46.30	$51.35	$58.36
Value of interest	-0.42	-0.54	-0.98	-1.32
Contingency margin for projection error and to amortize the surplus or deficit	-5.53	3.84	5.43	0.16
Monthly actuarial rate	$35.80	$49.60	$55.80	$57.20

(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 2). Non-catastrophic 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 4.

The projected monthly rate required to pay for one-half of the total of benefits and administrative costs for disabled enrollees for calendar year 1990 is $68.76. The monthly actuarial rate of $44.10 provides an adjustment of -$3.43 for interest earnings and -$21.23 for a contingency margin. Based on current estimates, it appears that the disabled assets are more than sufficient to cover the amount of disabled 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 disabled 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 2), 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. One set represents increases that are lower and is, therefore, more optimistic than the current

Table 4.--DERIVATION OF MONTHLY ACTUARIAL RATE FOR DISABLED ENROLLEES FINANCING PERIODS ENDING DECEMBER 31,1987 THROUGH DECEMBER 31, 1990

	Financing Periods			
	CY 1987	CY 1988	CY 1989	CY 1990
Covered services (at level recognized):				
Physicians' reasonable charges	$41.12	$44.71	$48.26	$53.00
Outpatient hospital and other institutions	22.93	24.81	26.07	28.07
Home health agencies	0.00	0.00	0.00	0.00
Group practice prepayment plans	1.05	1.39	1.69	2.03
Independent lab	1.24	1.37	1.56	1.87
Total services	$66.34	$72.28	$77.58	$84.97
Cost-sharing:				
Deductible	-2.42	-2.43	-2.44	-2.45
Coinsurance	-12.09	-13.19	-14.15	-15.49
Total benefits	$51.83	$56.66	$60.99	$67.03
Administrative expenses	1.69	1.72	1.73	1.73
Incurred expenditures	$53.52	$58.38	$62.72	$68.76
Value of interest	-8.84	-7.09	-6.19	-3.43
Contingency margin for projection error and to amortize the surplus or deficit	8.32	-2.69	-22.23	-21.23
Monthly actuarial rate	$53.00	$48.60	$34.30	$44.10

Table 5.-- ACTUARIAL STATUS OF THE SMI TRUST FUND UNDER THREE SETS OF ASSUMPTIONS FOR FINANCING PERIODS THROUGH DECEMBER 31, 1990

	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,		
	1989	1990	1991	1989	1990	1991	1989	1990	1991
Projection factors (in percent):									
Physician fees 1/									
Aged	2.5	3.2	4.1	1.7	2.1	2.9	3.3	4.4	5.2
Disabled	2.5	3.2	4.1	1.7	2.1	2.9	3.3	4.4	5.2
Utilization of physician services 2/									
Aged	4.7	6.2	6.9	3.0	3.1	3.7	6.3	9.4	10.0
Disabled	4.2	5.9	6.8	-0.3	1.0	1.8	8.8	10.9	11.7
Outpatient hospital services per enrollee									
Aged	10.2	18.2	19.6	1.8	10.9	12.2	18.7	25.6	27.0
Disabled	6.0	15.5	17.1	-6.5	1.3	2.9	18.5	29.6	31.2
	As of December 31,			As of December 31,			As of December 31,		
	1988	1989	1990	1988	1989	1990	1988	1989	1990
Actuarial status (in millions):									
Assets	$8,990	$12,401	$11,558	$8,990	$15,334	$20,109	$8,990	$9,250	$2,016
Liabilities	4,905	6,045	6,636	3,004	3,863	4,132	6,854	8,308	9,293
Assets less liabilities	$4,085	$ 6,356	$ 4,922	$5,986	$11,471	$15,997	$2,136	$ 942	-$7,277
Ratio of assets less liabilities to expenditures (in percent) 3/	10.0	13.5	9.1	15.9	27.6	33.9	4.8	1.8	-11.6

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.

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 not shown in Table 5 are the same as in Table 2.

Table 5 indicates that, under the assumptions used in preparing this report, the monthly actuarial rates will result in an excess of non-catastrophic assets over liabilities of $4,922 million by the end of December 1990. This amounts to 9.1 percent of the estimated total incurred non-catastrophic 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 non-catastrophic deficit of $7,277 million by the end of December 1990, which amounts to 11.6 percent of the estimated total non-catastrophic 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 non-catastrophic surplus of $15,997 million by the end of December 1990, which amounts to 33.9 percent of the estimated total incurred non-catastrophic expenditures for the following year.

5. Standard Premium Rate

Beginning with calendar year 1990, section 1839(a)(3) of the Act provides that the standard monthly premium rate, for both aged and disabled enrollees, is the lesser of:

1. The actuarial rate for enrollees aged 65 and older; or
2. 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 November preceding the promulgation (and rounded to the nearest multiple of ten cents).

The standard monthly premium rate for calendar year 1989 is $27.90. The OASDI benefit table increased 4.0 percent in December 1988. The $27.90 rate, increased by 4.0 percent and rounded to the nearer ten-cent multiple, is $29.00. Since this is less than the aged actuarial rate, the standard premium rate is $29.00 for calendar year 1990.

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

○