

A distributional assessment of Rhode Island's Catastrophic Health Insurance Plan (CHIP)

by Blair M. Lord

Since 1975, Rhode Island has operated a government-sponsored catastrophic health insurance program that is consistent in spirit with several of the national health insurance proposals. An important but often overlooked effect of such a program is its effect on the distribution of income. Actual claims data for

the years 1975-79 are available for the Rhode Island program permitting direct estimation of an average benefit per family and an average tax burden per family in each of 12 income classes. This permits an assessment of the program's redistributive effects.

Introduction

Ever since the enactment of Medicare (Title 18 of the Social Security Law, enacted July 30, 1965), Congress has been debating the merits of various national medical expense insurance programs. During the 1970's, as this national debate continued, three States, Maine, Rhode Island, and Minnesota, established their own catastrophic medical expense plans. Maine's program was enacted in 1973 and is scheduled to terminate whenever a Federal catastrophic plan becomes effective (Maine General Laws, Chapter 22, Section 3185). Rhode Island's plan, the Catastrophic Health Insurance Plan (CHIP), was enacted in April 1974 and began paying claims from January 1, 1975 (Rhode Island General Laws, Title 42, Chapter 62). In 1976 Minnesota enacted a similar program (Minnesota General Laws, Section 62E.52). This program technically still exists, but is currently inoperative due to an absence of funding, a result of a 1981 dispute over plan provisions which lead to a gubernatorial veto of a necessary appropriations bill. While there have been many long and intense debates concerning alternative national and/or State medical expense insurance programs, the existence of but a few actual plans has limited the availability of quantitative analyses of program features. This article will present an analysis of the income redistribution effects of CHIP as one step towards filling the information gap.

Virtually all government fund raising/expenditure programs affect the income distribution among program participants. In the case of government-sponsored health insurance programs, a certain degree of income redistribution has often been touted as a major objective. Often this redistribution has been stated under the guise of equity considerations, but throughout this article redistributive goals are clear. The public pronouncements of legislators are particularly forceful on this point. For example, Senator Kennedy, in his statement made to the Senate on January 15, 1975, noted that his Health Security Act (S.B. #3, 94th Congress):

“. . . (would provide) insurance coverage . . . regardless of where a person lives, where he works, his medical history, his income, the size of his family, or any other factor.

Moreover, he would pay for this insurance according to his ability to pay.” (Congressional Record, U.S. Congress, 1975)

Nevertheless, studies of the magnitude and actual direction of the presumed redistribution are rare. Only four studies appear to have been made which quantitatively assess redistributive effects of government-sponsored medical expense insurance programs.¹ One of these studies (Lord, 1980) examined Rhode Island's CHIP for the years 1975-77. However, because these were startup years for the program, the data were incomplete, and hence, the findings were strictly suggestive. This article will expand upon this previous study by examining the years 1978-79. These years are believed to be more representative of a mature program, and more indicative of the program's ultimate redistributive impact.

When enacted, CHIP had several stated purposes; however, the most important for this study was the provision of financial protection against catastrophic medical expenses for the State's residents. In the words of the CHIP Act, “to assure that each person residing in the State of Rhode Island shall have access to needed diagnostic, curative, and rehabilitative health services at reasonable costs and that each person shall have a reasonable means of protecting himself against the unusually high costs of receiving such health services (Rhode Island General Laws, #42-62-2).” In general, the law seeks to accomplish this goal by paying all otherwise unreimbursed costs of covered health services for State residents once such costs have become catastrophic.

Specifically, the law covers persons who have resided in the State for at least 3 months. Individuals who have moved to the State primarily to obtain CHIP benefits are excluded.

Benefits are only paid after a family has incurred a specific out-of-pocket expense termed a personal resource payment. This resource payment is calculated on a calendar-year basis and excludes any primary health insurance premiums or cash payments made to meet primary coverage deductibles. The dollar level of the resource payment depends upon the extent of private health insurance coverage carried by the claimant

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¹The analysis in this article draws heavily on four studies by Stuart, et. al., 1971; Wilensky, et. al., 1972; Feldstein, et. al., 1972; and Lord, 1980.

and the claimant's Medicare eligibility. Table 1 summarizes the relationship between the resource payment and these two variables. For persons ineligible for Medicare and otherwise uncovered for medical expenses, the resource payment is 50 percent of income or \$5,000, whichever is greater. If a fully qualified plan is carried, the resource payment is only \$500 or 10 percent of income; again, whichever is greater. In all cases, income is the family's adjusted gross income from the appropriate IRS 1040 Form. The same basic principles apply for families in the Medicare program. For these families the resource payment varies according to the type of private health insurance supplement to Medicare. Throughout this article, the family is used as the unit of analysis. The previous studies all used the family as the basic spending unit. Moreover, while benefits are actually paid to individuals, CHIP qualification, as determined by expenditure and income, is based on the family's experience. It is also true that most income and expenditure decisions of family members are interdependent. Finally, most of the necessary data are reported by family unit. A useful working definition for the term family is (1) a group of people usually living together who pool their income and draw from a common fund for their major expense items, or (2) a person living alone or in a household with others, but who is financially independent, i.e., his/her income and expenditures are not pooled. This definition is from the Expenditure Survey Series (Bureau of Labor Statistics, 1978).

State benefits are available to eligible persons only if the services are not available under other private or public medical expense programs. Once benefits become payable to a claimant, the State will cover 100 percent of allowable expenses during the calendar year in which eligibility is established. Benefits payments for the following year will be made, after a resource payment equal to 25 percent of that due the preceding year has been incurred.

The analysis of CHIP's redistributive impacts will be presented as follows. The next section gives a brief discussion of the methodology employed, the data used, and several methodological issues. The following section presents the findings for the years 1978-79. These results are compared with those previously obtained for the startup years, 1975-77, in the next section. The last section offers some concluding remarks.

Design, methodology, and data

To analyze the distributional effects of CHIP, a partial equilibrium analysis of the local benefit and fiscal incidence is used. That is, only the direct benefits and costs of CHIP are included in the distributional analysis. In the present instance, direct benefits paid to recipients are available from the CHIP claims' file for the years 1975-79. Direct costs are total program claims and administration costs paid by the

Table 1
Primary health coverage and Catastrophic Health Insurance Plan personal resource payment¹

Primary health coverage	Coverage under primary health coverage	Deductible or personal resource payment—the larger of:
Persons with qualified plan	Reasonable and customary physician's charges	\$500 or 10 percent of allowable income ²
	Full payment for charges for semi-private room in hospital covered for 120 days	
	Major Medical plan with at least \$10,000 in supplemental coverage	
Persons with a qualified plan but without Major Medical	Reasonable and customary physician's charges	\$1,250 or 25 percent of allowable income ²
	Full payment for charges for semi-private room in hospital covered for 120 days	
Persons with a nonqualified plan	Varies according to plan	Difference between amount paid under a nonqualified plan and a qualified plan up to \$1,500 plus qualified plan deductible
Persons with no health insurance	None	\$5,000 or 50 percent of allowable income ²
Persons with only Medicare Parts A and B	Medicare	\$1,000
Persons with Medicare Parts A and B, and Plan 65	Plan 65	\$500

¹Effective 1979.

²Allowable income is the Internal Revenue Service's adjusted gross income less individual and dependent's deductions.

administrative agency, the Rhode Island Health Department. There are, of course, many induced and secondary benefits and costs associated with any government program such as CHIP, but to identify and quantify them is extremely difficult, and hence, deemed beyond the scope of this article. This partial equilibrium, direct incidence approach is consistent with that used by Stuart and Bair, (1971).

In order to perform a distributional analysis, the following are required: (1) measurement of the program benefits and costs; (2) a procedure for allocating these benefits and costs to the proper population group; and (3) methods for measuring the extent of redistribution.

Gross benefits and costs

As mentioned, individual CHIP claims files are available containing detailed information on expenditures, nature of the illness, family income, and the like. To arrive at a gross benefit per family for each income class, all dollar figures were adjusted to 1979 levels. Since benefits are paid throughout the year, price inflation factors on a June-to-June basis were chosen; these inflation factors were taken from the Consumer Price Index (Bureau of Labor Statistics, 1975-1979). Family incomes were revalued using the all items component of the index, while CHIP benefits were revalued using the medical care component. After family income and CHIP benefit payments were revalued, total benefits for each income class were aggregated. These values were then divided by the number of families in each income class to yield a gross benefit per family from the program.

Unfortunately, not every claim in the master file included an entry for family income. As just noted, an analysis assessing the income redistributional aspects of CHIP, clearly, requires that benefit recipients be assignable to a particular income class; hence, only those claims which included a value for family income were used. For the years 1978-79, 27 percent of the total benefits paid were received by the 424 families for which a family income figure was unreported. The total value of these 424 claims amounted to \$3,383,219 in 1979 dollars. Some of the claims where a family income figure was omitted simply represent improperly recorded data and presumably occur randomly; however, other omissions are the result of various administrative practices. State administrators suggest that most beneficiaries with unreported income values are probably those with lower incomes, but a distribution of these claimants is unavailable.

Total program costs include all of those sums paid out in the form of benefits plus all costs incurred by the administrative agency to operate the program. For each year from 1976 to 1979, administrative costs averaged about 8 percent of the total paid benefits. For this analysis, these costs were reflected by increasing total benefits paid by 10 percent. As will be explained, the inability to allocate 27 percent of total benefits necessitated a modification in program costs utilized for the analysis. In light of this modification,

a percentage markup approach was deemed sufficiently accurate and more tractable than any attempt to directly estimate the total revalued administrative costs actually associated with the claims for which a family income figure was reported.

As noted, calculation of a net distributional effect, the difference between average benefits received and average costs incurred, requires that total allocated benefits and costs must be matched. That is, if only 73 percent of the total benefits paid are included in the allocation, use of 100 percent of total costs is inappropriate. For this analysis, it was decided to decrease total program costs by 27 percent in order to achieve the necessary matching. Clearly, this procedure requires that the distribution of the omitted claims be the same as the distribution of the included claims. As explained, this is highly unlikely; however, while recognizing its inaccuracy, it was deemed the only viable alternative.

Allocation procedure

The procedure, previously described, for assigning benefits to the members of each population subgroup was straightforward; however, determination of the proper family share of program costs was more difficult. CHIP is funded from the State's general revenue fund, a fund composed of a variety of different tax revenues. Since any particular family's different tax contributions cannot be identified, it is impossible to aggregate these contributions to yield any family's total tax payments to this fund. Further complicating the problem is the fact that some taxes are indirect; the entity which ultimately bears the financial burden is not the same as the entity paying the tax. The corporate income tax is a well-known example.

An allocation procedure must account for both the impossibility of observing individual contributions and the existence of tax shifting. In particular, it requires the following: (1) an appropriate tax allocation base for each tax entering the general fund; (2) a set of assumptions regarding the shifting and ultimate incidence of the taxes in question; and (3) total tax collections from each source and their relative share in total general revenues.

Given this information, the allocation procedure involves computing the dollar value of each general fund tax source supporting CHIP for each population subgroup. For any given tax, each population subgroup's percentage contribution is given by the ratio of that population's share of the relevant expenditure base to the entire expenditure base. If program expenditures from general funds are assumed to occur in direct proportion to the relative importance of each general fund tax source, these subgroup percentage shares can be converted to specific dollar sums. The total contribution of each population subgroup to total program costs, then, is simply the sum of that class' contribution to each of the component taxes. Obviously, the sum of all subgroup tax contributions must equal total program costs.²

²Additional information on this topic is available from the author.

Allocation base

Determination of the allocation base requires data on the current money value of each tax base being considered. The necessary type of detailed family income and family expenditure data are provided by the Consumer Expenditure Survey: Interview Survey 1972-1973 (Bureau of Labor Statistics, 1978). Unfortunately, this survey is conducted only once a decade with the most recently released being that conducted in 1972-73 and not in 1979 as needed. In addition, data are compiled at the regional level rather than by State. In order to use these Bureau of Labor Statistics data, it was assumed that the average class propensities to consume (both in general and for particular items) or receive different types of income remained constant over the period from 1972-73 to 1979 with income class definitions remaining constant. This assumption is the same as that used by Stuart and Bair (1971) in their study. The resulting allocation base, undoubtedly, undervalues the contributions of the higher classes somewhat; however, careful interpretation of the results can adequately account for this.

Assumptions for shifting

The issue of tax incidence has been the subject of much debate at both the theoretical and empirical level.³ The following tax incidence assumptions were utilized for this study and appear to represent at least a partial consensus:

- Personal income taxes are born by the individuals on whom they are levied;
- Corporate income taxes are born equally by the owners of corporate capital (assumed to be reflected by dividend receipts) and by consumers of corporate products (assumed to be distributed according to overall consumption expenditures). That is, half of the tax is born by stockholders and half by consumers;⁴ and
- General and selective sales taxes are shifted forward to the consumer. The general sales tax is distributed according to total consumption. Selective sales taxes are distributed according to consumption of the item taxed.

There is a final assumption regarding tax incidence which must be made explicit; although, it is clearly violated to a degree. To whomever the various levies are shifted, it is assumed that the burden is born by a resident of the taxing entity, the State of Rhode Island. Where the incidence is specified as falling upon consumers, this is probably acceptable. Where stockholders are the ultimate bearers of the tax, as is true for the corporate income tax, this need not be even approximately satisfied. There does not appear to be any way to correct for the likely violations of this working assumption.

³A review of this dispute is found in Pechman, 1974.

⁴While the incidence assumptions for each tax are somewhat controversial, easily the most controversial is that for the corporate income tax. This assumption regarding its incidence has been widely used as a compromise.

Sources of general revenue funds

The allocation of CHIP costs requires that the importance of the different general fund revenue sources be known. Five levies contributing approximately 97 percent of general revenue funds in 1979 were selected; general sales tax, 31.3 percent; personal income tax, 25.0 percent; a variety of direct business taxes, 19.6 percent; gas and motor vehicle taxes, 12.9 percent; and specific sales taxes on tobacco and alcohol, 7.9 percent (Rhode Island Department of Economic Development, 1979-80). The direct business taxes include a corporate income tax; hence, for simplicity all such business levies were assumed to follow the incidence pattern hypothesized for this tax.

Income distribution

The distribution of Rhode Island families by income is that obtained from the 1980 Health Interview Survey conducted by Rhode Island Health Services Research, Inc., and is presented in Table 2.⁵ This survey contains information on 1,953 families randomly chosen from the noninstitutionalized population of the State. Only two family income distributions for Rhode Island exist, the one described above and a similar one compiled in 1975. Because of its proximity to the period of primary analysis, 1978-79, the 1980 distribution was chosen.

Table 2
Distribution of families by income,
Rhode Island, 1980

Income class	Number of families	Percent of total Rhode Island families
Total	326,100	
\$0-2,999	12,700	3.9
3,000-3,999	9,700	3.0
4,000-4,999	7,100	2.2
5,000-5,999	11,400	3.5
6,000-6,999	8,800	2.7
7,000-7,999	8,100	2.5
8,000-9,999	17,500	5.4
10,000-11,999	19,200	5.9
12,000-14,999	29,600	9.1
15,000-19,999	68,200	21.0
20,000-24,999	34,400	10.6
25,000 and over	99,400	30.6

Source: Rhode Island Health Services Research, Inc.: Data from the Health Interview Survey (1975 and 1980).

⁵Since the income bands used in this 1980 survey were relatively wide, the 1975 Health Interview Survey, also conducted by Rhode Island Health Services Research Inc., was used to further subdivide the income brackets.

Measuring redistribution

Since this study focuses on net redistributive effects, per family average cost and benefit figures for each population subgroup must be combined to show the extent of redistribution attributable to the program. Three such combination measures were calculated: average net benefit, benefit-cost ratio, and uniformly distributed dollar. The average net benefit is simply the average benefit minus the average cost. If this is positive, the population subgroup is a net gainer under the program. The larger the net benefit, the more the subgroup gains.

The second measure of redistribution, the benefit-cost ratio, is simply the ratio of average benefits to average costs. Families in a class where the ratio is greater than one are net gainers. This measure has the advantage of being expressed in relative terms.

The third measure, the uniformly distributed dollar (UDD), is a summary measure which expresses the distributional effects of a public expenditure program with a single statistic. First proposed by (Feldstein, 1972), the UDD is simply a weighted sum of the average net benefits for all income classes. Weights can be arbitrarily chosen, but making them functionally related to income is perhaps the easiest from both a computational and interpretive standpoint. The functional relationship proposed by Feldstein is $W_i = \gamma^\alpha$. If $\alpha = 1$, the weights vary inversely with income. Net benefit distributions favoring the poor are implied when α is greater than 1. When α values are less than 1, benefit distributions favoring the more affluent population classes are indicated. Computations were performed for α values ranging from 0 to 2.

Distribution of program benefits: 1978, 1979

The net benefit and benefit-cost ratios for the years 1978-79 by income class are presented in Table 3. Examination of these redistributive measures for the pooled sample, columns 2 and 3, reveals a consistent

pattern of net progressivity. Specifically, the lowest income class is an impressive net gainer. Both measures, the net benefit and the benefit-cost ratio, are highest for this income class; indeed, they are approximately twice as large as those obtained for the second ranked income class. The next two lowest income classes, \$3,000-3,999 and \$4,000-4,999, are the second and third largest gainers respectively; although, their net gains are essentially equal. While no straightforward inference statistics are available, the errors due to estimation suggest that these last two net gains cannot be viewed as significantly different. Moving to higher income classes, the extent of the gain generally declines until the \$12,000-14,999 class is reached; although, the decline is not smooth. All income classes above the \$12,000-14,999 class are net losers, and the extent of the loss increases as income increases. To reiterate, the overall pattern suggests that CHIP is a generally progressive program.

The absence of smoothness in the movement of the measures of redistribution warrants further analysis. Column 5 in Table 3 presents the number of individual claims utilized in the calculation of the redistributive measures by income class, the cell size. Catastrophic health insurance programs do not generate a large volume of claims; moreover, small claims frequency becomes an even greater problem in a State such as Rhode Island with a total population below 1,000,000. While the cell size would appear to be adequate for the pooled sample, this must be tempered by the recognition that claim severity is widely dispersed. Since CHIP has no real benefit cap, claims ranged from several dollars to over \$100,000. It is interesting to note that the largest claims consistently proved to be those associated with psychiatric illnesses. Claims in excess of \$10,000 had a 53 percent chance of being associated with this cause. Due to the somewhat limited cell size and the extreme dispersion in claim severity, the redistributive measures in several income cells are somewhat affected by the presence of one or two very large claims. However, this is a far more serious problem when the sample is split for separate analysis.

Table 3
Net-benefit and benefit-cost ratios for Catastrophic Health Insurance Plan: 1978-79

Income class (1)	All recipients			Non-Medicare eligibles			Medicare eligibles		
	Net benefit (2)	Benefit-cost ratio (3)	Number of claims (4)	Net benefit (5)	Benefit-cost ratio (6)	Number of claims (7)	Net benefit (8)	Benefit-cost ratio (9)	Number of claims (10)
\$0-2,999	\$40.37	\$10.54	54	\$47.65	\$12.26	35	\$15.77	\$4.73	19
3,000-3,999	20.53	4.77	29	9.92	2.82	12	56.68	11.42	17
4,000-4,999	20.16	3.99	28	12.25	2.81	13	47.36	8.02	15
5,000-5,999	9.96	2.68	26	6.68	2.13	15	21.07	4.56	11
6,000-6,999	10.02	2.28	28	11.57	2.48	16	4.77	1.61	12
7,000-7,999	3.66	1.46	20	4.79	1.60	15	-.30	.96	15
8,000-9,999	5.75	1.69	31	-.88	.89	16	28.12	4.36	15
10,000-11,999	4.48	1.50	36	3.52	1.40	23	7.71	1.87	13
12,000-14,999	-1.06	.89	46	-.60	.94	30	-2.66	.74	16
15,000-19,999	-2.41	.77	71	-1.34	.87	46	-6.02	.42	25
20,000-24,999	-5.19	.59	23	-4.89	.61	13	-6.20	.51	10
25,000 and over	-11.42	.24	32	-12.08	.20	18	-9.19	.39	14

The very large redistributive effect favoring the lowest income class also needs careful interpretation. A number of factors may be inflating the redistributive effect of this group. First, the reported value for family income is adjusted gross income. Since this figure excludes social security payments, a potentially significant portion of lower income recipients' total income, many lower income recipients have an understatement of actual income. This places families in lower income classes than is appropriate. Indeed, adjusted gross income excludes all transfer payments, including all forms of welfare payments; however, officially, any family eligible for Medicaid (virtually all welfare recipients are so eligible) are ineligible for CHIP benefits and should not be affecting this analysis. Second, many families in the lower income class, may be individuals who are legally emancipated, filing separate tax returns, but actually living at home. This last fact would, of course, make them ineligible for Medicaid benefits which might otherwise be available were they living elsewhere. The net effect of these considerations should reduce the actual magnitude of redistribution to the lowest income class.

The extent of this reduction is suggested by the findings presented in Table 4. This table reports the values from the uniformly distributed dollar (UDD) calculation. Two sets of calculations were performed, one including all income classes and one where the lowest income class was omitted. With $\alpha = 0$, the UDD value is simply the average net benefit per family. This is, of course, negative since costs are greater than benefits by the amount of administrative costs. The negative value reflects the average family's share of the program's overhead. As the value of α rises representing more egalitarian social preferences, the UDD value of net benefits rises. With $\alpha = 1$, the weight given the marginal dollar of net benefits to a family is inversely proportional to income. Hence, the \$12.13 UDD figure associated with this α value suggests that CHIP has beneficial effects equivalent in social value to a net gain of \$12.13 by every family. The progressive nature of the program is demonstrated by the increasing UDD values as α increases. As expected, the picture of CHIP's progressiveness is diminished

when the lowest income class is removed. The UDD values are much lower for all values of α and increase at a much lower rate. For $\alpha = 1$, the UDD falls to \$4.09 from \$12.13. This change reflects a much less progressive plan.

Distributional impacts for Medicare and non-Medicare recipient

Medicare and non-Medicare CHIP claimants should differ in ways which affect CHIP's redistributive effect. Among those characteristics expected to differ are overall health status, relative economic circumstance, and a variety of demographic measures. Moreover, as explained in the introductory section, the mechanism of qualification for CHIP benefits differs for each group; more specifically, the personal resource payment is determined differently. Because of these many obvious and not so obvious differences, the two groups were subjected to separate examination.

To analyze these two groups independently requires two income distributions. To obtain such distributions, the national proportion of all households with at least one individual 65 years of age or over was obtained from Current Population Reports: Population Characteristics (Bureau of Census, 1979). This proportion was then applied to the number of families in each income class. This yielded an income distribution for the Medicare segment of the population and, by subtraction, the non-Medicare segment. It is likely that this procedure, placed too few lower income families and too many higher income families in the Medicare eligible subpopulation with just the opposite result for the non-Medicare group. This is because of the downward (or leftward) shift of the income distribution for the elderly as compared to that of the group under 65 years of age. Further refinement of the resulting distributions did not appear feasible. The ultimate effect of this procedure on the redistribution analysis is a probable understatement of the gross and net benefits for lower income families in the Medicare subpopulation and an opposite effect on gross and net benefits for similarly situated families in the non-Medicare subpopulation.

Table 4
Uniformly distributed dollar: 1978-79

Value of α (1)	All recipients		Non-Medicare eligibles		Medicare eligibles	
	All income classes (2)	Calculated without \$0-2,999 class (3)	All income classes (4)	Calculated without \$0-2,999 class (5)	All income classes (6)	Calculated without \$0-2,999 class (7)
0	-.7251	-2.3904	-1.2920	-3.2721	-.3550	.6105
.5	4.7208	.6462	4.1094	-.8592	7.8181	5.7703
1.0	12.1298	4.0904	11.8409	3.0726	13.1123	12.3510
1.5	20.1549	7.5492	20.7447	3.9967	18.1528	19.6477
2.0	26.9422	10.6235	28.7850	5.9019	20.6912	26.7100

Non-Medicare

The net benefit and benefit-cost ratios by income class for the non-Medicare subpopulation are presented in columns 5 and 6 of Table 3. Their calculation was very similar to that previously described; gross benefits by income class were obtained by aggregating the CHIP claims paid to non-Medicare families with the average family benefit then obtained by division. The average tax burden per family was assumed to remain unchanged; hence, the net family benefit and the benefit-cost ratio for each income class were calculated as before.

In general, the pattern of redistribution follows that observed for the entire CHIP claimant population; the program is generally progressive in its net impact. Families with incomes above \$12,000 continue to be net supporters of the program while those in the lower income classes are net gainers. However, unlike the results for the entire population of claimants, the pattern of redistribution is much more erratic. The previously observed smoothness no longer holds.

Within the group of net gainers, the lowest income class remains the leader by a large margin, indeed, an even greater margin than for the entire population. Reasons for this are unclear; however, the previously mentioned problems with the composition of this group certainly remain and appear to be even more severe. Between this lowest income class and the \$12,000 income class, the pattern of redistribution appears almost random.

Cell size is an important concern; hence, the number of observations in each cell is given in column 7 of Table 3. Clearly, the number of observations in these intermediate income classes is rather small. While no single cell has an exceptionally small number of observations, the modest number of observations throughout coupled with the high variability in claim severity is contributing to the erratic pattern of redistribution.

The uniformly distributed dollar presented in columns 4 and 5 of Table 4, likewise, follow a pattern consistent with the trends observed in Table 3. The overall progressive values impact of the program for the non-Medicare eligibles is greater than that for the entire population when all income classes are included, but lower when the \$0 to \$2,999 income class is excluded. Again, this is due to the very large size of the lowest income class' net benefit.

Medicare

In like manner, the calculations just described for the non-Medicare population were duplicated for the Medicare population. The net benefit, benefit-cost ratio, and cell size appear in columns 8 through 10 of Table 3. As before, a generally progressive net redistribution effect is apparent; however, there are important differences in the pattern of effects when compared to those previously described.

For this subpopulation it is imperative to note at the outset the cell sizes given in column 10. The

\$7,000 to \$7,999 income class has only 5 claims. This immediately suggests that the net benefit and benefit-cost ratio for this class must be viewed with suspicion. The relatively small number of observations for the smallest income class is also noteworthy. Unlike the case for the non-Medicare subpopulation, the net-benefit and benefit-cost ratio for this group is no longer the largest reported; indeed, it ranks fourth. Most likely, fewer persons in this subpopulation are being improperly classed into this income class; although, this is not a completely satisfying explanation. One very large claim in 1979 also explains the very large net benefit for the \$8,000 to \$9,999 class. Considering all these factors, the true pattern of redistribution is probably much smoother than indicated by these data.

The uniformly distributed dollar (UDD) measures are once again presented in Table 4. As expected, the extent of redistribution shown for the complete set of income classes is more modest than for either previous population. Interestingly, the redistributive impact is greater for the Medicare eligible population when the lowest income class is eliminated. This is, of course, due to the relatively small net benefit value for this class and the correspondingly higher values for several of the higher income classes.

Comparison with the startup years: 1975-1977

In the first years of operation, CHIP had a very low level of public visibility. Few individuals received benefits, in part, because few knew of its existence. In addition, by its very design, CHIP was the source of last resort for catastrophic medical expenses. It is frequently asserted that a new insurance company or a new insurance product must exist for several years before the book of business and the claims experience stabilizes. While it is arguable whether three years represents a sufficient time period for the program to mature, it is true that the level of public visibility had greatly improved by the beginning of the fourth year, 1978. Therefore, net benefits, benefit-cost ratios, and UDD were calculated for the startup years, 1975-77, and compared with those previously presented for 1978 and 1979.

The method of calculation was identical to that already discussed. For the purposes of this discussion, a comparison of only the entire sample populations was made. This was because of two reasons. First, by admission of the CHIP administrators, the data in these early years were not gathered and recorded in a particularly consistent fashion. Hence, limited sample size was deemed especially troublesome. This leads to the second reason, limited sample size. While the cell sizes across income classes are somewhat larger for the first 3 years, they are unevenly distributed between the Medicare and non-Medicare subpopulations. These two data limitations suggested that separating the non-Medicare and Medicare populations would be inappropriate.

Table 5 presents the net benefit, benefit-cost ratio, and cell size for each income class. Columns 2, 3, and 4 correspond exactly with the similarly numbered columns in Table 3. Comparing the pattern of net benefits for the two time periods reveals some interesting differences. The lowest income class, \$0 to \$2,999, was the greatest net gainer in both periods; however, the extent of gain increased substantially as the program matured. The net benefit in the second time period was \$40.37 as compared to \$31.16 for the first time period. In like manner, the second largest net gainer was the \$3,000 to \$3,999 income class, and the extent of the gain similarly increased as the program matured. Thereafter, the redistributive impact of the program in the earlier time period was more erratic than that exhibited in the earlier period. Surprisingly, this is not explained by the presence of jumbo claims or excessively small cell sizes. Finally, it is interesting to note that the first income class which was a net supporter of the program in the earlier period was the \$15,000 to \$19,999 class in contrast with the \$12,000 to \$14,999 class in the later period.

Table 5
Net benefit and benefit-cost ratios for
Catastrophic Health Insurance Plan: 1975-77

Income class	All recipients		
	Net benefit	Benefit-cost ratio	Number of families
\$0-2,999	\$31.16	\$9.65	94
3,000-3,999	14.55	4.14	20
4,000-4,999	10.18	2.77	21
5,000-5,999	.46	1.09	21
6,000-6,999	10.91	2.64	20
7,000-7,999	8.69	2.29	20
8,000-9,999	6.43	1.90	45
10,000-11,999	4.52	1.60	42
12,000-14,999	8.45	1.98	48
15,000-19,999	- 3.75	.58	62
20,000-24,999	- 7.60	.30	28
25,000 and over	- 9.21	.28	36

While the pattern of redistribution in the startup period was more erratic, it still may properly be characterized as progressive. It is also apparent from this comparison of results as presented in Tables 3 and 5 that the net redistributive effect became more progressive as the program aged. This is also confirmed by the uniformly distributed dollar (UDD) measures shown in Table 6. The figures presented in columns 2 and 3 in this Table correspond precisely with those in the similarly numbered columns of Table 4. Regardless whether the lowest income class was included in the calculation, the pattern of UDD in Table 6 confirms that the earlier period was less progressive than the more recent period. Perhaps the best examples of this are the UDD values when $\alpha = 1$. When all income classes are included, this value grew from \$9.21 for the 1975-77 period to \$12.13 for the later period.

Table 6
Uniformly distributed dollar: 1975-77

Value of α	All recipients	
	Calculated with all income classes	Calculated without \$0-2,999 class
0	-.6208	- 1.9087
.5	3.6128	.4643
1.0	9.2144	2.9671
1.5	15.2289	5.2945
2.0	20.3570	7.2283

Increased utilization of CHIP by the lower income classes, due to an increased awareness of its availability, undoubtedly, explains a part of this finding. It may also be true, although this is unverified, that those in the lower income classes actually found it harder in 1978 and 1979 to obtain adequate primary coverage and were forced to increase their utilization of CHIP for this reason. That the program did not evolve into yet another social perquisite for the higher income classes is significant.

Conclusion

Simply by its design, CHIP appeared to favor those in the lower middle income classes. This was due to the interaction between family income, primary medical expense coverage, and the resulting personal resource payment required before benefits could be collected. In short, families having at least one member employed in a job with a sound health insurance program but still receiving only a modest total income would incur the smallest resource payment. On the other hand, those with substantial incomes would find themselves facing a substantial resource payment because of its relationship to total family income while those with very low incomes would face a high resource payment due to the expected unqualified status of their primary medical expense insurance.

As the results indicate, this expectation is only partly correct. Clearly, those in lower income classes are net gainers under this program; however, the gains are largest for the very lowest income classes, an unanticipated result. CHIP's net redistributive impact is closer to being monotonically progressive than predicted.

There are, of course, at least two different reasons why a redistributive medical expense coverage program might be desired. The most obvious reason springs from a straightforward concern with using such a program as a tool to accomplish general income redistribution. However, an alternative justification for a program which happens to be redistributive follows from its possible market-correcting effects. This is, the fairness of income redistribution aside, such a program is needed to simply offset the regressive fringe benefit effect inherent in the progressive income tax. It is well-known that the poor are

less able to bear large financial risks and yet simultaneously face a higher price for insurance coverage. This is due to a combination of the progressive structure of the personal income tax with the deductibility of insurance premiums as an expense of doing business. For Rhode Island the language of the CHIP Act suggests that this market-correcting function was more important than simple income redistribution. In either case, Rhode Island's CHIP appears to be accomplishing an income redistribution in favor of the poor.

One group for which CHIP's redistributive impact appears inconsistent with its overall goals is with the Medicare population. Those Medicare families in income classes with positive net benefits typically receive a substantially higher net benefit than non-Medicare families in a corresponding income class. In addition, the tax burden on the Medicare eligibles is lower than that for the corresponding non-Medicare eligibles. Given the Medicare group's expected greater need for medical services, this situation may be reasonable. Society may also wish to explicitly design programs generally benefiting its older members. However, the progressiveness of CHIP for the Medicare group is lower than for the non-Medicare group. Furthermore, the exclusion of social security benefits and all other forms of nontaxable income from the income variable used by CHIP should result in an important overestimation of its progressiveness for this group. Considering all these factors, the program's progressivity with respect to the Medicare subgroup may be significantly less than intended by the designers and desirable from society's equity considerations.

Partly, to address this concern, the CHIP personal resource payment formula for Medicare recipients now includes an income test similar to that used for the non-Medicare recipients. The income value used is still adjusted gross income; however, the change appears effectively to be limiting payments to some high income Medicare eligible families.

While CHIP was enacted as a stopgap program to be quickly superceded by a similar Federal program, this obviously has not proven to be the case. Given the fiscal realities of government-sponsored health insurance programs, the entrenched private interests involved, and the likelihood that the greatest unmet medical expense need is inadequate catastrophic cover-

age, any movement at the national or State level is likely to be in the area of catastrophic expense protection. This study can offer only limited insight into the redistributive effects of noncatastrophic programs; however, it does provide actual results for one program which should prove useful in the design and revision of other similar government health insurance programs.

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