

TABLE 7.—*Ratio of assets in the fund at the beginning of the year to disbursements during the year for the Hospital Insurance Trust Fund*

[In percent]	
Calendar year:	
Historical data:	Ratio
1967 .....	28
1968 .....	25
1969 .....	43
1970 .....	47
1971 .....	54
1972 .....	47
1973 .....	40
1974 .....	69
1975 .....	79
1976 .....	77
1977 .....	66
1978 .....	57
1979 .....	54
Projection:	
1980 .....	53
1981 .....	52
1982 .....	65

#### ACTUARIAL STATUS OF THE TRUST FUND

The 1971 Advisory Council recommended that the hospital insurance program be operated on the general financing principle that annual income to the program should be approximately equal to annual outlays of the program plus an amount to maintain a balance in the trust fund equal to one year's expenditures. This principle reflects the view that a sizable fund is needed for the contingency that future income and outgo may differ substantially from projected levels, but that it is unnecessary and impractical to fund fully the future benefits of workers as they accrue the right to those future benefits.

The projected expenditures under the program, expressed as percentages of taxable payroll, are summarized for selected years over the next 25-year period in table 8. The ratio of expenditures to taxable payroll has increased from 0.95 percent in 1967 to an estimated 2.11 percent in 1980, reflecting both the higher rate of increase in hospital costs than in earnings subject to hospital insurance taxes and the extension of hospital insurance benefits to disabled beneficiaries and persons suffering from end-stage renal disease. Further increases in this ratio to 2.56 percent in 1985, and 4.72 percent by the year 2000 result from the assumption that the cost of institutional health care will continue to increase at a higher rate than taxable earnings. (See appendix A for a description of the methodology and assumptions used in this projection.)

The allowances necessary to build the trust fund to the level of a year's disbursements and to maintain it at that level, after accounting for the offsetting effect of interest earnings, are also shown in table 8. Since the level of the trust fund at the beginning of calendar year 1980 is 53 percent of the projected disbursements during 1980, a cost is associated with increasing it to the 100 percent level. Building the trust fund to the level of a year's disbursements could be accomplished in a single year, in a period of several years, or over the entire 25-year projection period. Because of the many patterns of trust fund growth possible, the allowance for trust fund building and maintenance has, for purposes of display in table 8, been developed to provide for uni-

form growth of the trust fund from the level of 53 percent at the beginning of 1980 to the level of 100 percent at the end of the 25-year projection period.

The adequacy of the financing of the hospital insurance program under current law is measured by comparing on a year-by-year basis the actual tax rates specified by law with the corresponding total costs of the program, expressed as percentages of taxable payroll. If these two items are exactly equal in each year of the 25-year projection period and all projections assumptions are realized, tax revenues along with interest income will be sufficient to provide for benefits and administrative expenses for insured persons and to build the trust fund gradually to the level of a year's outgo by the end of the period. In practice, however, tax rate schedules generally are designed with rate changes occurring only at intervals of several years, rather than with continual yearly increases to match exactly with projected cost increases. To the extent that small differences between the yearly costs of the program and the corresponding tax rates occur for short periods of time and are offset by subsequent differences in the reverse direction, the substance of the financing objectives will have been met.

The projected total costs of the program, expressed as percentages of taxable payroll, and the tax rates scheduled under current law are shown in table 8 for selected years over the 25-year period 1980-2004. The total cost of the program, including expenditures plus trust fund building and maintenance, exceeds the tax rate in nearly every year of the projection. Furthermore, expenditures for benefits and administrative expenses alone exceed the corresponding tax rates for all future years beginning in the late 1980's. The trust fund as a percent of a year's disbursements is projected to increase to a level of about 88 percent in 1987. The trust fund is projected to decline rapidly thereafter until it is completely exhausted in about 1994.

The actuarial balance of the hospital insurance program is defined to be the excess of the average tax rate for the 25-year valuation period over the average cost of the program, expressed as a percent of taxable payroll, for the same period. The average tax rate for the 25-year period 1980-2004 is 2.81 percent; the average cost of the program is 3.80 percent of taxable payroll, composed of 3.60 percent for program expenditures and 0.20 percent for the building and maintenance of the trust fund. The resulting actuarial balance, as shown in table 9, is a deficit of 0.99 percent of taxable payroll.

Long-range cost estimates for the hospital insurance program have been made, since the beginning of the program, for the 25-year period beginning with the year of the report. A relatively long valuation period, such as 25 years, is necessary in order to depict the pattern of rising costs which will ensue if trends over the past two decades continue into the future. Even a valuation period as long as 25 years fails to present fully the future contingencies that reasonably may be expected, such as the impact of the demographic shift after the turn of the century which is discussed in the old-age, survivors, and disability insurance report. On the other hand, the degree of uncertainty concerning future hospital costs, relative to the remainder of the economy, is sufficiently great as to limit the usefulness of projections beyond 25 years. A precise prediction of the future is not possible, even in the short range; however, both short- and long-range estimates can be made, based on reasonable assumptions, which will indicate the trend and general range of future costs.

Since future economic, demographic, and health care usage and cost experience may differ considerably from any single set of assumptions on which cost estimates are based, projections also have been prepared on the basis of two alternative sets of assumptions. The estimated operations of the hospital insurance trust fund during calendar years 1979-95 are summarized in table 10 for all three alternatives, and table 11 compares the actuarial balance under each of the three. The assumptions underlying alternative II, the intermediate projection, are presented in substantial detail in appendix A. The assumptions used in preparing alternative projections I and III are also summarized in appendix A. The projections shown in the statement of expected operations and status of the trust fund through December 31, 1982, contained earlier in this report, are based on the assumptions contained in alternative II.

The three alternative sets of assumptions were selected in order to indicate the general range in which the cost of the program reasonably might be expected to fall. The alternative I assumptions are somewhat more optimistic than those of alternative II, resulting in a lower average cost over the 25-year period and a stronger trust fund development. Alternatives I and III provide for a fairly wide range of possible experience. Actual experience reasonably may be expected to fall within the range, but no guarantee can be made that this will be the case, particularly in light of the wide variations in experience that have occurred since the beginning of the program. The projected trust fund development under alternative III also provides a measure of the strength of the financing of the program. An adequate financing schedule ought to be sufficiently strong to withstand, for a period of several consecutive years, conditions in the general economy and in the hospital sector which are substantially more adverse than anticipated under alternative II.

Under alternative II, the trust fund as a percent of a year's disbursements is projected to increase in the early and mid-1980's and to decline rapidly thereafter until it is completely exhausted in about 1994. Under alternative I, the trust fund is projected to grow steadily until the early 1990's then to decline steadily until the fund is completely exhausted early in the next century. Under alternative III, the trust fund as a percent of a year's disbursements is projected to increase in the early 1980's, then decrease steadily, with complete exhaustion of the fund by 1990. These projections do not reflect any reduction in disbursements due to certain proposed changes in regulations which were included in the 1981 Federal budget but which have not yet been implemented.

The divergence in outcomes among the three alternatives is reflected both in the estimated operations of the trust fund and in the 25-year average costs. The variations in the underlying assumptions, as shown in appendix A, can be characterized as (1) moderate in terms of magnitude of the differences on a year-by-year basis and (2) persistent over the duration of the 25-year period. Under alternative II, program costs are projected to grow at a rate which gradually declines to an ultimate level of 3.1 percent more rapidly than taxable payroll. Under alternative I, program costs are projected to grow at a somewhat lower rate which gradually declines to an ultimate difference of 1.3 percent.

Similarly, alternative III follows a pattern whereby program costs initially increase at a somewhat higher rate than under alternative II, gradually declining to an ultimate difference of about 5.1 percent. Recent experience has indicated that economic conditions producing results as adverse as those under alternative III can occur. In view of this and because of the wide range of possible experience, it is important that a substantial balance be maintained in the hospital insurance trust fund as a reserve for contingencies.

TABLE 8.—COST AND TAX RATES OF THE HOSPITAL INSURANCE PROGRAM, EXPRESSED AS A PERCENT OF TAXABLE PAYROLL

Calendar year	Expenditures under the program <sup>1</sup>	Trust fund building and maintenance <sup>2</sup>	Total cost of the program	Tax rate scheduled in the law <sup>3</sup>	Difference
<b>Historical data:</b>					
1967	0.95				
1968	1.05				
1969	1.13				
1970	1.21				
1971	1.33				
1972	1.31				
1973	1.34				
1974	1.42				
1975	1.69				
1976	1.83				
1977	1.91				
1978	2.07				
1979	2.00				
<b>Projection:</b>					
1980	2.11	0.10	2.21	2.10	-0.11
1981	2.20	.12	2.32	2.60	.28
1982	2.27	.13	2.40	2.60	.20
1983	2.35	.15	2.50	2.60	.10
1984	2.44	.16	2.60	2.60	.00
1985	2.56	.18	2.74	2.70	-.04
1990	3.26	.19	3.45	2.90	-.55
1995	4.02	.21	4.23	2.90	-1.33
2000	4.72	.23	4.95	2.90	-2.05
Average <sup>4</sup>	3.60	.20	3.80	2.81	-.99

<sup>1</sup> Costs attributable to insured beneficiaries only. Benefits and administrative costs for noninsured persons are financed through general revenue transfers and premium payments rather than through payroll taxes.

<sup>2</sup> Allowance for building the trust fund balance to the level of a year's outgo and maintaining it at that level, after accounting for the offsetting effect of interest earnings.

<sup>3</sup> Rates for employees and employers combined.

<sup>4</sup> Average for the 25-yr period 1980-2004.

Note: Taxable payroll is adjusted to take into account the lower contribution rates on self-employment income, on tips, and on multiple-employer "excess wages" as compared with the combined employer-employee rate.

TABLE 9.—Actuarial balance of the hospital insurance program expressed as a percent of taxable payroll

	Percent
Average contribution rate, scheduled under present law <sup>1</sup>	2.81
Average cost of the program: <sup>1</sup>	
Expenditures, for benefit payments and administrative costs for insured beneficiaries	3.60
Building and maintaining the trust fund, at the level of 1 year's expenditures	0.20
Total cost of the program	3.80
Actuarial balance	-0.99

<sup>1</sup> Average for the 25-year period 1980-2004.

Note: Taxable payroll is adjusted to take into account the lower contribution rates on self-employment income, on tips, and on multiple-employer "excess wages" as compared with the combined employer-employee rate.

TABLE 10.—ESTIMATED OPERATIONS OF THE HOSPITAL INSURANCE TRUST FUND DURING CALENDAR YEARS 1979-95, UNDER ALTERNATIVE SETS OF ASSUMPTIONS

[Dollar amounts in billions]

Calendar years	Total income	Total disbursements	Net increase in fund	Fund at end of year	Ratio of assets to disbursements <sup>1</sup> (percent)
<b>Alternative I:</b>					
1979 <sup>2</sup>	\$22.8	\$21.1	\$1.8	\$13.2	54
1980	26.5	24.8	1.7	14.9	53
1981	35.9	28.4	7.5	22.4	53
1982	41.8	32.7	9.1	31.5	69
1983	47.4	37.6	9.8	41.3	84
1984	53.3	43.3	10.1	51.3	95
1985	61.3	49.4	11.8	63.2	104
1986	71.9	55.9	16.0	79.2	113
1987	78.2	62.3	15.9	95.1	127
1988	84.1	68.7	15.4	110.5	138
1989	89.9	75.1	14.8	125.4	147
1990	96.1	82.3	13.9	139.2	152
1991	102.2	90.0	12.1	151.4	155
1992	108.4	98.3	10.1	161.5	154
1993	114.5	106.7	7.8	169.3	151
1994	121.0	115.2	5.8	175.1	147
1995	127.8	124.5	3.4	178.5	141
<b>Alternative II:</b>					
1979 <sup>2</sup>	22.8	21.1	1.8	13.2	54
1980	26.4	24.8	1.6	14.8	53
1981	35.0	28.4	6.6	21.5	52
1982	40.5	33.0	7.5	29.0	65
1983	46.0	38.3	7.7	36.7	76
1984	51.8	44.6	7.2	43.8	82
1985	59.7	52.0	7.8	51.6	84
1986	70.6	60.3	10.3	61.9	85
1987	78.3	69.9	8.4	70.2	88
1988	86.1	80.7	5.4	75.7	87
1989	94.1	92.5	1.7	77.4	82
1990	102.2	105.7	-3.5	73.9	73
1991	109.8	120.4	-10.6	63.3	61
1992	117.4	136.7	-19.3	44.0	46
1993	124.7	154.7	-30.0	14.0	28
1994	131.8	173.6	-41.7	(*)	8
<b>Alternative III:</b>					
1979 <sup>2</sup>	22.8	21.1	1.8	13.2	54
1980	26.4	24.8	1.6	14.8	53
1981	34.9	29.1	5.9	20.7	51
1982	40.9	34.7	6.2	26.9	60
1983	46.9	41.3	5.5	32.4	65
1984	52.9	49.5	3.4	35.8	65
1985	61.3	58.2	2.1	37.9	61
1986	72.9	70.7	2.2	40.1	54
1987	80.9	84.3	-3.4	36.7	48
1988	88.6	99.9	-11.3	25.4	37
1989	96.0	117.4	-21.4	4.0	22
1990	102.9	137.7	-34.8	(*)	3

<sup>1</sup> Ratio of assets in the trust fund at the beginning of the year to disbursements during the year.<sup>2</sup> Figures for 1979 represent actual experience.<sup>3</sup> Trust fund depleted in calendar year 1994.<sup>4</sup> Trust fund depleted in calendar year 1990.

Note: Totals do not necessarily equal the sum of rounded components.

TABLE 11.—ACTUARIAL BALANCE OF THE HOSPITAL INSURANCE PROGRAM, UNDER ALTERNATIVE SETS OF ASSUMPTIONS

[In percent]

	Alternative		
	I	II	III
Average contribution rate, scheduled under present law <sup>1</sup>	2.81	2.81	2.81
Average cost of the program, for expenditures and for trust fund building and maintenance <sup>2</sup>	2.99	3.80	5.03
Actuarial balance	-1.18	-0.99	-2.22

<sup>1</sup> Average for the 25-yr period 1980-2004.<sup>2</sup> Average for the 25-yr period 1980-2004, expressed as a percent of taxable payroll.

Note: Taxable payroll is adjusted to take into account the lower contribution rates on self-employment income, on tips, and on multiple-employer "excess wages" as compared with the combined employer-employee rate.

## CONCLUSION

The present financing schedule for the hospital insurance program is not adequate to provide for the expenditures anticipated over the entire 25-year valuation period if the assumptions underlying the estimates are realized. The assumptions and estimates that appear in this report were necessarily prepared before the most recent changes in the economy were known. Current evidence indicates that the economy has moved into a recession and is weakening rapidly. Therefore, revised short-range projections will probably be necessary in the near future as more information becomes available about the intensity of the changes in the economy.

Tax rates currently specified in the law (including the scheduled increases in 1981, 1985, and 1986) are sufficient, along with interest earnings, to support program expenditures over the next 10 years. However, they are not sufficient, under current assumptions, to provide for adequate growth in the trust fund—relative to annual disbursements—toward the level of a full year's disbursement recommended by the 1971 Advisory Council. The financing for the remainder of the 25-year valuation period is not sufficient even to provide for projected benefits and administrative expenses. The average percent of payroll necessary to provide for benefits and administrative expenses plus growth in the trust fund to the level of one year's disbursements exceeds the average tax rate scheduled in the law, producing an average deficit of 0.99 percent of taxable payroll over the entire 25-year projection period. Even under the more optimistic alternative I assumptions, the present financing schedule will result in the fund being exhausted early in the next century.

The trust fund balance at the beginning of 1980 was 53 percent of the projected disbursements for 1980, well below the level of a full year's disbursements. The ratio of fund to disbursements is projected to increase to a level of about 88 percent by 1987. The trust fund is projected to decline thereafter, until it is completely exhausted in about 1994. Under the less optimistic alternative III assumptions, the decline of the trust fund is accelerated, with complete exhaustion of the fund by 1990.

The hospital insurance trust fund is not in imminent danger of being unable to provide benefits which become payable. However, the present financing schedule does not provide for adequate growth in the trust fund (relative to annual disbursements); and, by 1990, disbursements exceed income, leading to complete exhaustion of the fund by about 1994. The Board recommends that Congress take action to examine ways of strengthening the long-range financing of the hospital insurance system. The Board also recommends that action be taken to curtail the rapid growth in the cost of the hospital insurance program which has occurred during recent years and which is anticipated in the future.



## APPENDIX A.—ACTUARIAL METHODOLOGY AND PRINCIPAL ASSUMPTIONS FOR THE HOSPITAL INSURANCE COST ESTIMATES <sup>1</sup>

The basic methodology and assumptions used in the estimates for the hospital insurance program are described in this appendix. In addition, sensitivity testing of program costs under alternative sets of assumptions is presented.

### 1. PROGRAM COSTS

The principal steps involved in projecting the future costs of the hospital insurance program are (1) establishing the present cost of services provided to beneficiaries, by type of service, to serve as a projection base; (2) projecting increases in the cost of inpatient hospital services covered under the program; (3) projecting increases in the cost of skilled nursing facility and home health agency services covered under the program; and (4) projecting increases in administrative costs. The major emphasis will be directed toward the cost of inpatient hospital services, which accounts for approximately 95 percent of benefit expenditures.

#### *a. Projection base*

The hospital insurance program is obligated, by law, to reimburse institutional providers for the reasonable cost of providing covered services to beneficiaries. In order to establish a suitable base from which to project the future costs of the program, the incurred reasonable cost of services provided must be reconstructed for the most recent period for which a reliable determination can be made. To do this, payments to providers must be attributed to dates of service, rather than to payment dates. In addition, the nonrecurring effects of any changes in regulations or administration of the program and of any items affecting only the timing and flow of payments to providers must be eliminated. As a result, the rates of increase in the incurred cost of the program differ from the increases in cash disbursements shown in tables 5 and 6.

The reasonable costs of covered services to beneficiaries are determined on the basis of provider cost reports. Payments to a provider initially are made on an "interim" basis; to adjust interim payments to the level of retroactively determined costs, a series of payments or recoveries is effected through the course of cost settlement with the provider. The net amounts paid to date to providers in the form of cost settlements are known; however, the incomplete data available do not permit a precise determination of the exact amounts incurred during specific periods of time. Due to the time required to obtain cost reports from providers, to verify these reports, and to perform audits (where appropriate), final settlements have lagged behind the liability for such payments or recoveries by as much as several years for some providers. Hence, the final cost of the program has not

<sup>1</sup> Prepared by the Division of Medicare Cost Estimates, Health Care Financing Administration.

been completely determined for the most recent years of the program, and some degree of uncertainty remains even for earlier years.

Additional problems are posed by changes in administrative or reimbursement policy which have a substantial effect on either the amount or incidence of payment. The extent and timing of the incorporation of such changes into interim payment rates and cost settlement amounts cannot be determined precisely.

The process of allocating the various types of payments made under the program to the proper incurred period—using incomplete data and estimates of the impact of administrative actions—presents difficult problems, the solution to which can be only approximate. Under the circumstances, the best that can be expected is that the actual incurred cost of the program for a recent period can be estimated within a few percent. This increases the error of projection directly, by incorporating any error in estimating the base year into all future years.

#### *b. Hospital costs*

The hospital insurance program reimburses participating hospitals for the reasonable cost of providing covered services to beneficiaries. Because of its cost reimbursement nature, the program essentially pays for the share of aggregate inpatient hospital costs which is allocated to beneficiaries. Hence, for analysis and projection purposes, trends in program costs can be separated conceptually into (1) increases in aggregate expenditures by hospitals for all patients in producing services of the types covered by the program and (2) changes in the share of these expenditures that are for hospital insurance beneficiaries and hence will be paid by the hospital insurance program.

Increases in aggregate inpatient hospital costs can be analyzed into three broad categories:

(1) Economic factors—the increase in unit costs that would result if hospitals' input cost increases (wage increases for hospital employees and price increases for goods and services purchased by hospitals) were the same as those for the general economy;

(2) Volume of services—the increase in total output of units of service (as measured by hospital admissions); and

(3) Unit input intensity—the increase in total costs due to increased labor and nonlabor input intensity (wage and price increases for hospital inputs which are more rapid than for workers and products in the general economy, plus increases in the number of hospital employees and amount of supplies and equipment used to produce a unit of service).

It has been possible to isolate some of these elements and to identify their roles in previous hospital cost increases. Table A1 shows the values of the principal components of the increases for historical periods for which data are available and the projected trends used in the estimates.

Increases in economic factors can be divided into those for payroll and those for nonpayroll expenditures. About half of hospital costs are for direct payroll expenses. This proportion has declined over the years, and a modest continuation in the decline is projected. The weighted averages of the economic factors in table A1 reflect these year-by-year proportions. Increases in average wages in the period 1966–78 generally ranged from 5½ to 7 percent per year, with the exception of somewhat higher increases in 1976 and 1978. Changes in

the CPI during the same period generally varied between 2½ and 7½ percent, with the exception of substantially higher rates of increases in 1974 and 1975. The increases in both average wages and CPI beyond 1978 are based on assumptions used in projecting experience under the OASDI program.

Increases in volume of services (as measured by admissions) are separated into (1) a part due to population growth and (2) a part due to changes in the average number of admissions per capita. The population projection used in this report is based on assumptions used in projecting experience under the OASDI program. Admission incidence rates increased on average 1.7 percent during the 10-year pre-Medicare period 1956-65; the trend in the period 1966-74 has been relatively consistent, with an average rate of increase of about 1½ percent. Increases in admission incidence in the period 1975-78 averaged less than 1 percent. Preliminary data for 1979 show an increase in admission incidence of 1.7 percent. This level is projected to taper gradually to an ultimate rate of increase that results solely from aging in the general population (i.e., admissions per capita by age and sex ultimately are assumed to be constant, so that the increases in overall average admissions per capita are due solely to changes in the mix of age and sex).

Unit input intensity changes can be analyzed and projected in terms of payroll and nonpayroll components in a manner similar to that for economic factors. The payroll component can be divided further between unit input intensity increases related to (1) the excess of average wage increases for hospital employees over average wage increases in the general economy and (2) increases in the average number of hospital employees per admission.

For several years preceding the beginning of the hospital insurance program, average hospital wages and salaries (as derived from data reported by the American Hospital Association) increased at a rate of about 1 percent per year more rapidly than the rate of increase in earnings in OASDI-covered employment. During the 1966-78 period, this differential has fluctuated widely, but has averaged slightly higher than 1 percent. Several factors contributing to this differential can be identified, including (1) growth in third-party reimbursement of hospitals—through Medicare, Medicaid, and comprehensive private plans—which is likely to have weakened hospital resistance to wage demands; (2) increased proportions of highly trained and more highly paid personnel; (3) an increased degree of labor organization and activity; and (4) the fact that hospital employees historically have earned less than similarly skilled workers in other industries. Over the short term, the differential level assumed is generally consistent with experience over the last 11 years but slightly lower due to the relatively high rates of increase projected for average wages in the entire economy. The projection assumes only a modest continuation of the wage level intensity factor over the long run.

The number of hospital employees has continued to increase more rapidly than the number of admissions over the past 20 years. Increases in employee intensity averaged 2 percent per year during the 10 years preceding Medicare. The early years of the program were marked by a substantial surge in employees per admission, followed by a period of only modest increases during the imposition of economic stabilization program controls. Many of the same factors which have affected

hospital wage level differentials can be identified also as contributing to the increase in employee intensity; in addition, the increased number and complexity of services provided with a given admission have been significant factors. Preliminary data for 1979 show an increase in employee intensity of about 1 percent. The projection assumes, in general, a continuation of this trend, gradually tapering to reflect a lower rate of industry growth than during the earlier period.

Nonlabor unit input intensity is a composite of several heterogeneous components. These include (1) price increases for goods and services that hospitals purchase which do not parallel increases in the CPI, (2) increases in the volume of medical and other supplies purchased and used per admission, and (3) increases in medical equipment and other capital assets employed in the provision of a hospital admission. Due to a lack of data, the nonlabor intensity factor cannot be separated into its component parts and must be treated as a residual. Historically, this factor has increased at a high rate and in an erratic fashion. Increases during the 1956-65 period averaged nearly 5½ percent; these were followed by an irregular series of increases during the period 1966-72 ranging between 6 and 18½ percent. The second and third years of the controlled period 1972-74 produced increases of only 2 to 3 percent, substantially below even the increases for the 10-year pre-Medicare period. Preliminary data indicate that the nonlabor intensity factor is declining sharply in 1979. The projection assumes a continuation of this trend in the near future, with a return to a level consistent with experience during recent years (excluding years subject to economic stabilization program controls) by 1982, followed by a gradual decline to a level consistent with experience during the decade preceding Medicare.

Aggregate inpatient hospital costs—reflecting the composite of economic factors, volume of service, and unit input intensity—have exhibited a very rapid rate and irregular pattern of increases. Although the pre-Medicare period produced an average rate of increase of approximately 10½ percent, typical rates in subsequent years have tended to vary between 10 and 19 percent.

Changes in the program's share of aggregate hospital costs result from (1) changes in the proportion of the population covered, including changes due to legislation; (2) changes in the relative number and value of services received by beneficiaries; and (3) the effect of administrative actions defining the services eligible for reimbursement and affecting the level of program payments. Historical and projected changes in the hospital insurance program's share of aggregate inpatient hospital costs appear in table A1, with changes in the proportion of the population covered netted from the other sources. As indicated in the table, the share of hospital costs allocated to beneficiaries has fluctuated somewhat in recent years.

The increases experienced in the proportion of the population covered reflect the more rapid rate of increase in the number of persons aged 65 and over than in the total population of the United States and, beginning in mid-1973, the coverage of certain disabled beneficiaries and persons with end-stage renal disease. Increases in the proportion of the population covered are projected to continue, reflecting a continuation of the demographic shift into categories of the population which are eligible for hospital insurance protection.

Other sources which contribute to changes in the program's share of hospital costs include changes in the relative number and value of services received by beneficiaries and the effect of administrative actions defining covered services and affecting payment levels. Data are not available which would enable a quantitative separation between the two components for historical years. The projection assumes, over the long range, changes in these "other sources" only due to the effects of demographic shifts on the number of services received by beneficiaries as a proportion of the total number of hospital services provided for the entire population. Increases in the average age of beneficiaries and of persons not covered lead to higher expected levels of usage of hospital services by both groups, the net effect of which is reflected as changes in "other sources."

*c. Skilled nursing facility and home health agency costs*

Historical experience with the number of days of care covered in skilled nursing facilities under the hospital insurance program has been characterized by wide swings. The number of covered days dropped very sharply in 1970 and continued to decline through 1972. This was the result of strict enforcement of regulations separating skilled nursing from custodial care. Because of the small fraction of nursing home care covered under the program, this reduction primarily reflected the determination that Medicare was not liable for payment rather than reduced usage of services. The 1972 amendments extended benefits to persons who require skilled rehabilitative services regardless of their need for skilled nursing services (the former prerequisite for benefits). This change and subsequent related changes in regulations have resulted in significant increases in the number of services covered by the program. However, recent data has indicated a decline in utilization of these services. Some continuation of this pattern is assumed for the next few years, with only modest increases projected thereafter.

Increases in the average cost per day in skilled nursing facilities under the program are caused principally by increasing payroll costs for nurses and other skilled labor required. Projected rates of increase are assumed to be only slightly higher than increases in general wages throughout the 25-year projection period. The resulting increases in the cost of skilled nursing facility services are shown in table A2.

Program experience with home health agency costs has shown a generally upward trend. The number of visits has fluctuated somewhat from year to year, with very sharp increases appearing in the last 3 years. Relatively large increases are assumed for the next few years, followed by a projected pattern of increases similar to that for skilled nursing facilities. Cost per service is assumed to increase at a rate only slightly higher than increases in general wages. The resulting home health agency cost increases are shown in table A2.

*d. Administrative expenses*

The costs of administering the hospital insurance program have remained relatively small, in comparison with benefit amounts, throughout the history of the program. The ratio of administrative expenses to benefit payments has generally fallen within the range of 2 to 3 percent. The short-range projection of administrative costs is based on estimates of workloads and approved budgets for intermediaries and the Health Care Financing Administration. In the long

range, administrative cost increases are based on assumed increases in workloads, primarily due to growth and aging of the population, and on assumed unit cost increases of 2 percent less than the increases in average wages shown in table A1.

## 2. FINANCING

In order to analyze costs and to evaluate the financing of a program supported by payroll taxes, program costs must be compared on a year-by-year basis with the taxable payroll which provides the source of income for these costs. Since the vast majority of total program costs relates to insured beneficiaries and since general revenue appropriations and premium payments are available to support the uninsured segments, the remainder of this report will focus on the financing for insured beneficiaries.

### *a. Taxable payroll*

Taxable payroll increases can be separated into a part due to increases in covered wages and a part due to increases in the number of covered workers. The taxable payroll projection used in this report is based on assumptions used in projecting experience under the OASDI program. Increases in taxable payroll assumed for this report are shown in table A2.

### *b. Relationship between program costs and taxable payroll*

The single most meaningful measure of program cost increases, with reference to the financing of the system, is the relationship between program cost increases and taxable payroll increases. If the rates of increase in both series are the same, a level tax rate over time will be adequate to support the program. However, to the extent that program costs increase more rapidly than taxable payroll, a schedule of increasing tax rates will be required to finance the system over time. Table A2 shows the resulting increases in program costs relative to taxable payroll over the 25-year projection period. These relative increases fluctuate somewhat during the 1979-81 period, due to the ad hoc increases in the maximum earnings subject to taxes. After 1981, the relative increases reduce gradually to an ultimate level of approximately 3.1 percent per year. The result of these increases over the duration of the projection period is a continued increase in the year-by-year ratios of program expenditures to taxable payroll, as shown in table A3.

## 3. SENSITIVITY TESTING OF COSTS UNDER ALTERNATIVE ASSUMPTIONS

Over the past 20 years, aggregate inpatient hospital costs for all patients have increased substantially faster than increases in average wages and prices in the general economy. As indicated in table A1, the 10-year period preceding Medicare was characterized by an average 10.4 percent increase in hospital costs, nearly 7½ percent higher than the increase attributable to general wage and price increases. The 1966-71 period experienced substantially higher increases in total hospital costs, averaging 16 percent per year. Of this increase, general economic factors accounted for only 5½ percent;

the remaining 10½ percent reflected increases in the volume of services provided and in unit input intensity. Even during the 1972-74 period of economic stabilization program controls, hospital costs increased at an average rate of about 12½ percent, over 5½ percent higher than the amount attributable to increases in average wages and in the CPI. Experience for the fully decontrolled years 1975-78 shows an average annual increase in hospital costs of about 15 percent, of which about 7 percent is in excess of increases in general economic factors. Preliminary indications for 1979 show hospital cost increases declining to about 3 percent higher than wages and prices in the general economy.

The sustained, high rates of hospital cost increases in the past raise serious questions concerning future cost increases which might be anticipated. Under conventional economic wisdom, the hospital industry would not be expected to sustain indefinitely the same rate of growth, relative to the general economy, experienced during the last 20 years. The growth pattern has diminished slightly in recent years, but shows no indication of halting. The most reasonable pattern of cost increase assumptions for the future, then, would fall between the two extremes of (1) an indefinite continuation of the past levels of excess of hospital cost increases over general economic factors and (2) a decline in the near term to hospital cost increase levels approaching those for the economy as a whole.

In view of the uncertainty of future cost trends, projected costs for the hospital insurance program have been prepared under three alternative sets of assumptions. A summary of the assumptions and results is shown in table A3. The set of assumptions labeled "Alternative II" forms the basis for the detailed discussion of hospital cost trends and resulting program costs presented throughout this report. It represents an intermediate set of cost increase assumptions, compared with the lower cost and more optimistic alternative I and the higher cost and less optimistic alternative III. Increases in the economic factors (average wages and CPI) for the three alternatives are consistent with those underlying the OASDI report.

As noted earlier, the single most meaningful measure of hospital insurance program cost increases, with reference to the financing of the system, is the relationship between program cost increases and taxable payroll increases. The extent to which program cost increases exceed increases in taxable payroll will determine how steeply tax rates must increase to finance the system over time.

Under alternative II, program costs are projected ultimately to increase approximately 3.1 percent faster than increases in taxable payroll. Program expenditures, which are currently about 2 percent of taxable payroll, increase to a level of almost 5 percent by the year 2000 under alternative II assumptions. Hence, if all of the projection assumptions are realized over time, hospital insurance tax rates by the end of the 25-year period will have to be substantially higher than those provided in the present financing schedule (2.9 percent of taxable payroll, for 1986 and later).

Alternatives I and III contain assumptions which result in program costs increasing, relative to taxable payroll increases, approximately

2 percent less and 2 percent more rapidly, respectively, than the results under alternative II. Under alternative I, program costs ultimately increase 1.3 percent more rapidly than increases in taxable payroll. By the year 2000, program expenditures under this alternative would be about 3.4 percent of taxable payroll. Hence, hospital insurance tax rates required by the end of the valuation period would be greater than those currently scheduled, even under the optimistic alternative I assumptions. Under alternative III, program costs ultimately increase 5.1 percent more rapidly than increases in taxable payroll. The result of this differential is a level of program expenditures in the year 2000 which is almost 7 percent of taxable payroll, about 4 percent higher than the 2.9 percent tax rate currently scheduled.

TABLE A1.—COMPONENTS OF HISTORICAL AND PROJECTED INCREASES IN HOSPITAL COSTS<sup>1</sup>

[In percent]

Calendar years	Economic factors			Volume of services <sup>2</sup>		Unit input intensity <sup>2</sup>				Aggregate inpatient hospital costs <sup>4</sup>	HI share		HI inpatient hospital costs
	Average wages	CPI	Weighted average <sup>3</sup>	Total population	Admission incidence	Wage level	Employee intensity	Nonlabor intensity	Weighted average <sup>3</sup>		Proportion of population	Other sources	
Historical data:													
1956-65	3.7	1.6	3.0	1.6	1.7	1.0	2.0	5.3	4.1	10.4			
1966	5.5	3.0	4.6	1.1	.5	-4.6	8.2	8.4	5.5	11.7			
1967	5.7	2.8	4.7	1.1	-.7	3.4	6.2	18.4	13.5	18.6			
1968	6.4	4.2	5.7	1.0	.1	3.3	4.4	11.6	9.7	16.5	0.6	7.5	24.6
1969	6.6	5.4	6.6	1.0	2.6	2.6	3.5	9.9	8.2	18.4	.5	-3.7	15.2
1970	5.4	5.9	6.0	1.1	2.4	4.5	1.3	8.3	7.3	16.8	.5	-5.3	12.0
1971	6.6	4.3	5.9	1.0	2.0	3.5	-.1	6.1	4.8	13.7	.6	-.8	13.5
1972	7.0	3.3	5.6	.9	1.2	1.1	.2	11.3	5.8	13.5	.7	-3.3	10.9
1973	6.5	6.2	6.6	.7	2.4	-1.8	0	3.1	.4	10.1	5.3	1.0	16.4
1974	6.6	11.0	9.0	.7	3.0	-.8	2.3	2.0	1.8	14.5	6.0	3.1	23.6
1975	6.3	9.1	8.0	.7	1.0	4.2	2.5	10.5	9.0	18.7	2.2	1.6	22.5
1976	8.4	5.8	7.5	.7	.9	.6	1.5	10.9	6.6	15.7	1.9	1.9	19.5
1977	7.1	6.5	7.1	.8	0	-.1	2.9	8.5	5.8	13.7	1.7	.8	16.2
1978	8.1	7.6	8.1	.8	-.1	-.1	2.3	5.4	3.9	12.7	1.5	1.2	15.4
Projection:													
1979	8.3	11.5	10.2	.8	1.7	1.0	1.0	-.8	.6	13.3	1.4	0	14.7
1980	9.6	14.2	12.2	.9	1.6	.5	1.0	-2.0	-.3	14.4	1.2	2.8	18.4
1985	9.1	7.8	8.7	.9	.7	0	1.0	7.0	4.4	14.7	1.5	.5	16.7
1990	8.3	6.5	7.5	.8	.4	.5	1.0	6.0	4.2	12.9	1.3	.3	14.5
1995	7.2	5.5	6.4	.7	.3	.5	.5	5.0	3.5	10.9	1.0	.2	12.1
2000	6.2	4.5	5.3	.7	.2	.5	.5	5.0	3.6	9.8	.6	0	10.4

<sup>1</sup> Percent increase in year indicated over previous years.<sup>2</sup> Based on data from the American Hospital Association through 1978.<sup>3</sup> Weighted average of the individual components, with adjustments for the effects of compounding. The weightings are based on the proportions of aggregate inpatient hospital costs which are for payroll

and for nonpayroll expenses. The adjustments for the effects of compounding are necessary to compensate for the fact that the various components actually are multiplicative, rather than additive as illustrated in this table.

<sup>4</sup> Includes hospital costs for all patients.

TABLE A2.—RELATIONSHIP BETWEEN INCREASES IN TOTAL HI PROGRAM COSTS AND INCREASES IN TAXABLE PAYROLL<sup>1</sup>

[In percent]

Calendar years	HI benefit costs				HI administrative costs <sup>2</sup>	Total HI program costs <sup>3</sup>	HI taxable payroll	Ratio of costs to payroll <sup>4</sup>
	Inpatient, hospital <sup>2</sup>	Skilled nursing facility <sup>3</sup>	Home health agency <sup>3</sup>	Weighted average				
1980.....	18.9	10.5	23.8	18.9	7.3	18.6	10.2	7.6
1985.....	17.0	12.9	14.1	16.9	11.1	16.8	11.4	4.8
1990.....	14.6	11.6	11.6	14.5	9.7	14.5	9.3	4.7
1995.....	12.2	10.2	10.1	12.1	8.3	12.1	8.0	3.8
2000.....	10.4	8.6	8.7	10.4	6.9	10.4	7.1	3.1

<sup>1</sup> Percent increase in year indicated over previous year.

<sup>2</sup> This column differs slightly from the last column of table A1, since table A1 includes all persons eligible for HI protection while this table excludes noninsured persons.

<sup>3</sup> Costs attributable to insured beneficiaries only. Benefits and administrative costs for noninsured persons are financed through general revenue transfers and premium payments rather than through payroll taxes.

<sup>4</sup> Percent increase in the ratio of program expenditures to taxable payroll. This is equivalent to the differential between the increase in program costs and the increase in taxable payroll.

Note: Taxable payroll is adjusted to take into account the lower contribution rates on self-employment income, on tips, and on multiple-employer "excess wages" as compared with the combined employer-employee rate.

TABLE A3.—SUMMARY OF ALTERNATIVE COST PROJECTIONS FOR THE HOSPITAL INSURANCE PROGRAM

[In percent]

Calendar years	Increases in aggregate inpatient hospital costs <sup>1</sup>				Changes in the relationship between costs and payroll <sup>2</sup>			Expenditures as a percent of taxable payroll
	Average wages	CPI	Volume and intensity	Total	Program costs <sup>3</sup>	Taxable payroll	Ratio of costs to payroll	
<b>Alternative I:</b>								
1980.....	10.0	14.3	2.0	14.4	18.6	10.7	7.1	2.10
1985.....	7.7	5.7	5.5	12.4	14.5	10.8	3.3	2.39
1990.....	5.8	3.0	3.7	8.1	9.7	6.6	2.9	2.78
1995.....	5.2	3.0	2.7	6.8	8.1	6.0	1.9	3.13
2000.....	5.2	3.0	3.0	7.0	7.6	6.2	1.3	3.37
<b>Alternative II:</b>								
1980.....	9.6	14.2	2.2	14.4	18.6	10.2	7.6	2.11
1985.....	9.1	7.8	6.0	14.7	16.8	11.4	4.8	2.56
1990.....	8.3	6.5	5.4	12.9	14.5	9.3	4.7	3.26
1995.....	7.2	5.5	4.5	10.9	12.1	8.0	3.8	4.02
2000.....	6.2	4.5	4.5	9.8	10.4	7.1	3.1	4.72
<b>Alternative III:</b>								
1980.....	9.9	16.6	.8	14.4	18.6	10.0	7.8	2.11
1985.....	10.3	9.8	7.5	17.8	19.9	12.4	6.7	2.80
1990.....	9.0	8.0	7.2	15.9	17.4	10.0	6.7	3.91
1995.....	8.3	7.0	6.6	14.3	15.4	9.2	5.8	5.30
2000.....	7.2	6.0	6.3	12.9	13.5	8.0	5.1	6.85

<sup>1</sup> Percent increase in the year indicated over the previous year. Includes hospital costs for all patients.

<sup>2</sup> Percent increase in the year indicated over the previous year.

<sup>3</sup> Includes cost attributable to insured beneficiaries only.

Note: Taxable payroll is adjusted to take into account the lower contribution rates on self-employment income, on tips and on multiple-employer "excess wages" as compared with the combined employer-employee rate.

APPENDIX B.—DETERMINATION AND ANNOUNCEMENT OF THE INPATIENT HOSPITAL DEDUCTIBLE FOR 1980<sup>1</sup>

Under the authority in section 1813(b)(2) of the Social Security Act (42 U.S.C. 1395e(b)(2)), I have determined that the Medicare inpatient hospital deductible for 1980 shall be \$180.

Section 1813 provides for an inpatient hospital deductible and certain coinsurance amounts to be deducted from the amount paid by Medicare for inpatient hospital services and post-hospital extended care services furnished an individual during a spell of illness. Section 1813(b)(2) requires the Secretary of HEW to publish between July 1 and October 1 of each year, the amount of the inpatient hospital deductible applicable to spells of illness beginning in the following calendar year.

Because the coinsurance amounts in section 1813 are fixed percentages of the inpatient hospital deductible for services furnished in the same spell of illness, the increase in the deductible has the effect of also increasing the amount of coinsurance the Medicare beneficiary must pay. Thus, for spells of illness beginning in 1980, the daily coinsurance for the 61st through 90th days of hospitalization (one-fourth of the inpatient hospital deductible) will be \$45; the daily coinsurance for lifetime reserve days (one-half the inpatient hospital deductible) will be \$90; and the daily coinsurance for the 21st through the 100th days of post-hospital extended care services in a skilled nursing facility (one-eighth of the inpatient hospital deductible) will be \$22.50.

Under the formula in the law, the deductible for calendar year 1980 must be equal to \$40 multiplied by the ratio of (1) the current average per diem rate for inpatient hospital services for calendar year 1978 to (2) the average per diem rate for such services in 1966. The amount so determined is rounded to the nearest multiple of \$4. The average per diem rates are based on the amounts paid to participating hospitals by Medicare for inpatient services to insured individuals, plus the deductible and coinsurance amounts.

The average per diem rate for a calendar year is computed from the inpatient hospital bills for all beneficiaries. Each bill shows the number of inpatient days of care and the interim cost (the sum of interim reimbursement, deductible, and coinsurance). The data are summarized for each year, and an average interim per diem rate computed that accurately reflects interim costs on an accrual basis.

In order to reflect the change in the average per diem hospital cost under the program properly, the average interim cost must be adjusted to show the effect of final cost settlements made with each participating hospital after the end of its accounting year. The final settlement adjusts the interim payment to the hospital to the actual full cost of providing covered services to beneficiaries. To the extent that the ratio of final cost to interim cost for 1978 differs from the ratio of final cost to interim cost for 1966, the increase in average interim

<sup>1</sup>This statement was published in the Federal Register for September 27, 1979 (Vol. 44, No. 189, 55660).

per diem costs will not coincide with the increase in actual cost that has occurred.

The current average interim per diem rate for inpatient hospital services for calendar year 1978, based on tabulated interim costs, is \$174.69; the corresponding amount for 1966 is \$37.92. These averages are based on approximately 96 million days of hospitalization in 1978 and 30 million days in 1966 (last 6 months of the year). The ratio of final cost to interim cost is approximately 1.035 for 1978 and 1.055 for 1966. Thus, the inpatient hospital deductible is  $\$40 \times [(174.69 \times 1.035) / (37.95 \times 1.055)] = \$180.78$ , which is rounded to \$180.

Dated: September 19, 1979.

PATRICIA ROBERTS HARRIS,  
*Secretary.*

APPENDIX C. DETERMINATION AND ANNOUNCEMENT OF THE HOSPITAL  
INSURANCE MONTHLY PREMIUM RATE FOR THE UNINSURED AGED,  
FOR THE 12-MONTH PERIOD BEGINNING JULY 1, 1980<sup>1</sup>

Under the authority in Section 1818(d)(2) of the Social Security Act (42 U.S.C. 1395i-2(d)(2)), I have determined that the monthly Medicare hospital insurance premium for the uninsured aged for the 12 months beginning July 1, 1980, is \$78.

Section 1818 of the Social Security Act provides for voluntary enrollment in the hospital insurance program (Part A of Medicare), subject to payment of a monthly premium, of certain persons age 65 and older who are uninsured for social security or railroad retirement benefits and do not otherwise meet the requirements for entitlement to hospital insurance. (Persons insured under the Social Security or Railroad Retirement Acts need not pay premiums for hospital insurance.)

Section 1818(d)(2) of the Act requires the Secretary to determine and publish, during the last quarter of each calendar year, the amount of the monthly Part A premium for voluntary enrollment for the 12-month period beginning with the following July 1. This section also requires that, for the period beginning July 1, 1980, the premium must be \$33 multiplied by the ratio of (1) the 1980 inpatient hospital deductible to (2) the 1973 inpatient hospital deductible, rounded to the nearest multiple of \$1 or, if midway between multiples of \$1, to the next higher multiple of \$1.

Under Section 1813(b)(2) of the Act, the 1980 inpatient hospital deductible was determined to be \$180. (See 44 FR 55660, September 27, 1979). The 1973 deductible was actuarially determined to be \$76, although the 1973 deductible was actually promulgated to be only \$72 to comply with a ruling of the Cost of Living Council. (See 37 FR 21452, October 11, 1972.) The monthly premium for the 12-month period beginning July 1, 1980, has been calculated using the \$76 deductible for 1973, since this more closely satisfies the intent of the law. Thus, the monthly hospital insurance premium is  $33 \times (180/76) = \$78.16$ , which is rounded to \$78.

Dated: December 8, 1979.

PATRICIA ROBERTS HARRIS,  
*Secretary.*

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<sup>1</sup> This statement was published in the Federal Register for December 17, 1979 (Vol. 44, No. 243, p. 73164).