14 May 1976, Volume 192, Number 4240 SCIENCE

The Financing of National Health Insurance

Bridger M. Mitchell and William B. Schwartz

The decision on how to finance a national health insurance program will have important political and social consequences, and the choice of a funding mechanism has therefore become the subject of major controversy. The method of financing will, for example, determine whether the public or the private sector will have primary responsibility for the new program. If premiums paid by employers and employees are the principal source of revenues, the program will be operated by private insurance companies; but if a payroll tax is the major revenue source, managerial responsibilities will be shifted to a government agency.

Of even broader social significance are two other issues related to financing. First, how much of the nation's resources should be allocated to the health sector? Monies spent on delivery of health care are, of course, not available for other important national needs. Second, how are the costs of a new insurance program to be shared and to what extent will such a program serve to redistribute income from the more to the less affluent?

The extent to which the total national resources allocated to health care should be increased has been widely discussed (*1, 2*) and will not be considered in detail here. Instead, we analyze the financing provisions of major health insurance bills before the Congress in order to bring into view both the distribution of costs and benefits under each type of proposed legislation and the social impact of alternative financing mechanisms.

Our analysis is carried out in several steps. First, we compute the tax burden and out-of-pocket expenses imposed across income groups by four bills that we consider to be prototypes of all others. Second, we estimate anticipated consumption of health services at various income levels and present detailed data on the degree of income redistribution that each bill would produce. Third, we examine the value judgments that underlie the various financing proposals and identify key points of consensus and controversy. Finally, we compare the effects of the major bills and propose a compromise that may help to resolve the controversy over how to finance national health insurance.

Basic Concepts in the Financing of National Health Insurance

The total cost (dollar burden) of a national health insurance (NHI) program can be financed by two components. The first, consisting of tax payments, provides a pool of revenue from which the insurance plan pays a portion of the patient's health care costs. The second, consisting of out-of-pocket payments, represents the expenditures that the patient must make when he obtains services. Only one major bill, as discussed below, has no requirement for cost sharing by patients.

To raise revenues for the tax portion of a national health insurance bill, the following three mechanisms are under consideration: (i) an income tax, (ii) a payroll tax, and (iii) a premium (*3*). As shown in Fig. 1, each raises a different amount of revenue from various income groups. For this reason, the choice of a given tax or combination of taxes is an important determinant of the income redistribution that will be produced by any insurance program. A premium imposes a burden that is constant across income groups (horizontal line in Fig. 1) because it is set at a level equal to anticipated insurance benefits (*4*). A payroll tax imposes a burden that rises in proportion to earnings up to some maximum level (in this example, $17,000 income), after which no further payment is exacted. An income tax imposes a burden that rises progressively as a function of income and therefore produces the greatest degree of income redistribution.

None of the proposed NHI bills, it should be noted, envisions using a single tax to finance an NHI program; each bill proposes that either a payroll tax or a premium provide between 50 and 80 percent of the revenues, and that the income tax provide the remainder. The proportion of total revenues raised by income taxes will, of course, be the most important determinant of the degree to which a bill causes income redistribution.

The second major component of dollar burden, the individual's out-of-pocket payments, will be determined by the coinsurance and deductible provisions of a given proposal. A coinsurance provision requires that a patient pay some fixed percentage of each dollar spent on health services. A deductible provision requires that he pay all costs up to a specified amount before his insurance coverage becomes effective. Each NHI bill that requires such payments provides for a reduced amount of cost sharing by low-income families; this reduction in out-of-pocket payments serves as a second mechanism (along with taxes) for redistributing income.

Dr. Mitchell is a senior staff economist at the Rand Corporation, 1700 Main Street, Santa Monica, California 90406. Dr. Schwartz is Chairman of the Department of Medicine and University Professor at Tufts University, Medford, Massachusetts 02155.

Tax Burden and Income Redistribution Produced by Four NHI Bills

In this section, we will examine the tax burden, out-of-pocket costs, and effects on income distribution of four prototypical health insurance proposals: the Administration, Kennedy-Mills, Corman-Kennedy, and Long-Ribicoff bills. The specific proposals may, of course, be modified or resubmitted in somewhat different form; however, the basic character of each is such that in the aggregate they embrace the full range of options likely to be considered by Congress, both in terms of the extent and generosity of coverage and the nature of the financing mechanisms.

We direct primary attention to the effects of the proposed legislation on the working population younger than age 65. Our reference unit is a family of four with one full-time worker. The effects on those other than the reference family and the costs of care for those older than age 65 will be dealt with briefly later in this article. All dollar values are expressed in terms of fiscal year 1975 (*5*).

Administration, Kennedy-Mills, and Corman-Kennedy Bills

The Administration, Kennedy-Mills, and Corman-Kennedy bills are considered together because the fundamental features of each are sufficiently similar (Table 1) that they lend themselves to convenient comparison. All three bills (unlike the Long-Ribicoff bill, which is discussed below) mandate a nearly identical package of basic health services for the entire population, including hospital care, physicians' services, and laborato-

Table 1. Characteristics of prototypical national health insurance bills (*18*).

Administration bill	Kennedy-Mills bill	Corman-Kennedy bill	Long-Ribicoff bill*
	General approach		
1) Employers required to offer comprehensive private insurance 2) Federal and state "assisted plan" provides coverage of low-income families and nonworkers, with cost-sharing subsidies at low incomes 3) Medicare plan for the aged	1) Federal plan for general population, with reduced cost-sharing for low-income persons 2) Medicare plan for the aged	1) Single federal plan that pays all costs of health care for entire population (both older and younger than age 65)	1) Federal "catastrophic" insurance for entire population 2) Federal plan, with comprehensive benefits for low-income families 3) Medicare plan for the aged
	Financing of benefits		
1) Premiums paid by employer and employee 2) Under assisted plan, no employee premium payments below income of $5000 (employer premium payment continues); subsidy financed from general revenues	1) Payroll tax of broadened scope applied to earned and unearned income up to income level of $20,000 per family 2) General revenues to finance reduced cost sharing	1) Payroll tax of broadened scope (50 percent) 2) Federal general revenues (50 percent)	1) Payroll tax to finance catastrophic plan 2) General revenues to finance low-income plan
	Cost-sharing provisions		
Employer plans 1) Deductible of $150 per person before benefits commence; maximum of three deductibles per family; separate $50 deductible per person for drug expenditures 2) Coinsurance payment of 25 percent 3) Maximum out-of-pocket payments of $1500 per family State-assisted plans 1) Deductible, coinsurance, and maximum payments are reduced for families with incomes of less than $7500	1) Deductible of $150 per person; maximum of two deductibles per family 2) Coinsurance payments of 25 percent 3) Maximum out-of-pocket payments of $1000 per family 4) Reduced cost sharing at less than $8800 family income; no cost sharing at less than $4800 income	1) No cost sharing	Catastrophic plan 1) Hospital inpatient coverage after first 60 days of care; then $21 per day copayment. 2) Physician, laboratory, x-ray, home health services coverage after $2000 of expenditure; then 20 percent coinsurance payment 3) Maximum out-of-pocket payments of $1000 per person after catastrophic coverage begins Low-income plan 1) Families at incomes less than $4800 pay $3 per physician visit. All other services covered in full
	Covered services		
1) Hospital and skilled-nursing facilities 2) Physician, laboratory, and x-ray services 3) Prescription drugs 4) Maternity, well-child care 5) Limited care for mental illness 6) Dental, vision, hearing services for children under age 13	1) Hospital and skilled-nursing facilities 2) Physician, laboratory, and x-ray services 3) Drugs for chronic conditions 4) Maternity, well-child care 5) Limited care for mental illness 6) Dental, vision, hearing services for children under age 13	1) Hospital and skilled-nursing facilities 2) Physician, laboratory, and x-ray services 3) Drugs (limited if prescribed by private physician) 4) Maternity, well-child care 5) Dental care to age 25 (phased in over first 5 years of program) 6) Vision services (limited) 7) Limited care for mental illness	1) Hospital, skilled-nursing, and intermediate care facilities 2) Physician, laboratory, and x-ray services 3) Maternity, well-baby care 4) Limited care for mental illness

*A revised version of the Long-Ribicoff bill, introduced 3 October 1975, eliminates copayments and cost sharing for catastrophic benefits. It also gives employers the option of providing premium-financed private catastrophic coverage in lieu of making payroll tax payments to the federal program for catastrophic coverage.

ry and radiological studies. Moreover, because services provided by the bills are so extensive, each would largely replace both existing private insurance coverage and current Medicaid plans for low-income groups.

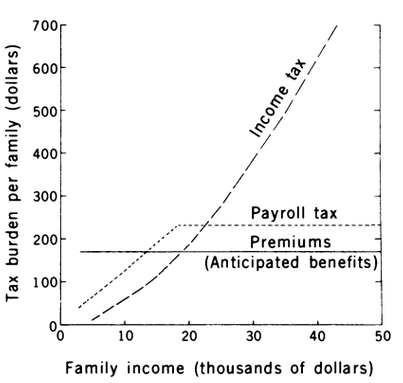
There are, by contrast, substantial differences in the financing provisions of the three bills. As shown in Fig. 2, the Corman-Kennedy bill and the Kennedy-Mills bill derive half or more of their revenues from a payroll tax, whereas the Administration bill relies primarily on a premium. Furthermore, although each plan uses the income tax to raise a portion of its required revenues, the Corman-Kennedy bill depends more heavily on the income tax than do the others.

The provisions for out-of-pocket payments also differ among the three. The Corman-Kennedy bill has no cost-sharing requirement, whereas both the Kennedy-Mills and Administration bills have a deductible provision ($150 per person), as well as a coinsurance clause that requires payment of 25 percent of all costs incurred after the deductible is satisfied. Each of these last two proposals does, however, set an upper limit on out-of-pocket payments—$1000 in the Kennedy-Mills bill and $1500 in the Administration bill.

Tax burden. As shown in Fig 2, the total tax burden for the health care of the population younger than age 65 is very similar under both the Kennedy-Mills and Administration bills, amounting in each case to some $45 billion (on the basis of the cost of medical services in 1975). By contrast, the burden imposed by the Corman-Kennedy bill is much larger, amounting to $68 billion (*6*).

Table 2 and Figs. 3 and 4 demonstrate that, although the total tax burden imposed by the Administration and Kennedy-Mills bills is nearly the same, the way in which the burden is distributed across income groups under the two bills is very different (*7*). Only at an income in the range of $15,000 per year is the impact of the two bills similar; at lower incomes the Administration bill is considerably more burdensome than the Kennedy-Mills bill (by $300 to $400), whereas at higher incomes the situation is reversed.

The Corman-Kennedy bill, although it raises approximately 50 percent more total revenue than the other bills, places a much smaller burden on low-income families than does the Administration bill; this burden, moreover, is only slightly larger than that imposed under the Kennedy-Mills bill (Fig. 5 and Table 2). At high income levels, on the other hand, the tax burden imposed by the Corman-



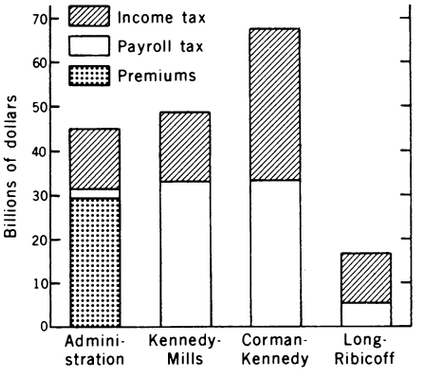
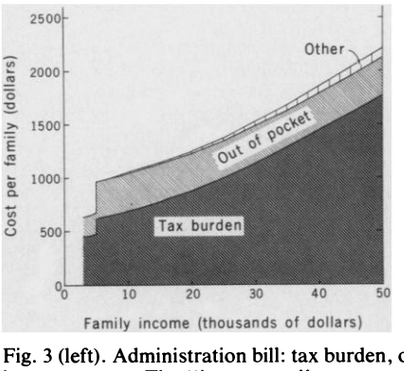


Fig. 1 (left). Tax burden across income groups as imposed by a payroll tax, an income tax, and a premium in order to raise $10 billion of revenue. In this and succeeding figures, the curves represent the tax burden on a family of four with a full-time wage earner ("reference family"). The "income tax" curve includes the burden of both the personal income tax and the corporate profits tax (appendix A). The payments shown in the figure, if multiplied by the number of families at every income level, would not total to $10 billion because such a calculation does not include payments made by single persons or by families of a composition different from that of the reference family. Fig. 2 (right). Tax burden imposed on the nation by each of four prototypical health insurance bills under consideration by the Congress. The income tax component includes the funding of existing health care programs that would be continued, as well as of new services specified under each bill. The small payroll tax component under the Administration bill is used to finance the program for care of the disabled (appendix C).



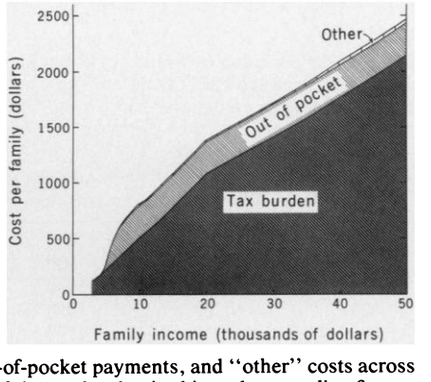


Fig. 3 (left). Administration bill: tax burden, out-of-pocket payments, and "other" costs across income groups. The "income tax" component of the tax burden in this and succeeding figures includes both personal income and corporate profits taxes (appendix A). The abrupt reduction in tax burden and out-of-pocket payments below an income of $5000 is accounted for by the elimination of the employee's share of the premium and by provisions for reduced cost sharing. Fig. 4 (right). Kennedy-Mills bill: tax burden, out-of-pocket payments, and "other" costs across income groups.

Table 2. Tax burden at representative income levels under four prototypical bills before the Congress (family of four with one full-time worker). Amounts are given in dollars; the values shown in this and subsequent tables in the text have been rounded to the nearest $5 when they are less than $100, and to the nearest $10 when they are more than $100.

Family income	Prototypical bills*			
	Administration	Kennedy-Mills	Corman-Kennedy	Long-Ribicoff
3,000	460	130	190	25
6,000	640	280	410	65
9,000	690	450	660	120
12,000	730	600	880	170
15,000	780	780	1140	230
20,000	880	1080	1570	310
30,000	1140	1410	2240	530
40,000	1450	1760	3030	790
50,000	1780	2140	3880	1070

*Calculation of the tax rates and tax burden for each income group is described in appendices A and C. The "income tax" component of the tax burden includes the indirect burden of the corporate profits tax, as well as the direct burden of the personal income tax. Under the Administration bill, the abrupt reduction in the tax burden at incomes less than $5000 is accounted for by the elimination of the employee's share of the premium.

Kennedy bill is approximately twice as large as that imposed by the other two proposals; for example, at an income of $50,000 per year, the tax burden is nearly $4000 as compared with approximately $2000 under both the Administration and Kennedy-Mills bills.

Out-of-pocket expenses. As shown in the middle sections of Figs. 3 and 4, average out-of-pocket expenditures at all incomes greater than $10,000 are similar under both the Kennedy-Mills and the Administration bills, amounting in each case to some $300 (appendix D). Out-of-pocket payments for low-income families (those earning less than $5000) are reduced to approximately $200 under the Administration bill and are eliminated under the Kennedy-Mills bill. As mentioned earlier, under the Corman-Kennedy bill, there are no out-of-pocket payments for any income group.

Total burden. In Figs. 3 to 5, the top curves represent the total dollar burden across income groups under each bill. Total burden, as shown in each figure, consists of the tax burden, out-of-pocket payments, and a small "other" component required for the support of government programs which provide services that would otherwise be made available through an NHI plan (for example, Maternal and Child Health and Veterans Administration programs).

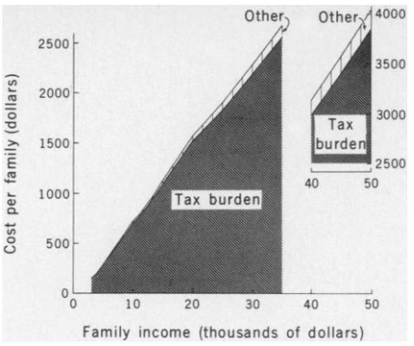


Fig. 5. Corman-Kennedy bill: tax burden, out-of-pocket payments, and "other" costs across income groups.

Three features of these figures and of Table 3 are of particular interest.

1) The total burden on middle-income families under the Administration, Kennedy-Mills, and Corman-Kennedy bills is of roughly the same magnitude; for example, at an income of $12,000 to $15,000, the total payments under all three are in the range of $1000 per year.

2) The total burden on low-income working families is much greater under the Administration bill than under the other two bills; for example, at an income of $3000, total payments are more than $600 under the Administration bill as compared with payments of less than $200 under each of the other two bills.

3) The total burden at high income levels is substantially larger under the Corman-Kennedy bill than under either the Administration bill or the Kennedy-Mills bill; for example, at an income of $50,000, payments are nearly twice as large ($4100 as opposed to $2200 and $2500, respectively).

Income redistribution. A family's net gain or loss of income under a given health insurance plan is determined by the difference between the value of health services that it uses and the costs it incurs in acquiring care [taxes, out-of-pocket costs, and "other" expenses (*8*)]. Figures 6 and 7 show the pattern of income redistribution produced by the Administration, Kennedy-Mills, and Corman-Kennedy bills; the cross-hatched areas indicate net gains of income and the shaded areas indicate net losses. The line representing consumption of services under a given bill is an approximation that reflects the effects of many factors, including the extent of services covered, the amount of cost sharing required under the bill, the level of education, and the ease of access to care (appendix D). The line representing total burden is taken from Figs. 3 to 5.

As is apparent from the figures and Table 4, the earnings level at which a family switches from a position of net gain of income to net loss varies markedly among the bills. Under the Administration bill (Fig. 6), the switch occurs at a low income, approximately $5000 per year, with the result that most working families emerge as net losers. This net loss on the part of nearly all working families serves chiefly to subsidize services for low-income families without a full-time worker. Under the Kennedy-Mills bill (Fig. 6), the switch occurs at approximately $11,000, meaning that nearly all low-income families are net gainers at the expense of those in middle- and upper-income groups. Under the Corman-Kennedy bill, which relies more heavily on the income tax than do the other two bills, the shift from gain to loss occurs at a still higher level, about $15,000 (Fig. 7). Furthermore, the net

Table 3. Total burden (tax plus out-of-pocket payments plus other costs) across income levels under four prototypical bills before the Congress (family of four with one full-time worker). Amounts are given in dollars.

Family income	Disposable family income†	Prototypical bills*			
		Administration	Kennedy-Mills	Corman-Kennedy	Long-Ribicoff
3,000	2,410	640	130	190	40
6,000	4,700	990	490	410	590
9,000	6,960	1040	750	670	870
12,000	9,260	1090	900	900	990
15,000	11,550	1140	1070	1170	1060
20,000	15,280	1240	1380	1610	1150
30,000	22,380	1520	1720	2320	1420
40,000	29,440	1860	2080	3180	1730
50,000	36,050	2220	2470	4080	2070

*Calculation of out-of-pocket payments is described in appendix D. The income tax component of the tax burden includes the indirect burden of the corporate profits tax, as well as the direct burden of the personal income tax. †Calculated from total effective tax rates in 1966 for federal, state, and local taxes (*19*, varient lc, table 4-8). These rates include the individual income tax, corporate income tax, property tax, sales and excise taxes, payroll taxes, and personal property and motor vehicle taxes.

Table 4. Income redistribution under the Administration, Kennedy-Mills, and Corman-Kennedy bills for a family of four with one full-time worker. Amounts are given in dollars.

Family income	Redistribution*			Incremental redistribution†		
	Administration	Kennedy-Mills	Corman-Kennedy	Administration	Kennedy-Mills	Corman-Kennedy
3,000	+400	+890	+960	+410	+900	+970
6,000	−40	+430	+740	−5	+470	+780
9,000	−90	+110	+480	−15	+190	+560
12,000	−140	−40	+250	−20	+80	+370
15,000	−190	−210	−10	−30	−50	+150
20,000	−300	−520	−450	−50	−270	−210
30,000	−580	−860	−1170	−100	−380	−690
40,000	−910	−1220	−2020	−170	−470	−1270
50,000	−1270	−1610	−2930	−230	−570	−1890

*Redistribution (net gain or net loss) is equal to total consumption minus total burden. The computation of total consumption is described in appendix D. †The incremental increases in income distribution produced by each bill are calculated by subtracting the tax burden of current public health care programs from the total values for redistribution shown in the left half of the table. This calculation assumes that the benefits of current health care programs, such as Medicaid, flow to those who are earning less than $3000 or who are working less than full time (appendix B).

loss at higher incomes under the Corman-Kennedy bill is considerably greater than under the other two proposals. For example, at an income of $50,000 per year, the net loss of $2900 is nearly twice as large as that exacted by the Administration or the Kennedy-Mills bills ($1300 and $1600, respectively).

Finally, we should emphasize that a major portion of the net losses at upper income levels does not, in fact, represent a new burden created by the bills. Because each bill would continue to redistribute income to low-income, nonworking families who now receive benefits from existing programs such as Medicaid and neighborhood health centers, the increment in redistribution would in every instance be appreciably less than the total redistribution (see Table 4). As a result, under the Administration bill there is virtually no incremental loss of income among families earning between $5,000 and $30,000; and even at earnings levels above $30,000, the changes are small, amounting to no more than $100 or $200. Under the Kennedy-Mills bill, the changes are more substantial, but only the Corman-Kennedy bill produces a major incremental change, for example, a loss of approximately $2,000 at an income of $50,000 (*9*).

Long-Ribicoff Bill

We have reserved the Long-Ribicoff bill (Fig. 8) for separate discussion because, unlike the other three bills, it would have no effect on the basic insurance coverage of the great majority of families. Families earning more than $4800 a year would receive coverage that consists solely of protection against massive ("catastrophic") expenditures and benefits would become available only after out-of-pocket or private insurance payments in a given year had reached $2000 to $6000, depending on the type of medical expenses (see Table 1). The typical family earning more than $4800 could therefore be expected to maintain its existing private coverage for basic health care services and to face the same high level of out-of-pocket expenditures as it does now (*10*). Families earning less than $4800 per year would receive quite different treatment in that they would be excused from essentially all out-of-pocket payments and would thus be provided with full insurance coverage (*11*).

Tax burden. The tax burden under the Long-Ribicoff bill is highly progressive because two-thirds of the funds are derived from the income tax (Table 2 and Fig. 8). As a consequence, families in low-income brackets would pay less than $100 per year in taxes, whereas those in high-income brackets would pay as much as $1000 per year. (The revised version of the Long-Ribicoff bill, introduced in October 1975, would eliminate cost sharing for catastrophic coverage and thereby increase the tax burden shown in the tables and figures by about 5 percent.)

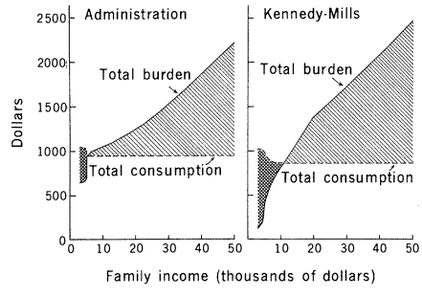


Fig. 6. Income redistribution under the Administration bill and the Kennedy-Mills bill. The cross-hatched area below the "total consumption" line represents net gains of income and the shaded area above the consumption line represents net losses. The average total consumption of services has been assumed constant except for low-income groups (appendix D). The higher values shown for the total consumption of low-income families are accounted for by reduced requirements for out-of-pocket payments by such families.

Income redistribution. The largest fraction of the tax revenues raised by the Long-Ribicoff bill would subsidize the health care of low-income groups. Families with earnings of less than $4800 would be net gainers to the extent of approximately $900 per year. Middle- and upper-income families, except for the 1 to 2 percent suffering catastrophic illness, would face a net loss of income. However, because the health care of many low-income, nonworking families is already heavily subsidized by public funds, the incremental effect of the Long-Ribicoff bill on the income redistribution of middle- and upper-income families would be quite small, amounting to a net loss of $50 at an income of $20,000 and $170 at $50,000.

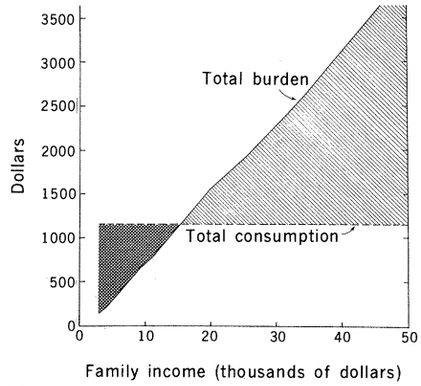


Fig. 7. Income redistribution under the Corman-Kennedy bill. The cross-hatched area below the "total consumption" line represents net gains of income, and the shaded area above the consumption line represents net losses. Because the bill has no cost-sharing provisions, the average total consumption of services has been assumed constant for all income groups (appendix D).

Effects on Other Than a Family of Four with a Full-Time Worker

In the following paragraphs, we briefly examine the effects of the proposed legislation on single individuals, on families without a full-time worker, and on the population older than age 65.

Single individuals. Under all bills, single individuals would incur smaller net gains (or larger net losses) than would families at the same income level. Although a single individual consumes fewer services than a family, he pays a similar amount of income and payroll taxes. The Administration bill is less discriminatory toward individuals than are the other proposals because it reduces a single person's premium (but not his taxes) to reflect his smaller anticipated benefits.

Families without a full-time worker. Families without a full-time worker would be in a favorable position under all the proposed bills. Such families, because they have limited incomes, would typically pay little tax and would not be required to make appreciable out-of-pocket payments (appendix D). As a result, they would be net gainers in amounts ranging from $800 to $1200. For nonworking families who are not covered by Medicaid or other public programs, nearly all of this gain would represent an increment in income redistribution. Families that are now covered by public programs would have an incremental gain that is dependent on the extent to which their current benefits are improved. In states with generous Medicaid benefits, the incremental gain would be small; in other states, the incremental gains would be more substantial.

The over-65 age group. Under all bills, the cost of the program for the over-65 age group would be borne almost entirely by the working population younger than 65, as is now the case with Medicare. The reason is as follows. Although most of those now retired paid taxes into the Medicare account during their working years, these monies have not been accumulated and are therefore not available to pay the promised benefits. Instead, current payroll taxes and income taxes from the population younger than 65 are, and will be, used to pay such commitments. We have, however, excluded these costs from our analysis of income redistribution because those who are

now supporting the program can look forward to being the beneficiaries of similar payments by the next generation of workers. (The problem of demographic changes that may invalidate this assumption is beyond the scope of our article.)

Total expenditures on health care for the elderly under each of the four major bills are strikingly similar, ranging from $21 billion to $24 billion per year (appendix B). This similarity results from the fact that each bill, in essence, continues the Medicare program and simply mandates a slight expansion of existing benefits.

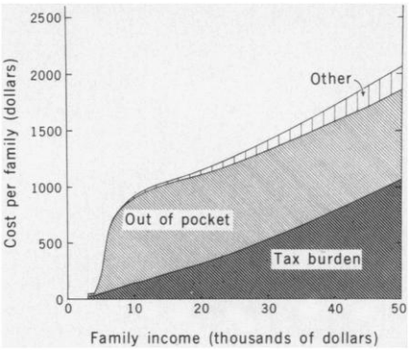


Fig. 8. Long-Ribicoff bill: tax burden, out-of-pocket payments, and "other" costs across income groups.

Effect of Each Bill on National Expenditures and on Federal Budget

Figure 9A shows the amount by which each of the four bills can be expected to increase total national expenditures on health services, that is, on the care of those older as well as younger than age 65. These new expenditures range from a low of $3 billion under the Long-Ribicoff bill to a high of $13 billion under the Corman-Kennedy bill. Our calculations ignore the price increases that can be expected to occur in response to an increased demand for care (*1, 12*).

The effects of the bills on the federal budget are shown in Fig. 9B. In several instances, the budgetary changes are substantially larger than the changes in national expenditures. The explanation lies in the fact that increases in the federal budget are determined largely by the choice of a taxing mechanism (income taxes and payroll taxes appear on the budget but premiums do not), whereas increases in actual expenditures are determined solely by the degree to which a particular bill reduces out-of-pocket payments and thus stimulates use of services.

A comparison of the Administration and Kennedy-Mills bills dramatically illustrates how particular tax choices have different effects on the budget. The two bills, as has been pointed out, mandate similar reductions in out-of-pocket payments and would therefore induce nearly identical new expenditures of some $5 billion to $6 billion. However, the Administration bill would have a relatively small effect on the budget because it raises some 70 percent of its revenues by means of a premium, whereas the Kennedy-Mills bill would have a substantial impact because it raises the same fraction of its revenues by a payroll tax. In the case of the Corman-Kennedy bill, the massive increase of approximately $64 billion in the federal budget results from both the choice of financing mechanisms (payroll taxes and income taxes) and the shifting of all current out-of-pocket payments to the public sector.

Reliability of Estimates

Our estimates of the total costs of each bill, and of the distribution of costs and benefits under each, rest on a large number of detailed calculations (see appendices). In this section we briefly consider how the uncertainty surrounding these estimates affects our conclusions concerning income redistribution.

The estimates of total costs are subject to the most uncertainty because we cannot precisely calculate the amount by which each program would increase demand for care, and because there is no satisfactory method of estimating how much the price of medical services would be increased by a given change in demand.

The distribution of costs by income group can be estimated more reliably because the calculations are based on extensive data defining tax payments at each level of income. The estimates of distribution of benefits by income group are less precise, however, because there are only fragmentary data defining the way in which additional insurance coverage influences the consumption of services at various income levels.

Fortunately, these uncertainties do not significantly affect our estimates of the income redistribution produced by any given bill. Because total costs are equal to total consumption, any adjustment in total consumption would produce offsetting adjustments in the distribution of both dollar burden and consumption (Figs. 6 and 7) and would thus have little effect on the pattern of income redistribution.

Implications of the Financing Provisions

Any NHI plan reflects a set of values about society's responsibility for providing access to health care and about the appropriate way to distribute the costs of medical services. A comparison of the proposals now being considered by Congress demonstrates that lawmakers are approaching a consensus with respect to certain key values, while others remain in contention. In this section, we compare the philosophies underlying the four bills discussed above in order both to illuminate areas of agreement among various political factions and to identify issues around which controversy still exists.

The individual bills, although they differ appreciably in their definitions of who is poor, all reflect the view that access to health services by persons of low income should be at least equal to that of the rest of the population. Each bill attempts to achieve this goal by reducing or eliminating out-of-pocket payments by the poor and thus largely removing financial barriers to care. The bills, in addition, reflect the consensus that the tax contributions of the poor should be kept low (*13*), and that the burden of subsidizing such favorable tax treatment should be distributed in a progressive fashion by the use of the income tax.

Finally, all the bills reflect the view that the entire population should be provided with protection against major financial loss due to catastrophic illness. The extent of the "catastrophic" coverage varies markedly among the proposals, but each ensures, as a minimum, that a family's health expenditures in a given year will not exceed several thousands of dollars.

Beyond the areas of consensus, there are, however, important areas of controversy. The first of these centers on how much more of the nation's resources should be devoted to providing care to the general population, that is, to all those who are in other than very low income groups. The divergent views on this issue are reflected in the degree to which each bill reduces out-of-pocket payments by the nonpoor and thus stimulates their use of services. The Long-Ribicoff bill, by leaving current methods of payment unchanged (save for catastrophic illness), provides almost no stimulus to consumption. The Corman-Kennedy bill, by eliminating all out-of-pocket payments, encourages the maximum use of services. Between the two are the Administration and Kennedy-Mills bills, each of which includes a mod-

erate coinsurance and deductible provision.

The value judgments lying behind these financing provisions are fundamentally different. At one end of the spectrum, as exemplified by the full coverage provisions of the Corman-Kennedy bill, are those who feel that "health care is a right"—that access to health services should neither be limited nor rationed by price. Many who hold this view also believe that early and regular use of health services will help to prevent later serious illness and, therefore, that the use of ambulatory care should be encouraged.

At the other pole, as exemplified by the provisions of the Long-Ribicoff bill, are those who see no justification for a societal decision to commit additional resources to the care of the general population, except for the treatment of catastrophic illness. Some who hold this view argue that such resources could be better spent on pollution control, housing, or education. Others maintain that the decisions to spend more on health care rather than on other goods and services should remain with the individual and not be brought into the public domain. Analysis of this complex controversy lies beyond the scope of this article but is discussed in detail elsewhere (*1*, *2*).

Controversy also exists across a second major dimension of the financing problem. There is sharp disagreement along the political spectrum over how the burden of total health expenditures, once decided on, should be distributed. This conflict of views can be seen in the contrasting financing provisions of the Kennedy-Mills and Administration bills. These bills, as mentioned earlier, are similar in that they cover a nearly identical package of basic health services, mandate virtually the same deductible and coinsurance payments, and will require nearly the same tax revenues. They differ significantly, however, in that the Kennedy-Mills bill relies on a payroll tax, whereas the Administration bill uses a premium to fund virtually all program costs other than those for the poor. The payroll tax strategy is designed to limit the burden on the less affluent and to use the financing provisions of the program as a means of effecting income redistribution. The premium strategy, on the other hand, is aimed at avoiding significant redistributive effects by linking the size of tax payments to anticipated benefits (*14*).

Economic analysis cannot, of course, determine what amount of income redistribution is appropriate for society. This

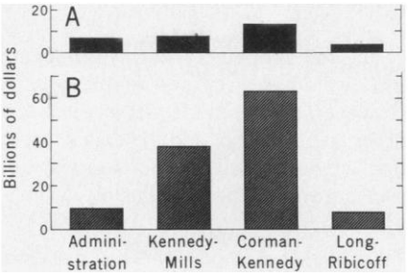


Fig. 9. Increase in national spending on health services (A) and increase in the government budget (B) under each of four health insurance bills before the Congress. The values shown include increased expenditures for both those older than and younger than the age of 65. The data do not include any correction for the rise in the unit price of services that would be produced by the increased demand for care.

issue can only be resolved through the political process. However, by bringing into focus the practical consequences caused by a given financing proposal, analysis can facilitate both dialogue and compromise. For example, payroll tax advocates and premium advocates appear to be so far apart on basic goals that the possibility of reconciling their differences seems remote. However, when the competing approaches are examined in terms of the tax burden that each imposes on middle- and upper-income taxpayers, the differences, expressed as a proportion of income, prove to be surprisingly small (Table 2). Indeed, the data suggest that despite the controversy over principle, compromise on a financing strategy may be possible.

To this end, let us consider the consequences, under the Administration bill, of using a premium subsidy to reduce the burden on families earning less than $12,000 to the amount that would be produced by a payroll tax program. The notable finding, as shown in Table 5, is that such a subsidy would cause relatively minor increases in the tax burden on middle- and upper-income families. The cost to those earning between $12,000 and $25,000 would be only $50 to $150 per year; to those in higher income brackets, it would be no more than an additional $200 to $400 per year (*15*). (In the case of the Corman-Kennedy bill, replacement of the payroll tax by a subsidized premium of similar design would have only a slightly larger effect.)

Table 5. Effects on tax burden of substituting a subsidized premium for the mandated premium in the Administration bill for a family of four with one full-time worker. Amounts are given in dollars; all values include a 0.22 percent payroll tax on earnings up to $14,100 which would fund the current disability program under Medicare.

Family income	Mandated premium*	Subsidized premium†
3,000	460	130
6,000	640	290
9,000	690	470
12,000	730	650
15,000	780	840
20,000	880	980
30,000	1140	1340
40,000	1450	1770
50,000	1780	2230

*Premium of $600 plus 7.46 percent income surtax. †Premium graduated from $0 to $600 plus 10.42 percent income surtax (appendix A).

The degree of additional income redistribution caused by such a subsidy is small enough (some $5 billion in the aggregate) that premium advocates might accept it, provided they received in return a concession from the payroll tax supporters. The desired concession would almost certainly relate to the government's role in the administration of an NHI program. Many premium supporters object to a payroll tax, not only because of its effect on income distribution, but also because they believe that it would lead to government domination of the health care sector and sharply diminish the role of private enterprise. Because payroll tax revenues become part of the federal budget, an NHI program based on a payroll tax would be administered and controlled by a government agency such as the Social Security Administration; the private insurance industry would thus be excluded from underwriting health insurance and would retain, at most, a role in the processing of claims. Furthermore, government administration of an NHI program would almost inevitably lead to a major expansion in federal control of both the price of health services and the terms under which health care is provided. A subsidized premium program would, on the other hand, allow health insurance to remain in the private sector.

Supporters of the payroll tax would, of course, favor the added income redistribution resulting from a subsidized premium but might not feel that this is sufficient compensation to justify a major concession on government control. Many payroll tax supporters believe, albeit on the basis of weak evidence, that the government could operate an insurance program more efficiently than private insurers and that many of the ills of the health care system can be solved only by increased government regulation (*16*). Thus a program based on premiums, even if appropriately subsidized,

will still be viewed by some payroll-tax advocates as basically unacceptable. It should be noted, however, that a subsidized premium does overcome a serious objection that can be leveled at an ordinary premium program. An ordinary premium imposes a larger tax burden on the employer of low-income workers than does a payroll tax and thus acts as an important disincentive to the hiring of low-wage employees (appendix E). Under a subsidized program, both the employer's and the employee's premiums are reduced to the level imposed by a payroll tax, and this disincentive is removed (*17*).

We do not mean to suggest that the only way for advocates of alternative financing strategies to resolve their differences is through the use of a subsidized premium. Other compromises may well be possible. For example, another promising approach might use a combination of premiums and payroll taxes as a means of increasing the role of government while still leaving a significant portion of control in the private sector.

Conclusion

In this study we have developed a conceptual framework for the analysis of NHI financing and have defined the extent to which four different legislative proposals would redistribute income. Our analysis of the various proposals has made it clear that there is broad political agreement on the need to provide universal protection against the expense of catastrophic illness and to make health care more accessible to the poor.

Despite this consensus, important unresolved issues have led to a deadlock among proponents of various NHI bills. Controversy centers on several questions. For example, how large a role should government play in the administration of a national program? How much of the nation's resources should be devoted to health care? To what degree should an NHI bill serve to redistribute income?

In an attempt to resolve the present stalemate, it is likely that new legislative proposals will emerge that will incorporate combinations of taxes and out-of-pocket payments significantly different from those embodied in the four bills we examined. We believe that the quantitative evaluation of such proposals, using the techniques described here, will yield insights that can promote rational political dialogue and thus can help to resolve the current controversy over national health insurance.

Supplementary Information

The full appendices to this article are included in the reprints of the article. However, to give the reader an overview of the methodology and the data sources that we have used, a brief summary of each appendix is provided below.

Appendix A

Calculation of the tax burdens associated with raising $10 billion of revenue. The proportion of income derived from three major sources—wages, property income, and nontaxable income—is calculated for each level of family income on the basis of federal income tax returns and Census population survey data. The tax rates required to raise $10 billion from each of the three revenue sources—payroll tax, income tax, and premiums—are obtained from tax bases calculated as follows. The payroll tax base is determined (with Social Security Administration data) by increasing the fiscal 1975 wages currently subject to payroll taxes by the amount that would be raised from the wages of workers not now taxed. Earnings in excess of the maximum taxable amount ($17,000) are excluded from this calculation. The income tax base is determined from the combined yield of personal and corporate income taxes projected in the 1975 U.S. budget. We assume that, at each level of income, increased revenue will be derived by applying a uniform percentage surtax to a family's personal income tax liabilities and that the burden of the increase in the corporate tax is proportional to property income. The base for premiums is determined for HEW statistics on the number of persons and families younger than age 65; in our calculations we assume that the premium for a single individual will average 40 percent of the family premium.

Appendix B

Total costs under four prototypical NHI bills. To maintain comparability with other discussions of NHI proposals, we use HEW estimates of the total costs of each bill for fiscal year 1975 and exclude costs of long-term care. The HEW figures are within the range of independent estimates derived from calculations of the "induced demand" for services caused by improved insurance coverage. We do not include a value for added expenditures that result from increases in the price of medical services as induced by insurance. Expenditures for the populations younger than age 65 are disaggregated into tax payments (payroll tax, income tax, and premium payments) and out-of-pocket costs.

Appendix C

Tax revenues from each source of financing for prototypical NHI bills (under-65 population). Revenues from premiums and payroll taxes are calculated from the premium and tax rate specifications of each bill. The difference between total required revenues (calculated in appendix B) and revenues from premiums and payroll taxes is allocated to income taxes except in the case of the Corman-Kennedy bill, which specifies that the required revenues shall be raised equally from payroll and income taxes.

Appendix D

Calculation of total consumption of health services at various incomes (under-65 population). To obtain average values for consumption of services by middle- and upper-income families, we first calculate total consumption under the Administration bill, by using as the basis for our estimates the actuarial experience under similar benefit packages written by private insurance companies. The average value for the Administration bill is then adjusted to reflect both the benefits and the amounts of cost sharing mandated under the other three bills. For each bill, the average value (calculated as just described) is used to represent total consumption of families at all incomes greater than $10,000.

The value for consumption of services by lower-income families under the Corman-Kennedy bill is calculated on the basis of studies indicating that, in the absence of cost sharing, total consumption of low-income families is the same as that of families earning more than $10,000. This value (corrected for differences in services covered) has also been taken to represent the consumption of those families who, under the Kennedy-Mills and Long-Ribicoff bills, face no cost-sharing requirements. Values of consumption by low-income families who do face out-of-pocket expenses (Kennedy-Mills, Long-Ribicoff, and Administration bills) are estimated by adjusting the "no cost sharing" values by the fraction of total consumption that a family must pay out-of-pocket.

Appendix E

The implication for the employee of the employer's share of a payroll tax or premium. In our calculation of tax burden, we assume that the employer's share of a premium or a payroll tax is, in fact, borne by the employee. The employer, over time, shifts his burden to the employee by failing to increase wages as rapidly as he would in the absence of the required premium or payroll tax payment. Workers earning near the minimum wage may constitute an exception if the legal minimum rises as fast as do inflation and productivity. In such a case, minimum-wage workers will face a lower tax burden than the one we have calculated, but they will also face an increased risk of unemployment.

References and Notes

1. J. P. Newhouse, C. E. Phelps, W. B. Schwartz, *N. Engl. J. Med.* **290**, 1345 (1974).
2. V. R. Fuchs, *Who Shall Live?* (Basic Books, New York, 1974).
3. Premiums have been included as a form of taxation because the financial inducements for an employee to join a mandated program are such that almost all the working population could be expected to participate. We use the term "income tax" to denote the sources of general revenues—personal income and corporate profits taxes—that would fund most NHI proposals (appendix A).
4. Premiums are not set at a single amount for the entire population but rather at a level equal to the benefits that the insurer expects to pay to a particular group of employees. For this reason, there will be some variation around a mean value such as that shown in Fig. 1.
5. We have projected all values to fiscal year 1975 on the basis of the rate of inflation that was occurring in the health sector immediately prior to 1975 (appendix B). Our projections thus incorporate lower rates of price and wage increases than have actually occurred in the last year; the values shown are, therefore, approximately 3 percent too low. To preserve comparability among the bills, we have removed the costs of long-term nursing home and custodial care from all of our estimates.
6. In brief, the values for the tax burden were obtained as follows: Total expenditures were first estimated for the year 1975, and the anticipated increase in expenditures caused by reduced out-of-pocket payments ("induced de-

mand") was calculated for each bill. From these figures, the total costs of the program were estimated, and the tax burden imposed by the bill was then determined. To obtain the tax burden at each income, the appropriate tax rates were applied to the total tax burden (appendices B and C).

7. For every bill, the employer's portion of a premium and of a payroll tax is shown as a burden on the employee because in the long run the employer will, in nearly all instances, be able to shift these costs to his workers (appendix E).
8. In terms of welfare economics our measure of income redistribution overstates benefits to the extent that a family, if given the choice, would purchase less coverage than that mandated.
9. Because of the technique used in our calculations, the difference in the amount of redistribution produced by the Corman-Kennedy bill is understated by a small amount. This understatement occurs because the Corman-Kennedy bill shifts the portion of the current Medicaid program now funded by the states to federal taxpayers, whereas under the Administration and Kennedy-Mills bills, the revenues for funding the Medicaid program would continue to be raised by somewhat less progressive state taxes.
10. Under the Long-Ribicoff bill, some 40 percent of out-of-pocket expenses would be in the form of premium payments for voluntary insurance.
11. The Long-Ribicoff bill also provides that if a family earning more than $4800 spends all of its income in excess of that amount on medical care, it is then entitled to full coverage for the remainder of that year. This provision will be of benefit to only a small number of families (appendix D).
12. J. P. Newhouse, *Inflation and Health Insurance* (Rand Corporation, Santa Monica, Calif., 1975); M. S. Feldstein and B. Friedman, in *The Role of Health Insurance in the Health Services Sector*, R. N. Rosett, Ed. (National Bureau of Economic Research, New York, 1976).
13. The Administration bill reduces the burden on low-income families to a lesser degree than the other bills because it does not relieve the employer of his share of a premium payment (75 percent of the total, or $450) and, because the employer will very likely pass this cost on to his employee, the employer's payment represents a continued burden on the worker (appendix E).
14. The Administration bill does, however, provide a partial premium subsidy for those earning less than $5000 per year and thus redistributes income to a small extent.
15. The practical implementation of a subsidized premium program might take one of several forms. One approach would be to mandate the provision of a standard group insurance policy by employers but at the same time to subsidize low-income employees and their employers by providing each with credits against their income tax payments. For those low-income workers whose tax credit was larger than the income tax that they owed, a refund would be paid by the government.
16. Government agencies now have lower claims-processing costs per dollar of benefits paid than do private insurers, but because of differences in program characteristics, such as the size of the average government claims, it is not clear that public agencies are inherently more efficient [R. D. Blair and R. J. Vogel, *The Costs of Health Insurance Administration* (Heath, Lexington, Mass., 1975)]. In fact, a recent study comparing the processing of an identical profile of Medicare claims by private firms and by the Social Security Administration indicates that costs per claim are lower under private administration [U.S. General Accounting Office, *Performance of the Social Security Administration Compared with That of Private Fiscal Intermediaries in Dealing with Institutional Providers of Medicare Services* (Report to the House Committee on Ways and Means, 30 September 1975)]. It is also frequently argued that a considerable savings would result under public administration of an NHI program because the government does not need to earn a profit whereas a private insurer must. However, the apparent savings that a public program enjoys by forgoing a profit are deceptive; in raising capital, public agencies incur expenses that are analogous to payments by private insurers to their investors (profits). However, in the case of the government, these expenses are obscured because, for example, the interest on borrowed funds (such as government bonds) does not appear in the agency's budget. Conversely, the administrative costs of the Medicare and Medicaid programs are inflated relative to those of private insurers because they include expenses for regulatory functions that are not performed by private companies. However, the value of such regulation has been seriously questioned [C. C. Havighurst, Ed., *Regulating Health Facilities Construction* (American Enterprise Institute for Public Policy Research, Washington, D.C., 1974); R. G. Noll, in *Controls on Health Care* (National Academy of Sciences, Washington, D.C., 1975); P. O'Donoghue, *Evidence About the Effects of Health Care Regulation* (Spectrum Research, Denver, Colo., 19 → R. A. Posner, *Univ. Chicago Law Rev.* **39**, 1 (1971)].
17. B. M. Mitchell and C. E. Phelps, *Employer-Paid Group Health Insurance and the Costs of Mandated National Coverage* (Rand Corporation, Santa Monica, Calif., 1975). A related objection to a program based on premiums—namely, that it discourages the hiring of workers prone to illness—can be overcome by pooling the insurance risks of employees of smaller firms into larger statistical groups (appendix E).
18. U.S. Department of Health, Education, and Welfare, *National Health Insurance Proposals* (Social Security Administration No. 75-11920, Washington, D.C., 1974).
19. J. A. Pechman and B. A. Okner, *Who Bears the Tax Burden?* (Brookings Institution, Washington, D.C., 1974).
20. Supported by a grant from the Department of Health, Education, and Welfare to the Rand Corporation. Research was carried out in 1974–75 while W.B.S. was a Macy Faculty Scholar. The views presented in this article are those of the authors and do not necessarily reflect those of the Rand Corporation or the sponsors of its research. We thank J. P. Newhouse for his continued support and critical advice over the course of this research; A. J. Alexander, G. V. Bass, B. C. Hallowell, L. E. Lynn, C. E. Phelps, and M. A. Rockwell for helpful comments and reviews of drafts; and B. M. Mori and S. Yamasaki for research assistance. A longer version of this article is scheduled for publication as Rand Corporation Report R-1711.

Social Impact of Pollution Control Legislation

The Clean Air Act and court decisions interpreting it will affect far more than air quality.

Wallace H. Johnson

The basic unity of things, their interdependence, and the fact that an alteration in a condition at one point in an infinite chain of interrelationships will result in an almost infinite number of changes at other points, is what I take to be at the heart of the environmental movement. It is, indeed, the principle at the heart of one of the most important statutes to emerge from the environmental movement, the National Environmental Policy Act of 1 January 1970 (*1*), wherein Congress, within the area over which it has jurisdiction—actions by the federal government—has decreed that every such proposed major action be preceded by the preparation of a detailed statement of its impact upon the human environment.

The author is a partner in the firm of Kutak Rock Cohen Campbell Garfinkle & Woodward, Omaha, Nebraska 68102, and formerly was assistant attorney general of the land and natural resources division of the Department of Justice, Washington, D.C. A variation of these remarks was presented at the Vail Symposium, Vail, Colorado, on 13 August 1975.

Clean Air

To illustrate how profound the economic, social, political, cultural, and demographic impacts can be of an action which seems at first blush to be physical and local, consider the Clean Air Act (*2*), which was enacted in its present form on 31 December 1970. The statute is intended to eliminate air pollution and the ensuing hazard to health resulting from breathing noxious fumes. The statute's mechanism for achieving this result affects all of us directly in our professional as well as personal lives.

The act requires the establishment by the administrator of the Environmental Protection Agency (EPA) of national ambient air quality standards for specific types of air pollutants. Primary standards must be established which in the judgment of the administrator of the EPA are "requisite to protect the public health"; secondary standards are to be established which in the judgment of the administrator are "requisite to protect