

letter to the editor

RESPONSE TO HEALTH CARE COSTS IN THE YEAR 2000

To the Editor—The Public Services Laboratory, Georgetown University, study of future health care costs (*Public Health Reports*, Vol. 93, September-October 1978, pp. 493-588) is impressive both in scope and level of detail. Georgetown has appraised carefully the probable future growth in personnel and facilities within major sectors of health care. However, the conclusion on page 500 that direct health care costs will "reach 11 to 12 percent of the GNP by the year 2000" is not altogether persuasive.

The detailed sector-by-sector analysis of the health care industry indicated that these costs would be only 7.8 percent of GNP, based on demographic and institutional trends, allowing by and large for the maintenance of relative income levels for health care workers. This estimate excluded the full beneficial effect of various hospital cost containment approaches and of other changes that might lower hospital expenses. A sensitivity case which, among other, more conservative assumptions, assumed that hospital prices would rise more rapidly in line with historical trends indicated a maximum level of 11.1 percent, although the text indicated that some attenuation in this rate will almost certainly occur.

These results were generally confirmed by a simplified aggregate analysis, based on a regression of historical data, which indicated a range of 9.3 to 11.8 percent. These figures are rather higher than they should be because of a questionable technique used in projecting the provider variable (the growth in the absolute number of physicians was used, rather than that of the number per 100,000 of population). If this is corrected, the results come closer to those obtained from the detailed analysis.

One might have expected the conclusion to follow that costs in the year 2000 would likely be in the lower part of the 8 to 11 percent range. The justification for the actual conclusion of "11 to 12 percent" or "nearly 12 percent" on page 504, is not stated explicitly. It may reflect a judgemental assessment of factors not included in the detailed analysis, but if so the authors would probably have stated what these

additional factors were. Alternatively, it may represent a subjective judgement that the upper limits of the calculated ranges are more likely to be correct than the lower, which have already been exceeded. Since the upper limit of 11.1 percent from the detailed analysis appears to be an outside worst case, considered to be very unlikely, and because the conclusion is that this will be exceeded, the only real link between the analysis and the conclusion is the upper limit of the simplified analysis which, as noted above, involves a questionable extrapolation. The careful work that went into the detailed analysis would then appear to be largely irrelevant to the conclusion.

If historical data are applied to the simplified aggregate model, excluding the financing variable, personal health care costs are calculated to have remained fairly constant at around 4 percent of disposable personal income. The major part of the historical increase is consequently attributable to the financing variable. It may be interesting to note that since 1929 direct expenditures on health care made out-of-pocket by consumers have in fact been reasonably constant around a somewhat lower but comparable level of 3.5 percent. The increase in expenditures has come from the increase in public and private indirect expenditures, which expressed on the same basis, have grown fairly steadily at around 6 percent a year throughout the period.

In order to examine these findings, a simple equation was constructed expressing personal health care as a percentage of disposable personal income. It contained a constant term representing the out-of-pocket expenditures plus a term growing at a constant annual rate representing the indirect expenditures. No other variables were included. A rather close fit to historical data was obtained over nearly half a century, through periods of depression, war, and post-war prosperity:

Personal Health Care (\$ billions)

	1929	1940	1950
Actual	\$ 3.2	\$ 3.4	\$ 10.4
Equation . . .	3.4	3.4	10.4

Personal Health Care (continued)

	1960	1970	1977
Actual	\$22.7	\$60.1	\$142.6
Equation . . .	23.1	59.8	142.6

It will be agreed that such a simple equation cannot possibly reflect the demographic, institutional, and technical changes in the industry which have occurred over half a century. Yet if we assume that the actual expenditures represent only the effect of these changes, we need to explain how this could result in a steady level of direct expenditures and a steady rate of growth in indirect expenditures. It seems unlikely that the latter could have been deliberately increased to hold direct expenditures constant, recognizing the complex organization of private insurance and government programs, and the varied and complicated mechanisms for expansion; and even more unlikely that this would fortuitously result in a steady rate of growth.

Instead it seems more plausible to suppose that the public apprehension of a reasonable share of disposable income to spend out-of-pocket on medical care has remained constant, and that the various forms of public and private coverage which provide the funds for indirect expenditures have been expanded steadily and independently in response to a rather stable balance of social and economic pressures. As long as the funds available exceeded the minimum level needed to attract the services provided, there would have been no overriding pressure upon either the public or the private decision-makers responsible for health care to change their respective policies. Instead, the surplus funds available would have contributed to "excess inflation" in the health care industry; that is, the difference between what the services could reasonably have been provided for, taking into account all demographic, institutional, and technical changes, and the actual cost.

This hypothesis, which is supported to some extent by the observation that costs have tended to rise more rapidly in those health care sectors with greater

indirect coverage, suggests that a projection of actual costs into the future must take into account changes in the expenditure "policies" of consumers and decision-makers. The implications of assuming there will be no change in policies are as follows:

	1929	1950	1977
Actual (percent) ..	3.5	4.5	8.8
Equation (percent)	—	—	—

	1980	1985
Actual (percent) ..	—	—
Equation (percent)	9.8*	11.7

* Note: In fair agreement with HEW's Forward Plan for Health, which suggests that NHC expenses may reach 10 percent of the GNP in 1980.

For ease of comparison, the same economic assumptions as those used by Georgetown have been utilized in this and in the other calculations in this communication.

The above table shows that the Georgetown forecast for the year 2000 may be reached by around 1985, if the policies and their consequences are not changed. The reason for the difference in the two outlooks is that, although both use roughly the same constant term, the manner in which the influence of increased coverage is modelled is different. It is believed that the a priori structure of the Georgetown aggregate model is largely responsible for this. It would, for example, be interesting to see the result of using the percentage of expenses paid directly as the financing variable in the Georgetown models, which might yield yet another projection. Undoubtedly both approaches have certain virtues and deficiencies; this comparison simply highlights the great amount of variation that can sometimes be introduced by fitting different models to historical data and using them to produce long range forecasts.

One consequence of the Georgetown approach is that their models are rather insensitive to changes in third party coverage. The detailed hospital sector model actually indicates a modest decline in expense with an increase in coverage. Even the aggregate model predicts that a major increase of coverage from 53 to 85 percent would only raise health care costs by about 1 percent of GNP.

Since a major part of the historical rise in the share of GNP devoted to health care appears to be associated with the expansion of coverage, it is

not easy to see why future expansion of third party coverage will have such a small impact, especially since the analysis specifically excludes the effect of the introduction of possibly more cost-effective forms of coverage, such as HMOs, which might alleviate or eliminate the inflationary impact of such expansion.

It would therefore appear that what Georgetown has accomplished in their detailed analysis is not so much a forecast of future health care costs as an estimate of the cost at which national health care *could be provided*, taking into account demographic, institutional, and technical changes and allowing for the maintenance of relative income levels for health care workers. The estimation of this cost, 7.8 percent of GNP, is a considerable achievement, and provides a needed target for cost containment programs. The actual cost will likely be higher, if past experience is any guide, with the difference reflecting excess inflationary pressures within the industry. It is believed that Georgetown's report does not provide any real insight into the probable magnitude of this difference.

The table above shows that continuation of past trends could lead to costs approaching 12 percent of GNP in the next 5 to 6 years, if the policies underlying the trends of the past 50 years remain unchanged. It is thought probable that a restructuring of the Georgetown aggregate model as mentioned above would support this. What is the likelihood of significant changes in these policies in the near future?

There seems little reason to believe that the public perception of a reasonable percentage of income to spend on health care will be reduced significantly in the near future. We may also anticipate continued pressures to continue the expansion of indirect benefits, given the present unevenness of coverage. Furthermore, some time will be required to change the liberal attitudes towards costs, and the perhaps unrealistic expectations of improved care in the future, which have developed among both providers and consumers over many years of rapidly increasing funds. It will not be easy to reconcile any significant curbing of the growth of expenditures with social and political pressures, with free bargaining between employers and employees, and with the maintenance of traditional American standards of medical care.

Yet it is equally difficult to see how the expansion of indirect expenditures can continue very much longer at past rates, without the national financial burden compelling a change. Health care, education, and other social welfare expenditures, growing at roughly comparable rates, have absorbed an in-

creasing share of the growth in real GNP, rising from 30 percent in the 1950s to over 100 percent in the early 1970s. The accompanying rise in public concern suggests that the latter rate is not acceptable for any extended period of time. Indeed, if continued it would require two-thirds of the GNP in the year 2000 to be dedicated to social welfare, which would imply a radical transformation of American society.

This suggests that a meaningful estimate of probable health care costs would have to address the difficult question of what is the maximum tolerable level. Presumably, national attitudes would change as costs approach such a level. If well-conceived and effective measures to contain costs are not implemented well in advance, radical last-minute corrective actions might ultimately become mandatory, possibly with undesirable consequences. In addition, consideration would need to be given to ways in which the inflationary pressures of expanding third-party coverage may be reduced before the maximum tolerable level is approached, resulting in lower long range costs and possibly providing more effective care.

If the estimation of future costs were purely an academic issue, Georgetown's judgement that the long range level of costs will be in the range of 11 to 12 percent of GNP would of course be completely acceptable as a subjective appraisal by a distinguished group of experts who have directed considerable time and effort to a difficult problem. But it is not entirely an academic issue. Surely, the dedication and vigor that will be applied to cost-containment in the coming years will depend to some extent upon how serious the outlook for rising costs is perceived to be by decision-makers in both the public and private sectors. An expectation of a relatively gentle rise from present levels, in the 9 to 10 percent range, to only 11 or 12 percent by the year 2000 in the absence of effective cost-containment measures may not appear very alarming, in view of the exponential rate of increase in the past. This might well contribute to some slackening in these efforts, especially since even this projection appears from a study of the report to contain a considerable safety margin.

It has been shown above that Georgetown's conclusion does not seem to be related to their commendably detailed analysis. Rather it appears to have been developed from their simplified aggregate analysis which does not appear to be sufficiently robust to support the conclusion. As shown above, alternative formulations could result in much higher levels of future expense. It also appears that additional analysis would be required to arrive at a meaningful

range, based on explicit assumptions of future public and private policies towards health care financing. In view of these concerns, and the possibly adverse practical consequences of an overly optimistic forecast of future costs, it may be desirable for the Georgetown authors to explain how their conclusion was reached.

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IN REPLY

Thomas F. Perkins in his letter about the September-October 1978 supplement to *Public Health Reports*, "Cost of Disease and Illness in the United States in the Year 2000," analyzed in some depth the estimates of total direct expenditures as a percentage of Gross National Product, without reference to the estimates of direct expenditure by disease classification and the estimates of indirect cost (total and by disease). He summarized the findings in terms of cost by both the micro (disaggregated model) and the macro (aggregated model) with estimates ranging from a low of 7.8 percent of GNP to a high of 11.8 percent of GNP, respectively. Additionally in his letter, Mr. Perkins offers his own simple extrapolation model of long-term health expenditure growth, applying the proposed model to past years' data for verification.

To put the reviewer's comments in perspective, it may be useful to underscore the basic summary of findings which include findings on the trends in direct outlays for health care, estimates of the indirect illness cost (cost of premature death and disability), trends in premature death and sickness, and an analysis of overall economic gains and economic costs. The projections made are applied to each of the diseases in the 2-digit code of ICDA.

The projections are set within a framework of an overall economic model for the United States and are derived from that model in terms of basic economic components such as wage rates and productivity, interest rates, prices for medical services, consumer goods, and the deflator of Gross National Product. The estimates derived are summarized in the report in this way:

- Diseases of the circulatory system, cancer, and mental diseases will continue to absorb relatively large shares of the total cost of illness in contrast to their shares in 1900 and 1930.
- Total costs of premature death will rise by between \$87.2 and \$174.9 billion, depending on the discount rate.

- The real economic costs of illness will be more than double the 1975 costs by the year 2000.
- Total economic costs of illness will exceed \$2 trillion in year 2000.
- Direct costs of health care will rise faster than the GNP and reach 11 to 12 percent of the GNP by year 2000.

It is the report's conclusion that direct health costs will reach 11-12 percent of GNP (figures derived from the highs of the micro and macro estimates respectively) which Perkins finds not persuasive. In essence, he asks why the upper range of the micro and macro models was used in the summary. He continues his comments on the factors in the micro estimate that emphasize a possible lid on growth and argues that the macro estimate is not robust because the estimating model uses number of physicians rather than physicians per 100,000 population.

Mr. Perkins is impressed with the detail in which the micro estimates are presented—in contrast to the summary presentation of the macro model—namely, a detail that calls for estimates of number of physician retirements and deaths, new enrollments (and graduates) including separately new enrollments from foreign medical schools and Canada with a separate analysis of the effect of new schools. Similar detail is used in estimating hospital expenditures, dental care, nursing care, nursing home services, drugs, and so forth in the micro estimate. He is concerned that a low estimate of future health expenditures could result in a slackening of effort towards cost containment. The point is well taken. However, as pointed out numerous times in the report, we submitted that the most reliable and defensible cost estimates—for policy or other purposes—are to be produced using reasonable, conservative assumptions.

Mr. Perkins seems to disregard the high of the range of the micro model, but it is important to note that a little over half the difference between the low and the high, that is, between 7.8 and 11.1 percent of GNP, is attributable mainly to the range of price assumptions made for hospital care. In the high estimate, hospital costs are assumed to rise 3 percentage points above the economy's inflation rate, and in the low estimate, 1.2 percent. "Price," as used here and by the Bureau of Labor Statistics, is not a price for a uniform quality of service as conceptually it is intended to be, but a high price that often includes a higher quality of service.

While the past is prelude to the future, there are downward biases in tying closely to past documented experience in the micro model, as anyone working

with such projections understands. It is a conservatism that results mainly from attempting to keep the estimates within the bounds of what can be reported statistically and validly based on past information. Often where there are no data, no adjustment is made. To do otherwise, it is argued, brings the estimates within the realm of guesswork.

The macro model is criticized by Mr. Perkins with its range of 9.2 to 11.8 percent "because of a questionable technique used in projecting the provider variable (the growth in the absolute number of physicians used rather than that of the number per 100,000 population)". The aggregated estimates are derived from a behavioral model which was applied in our overall study (on trends in the cost of illness) for purposes of assessing the historic contribution of biomedical research on health expenditures. The model formally is written as:

$$H = f(D, P, F, T)$$

where

- H = real per capita personal health care expenditures in 1967 dollars
- D = characteristics of demanders (real per capita personal income 1967 dollars)
- P = provider characteristics (a weighted average of the stock of physicians and nurses per 100,000 population normalized by the respective standard deviation)
- F = financial characteristics of the health care system (share of third party payments in total personal health expenditures)
- T = characteristics of technical advances (biomedical research and development).

After extensive study of this and modifications, we decided that the model was not sufficiently robust to yield definitive information about the relation of biomedical research to health expenditures. The study work on the model and its variants concentrated, however, on the share of health expenditures to be attributed to biomedical research. The model did work well in explaining overall growth in health expenditures.

The model was applied, therefore, in arriving at a macro estimate of health expenditures within some reasonable "ballpark" range. In applying the model, for consistency purposes, the growth in population per 100,000 physicians might have been used as proposed by Mr. Perkins. It was not. The physician provider variable coefficient, because of its relative size, instead was used to correct for some of the downward bias in the estimates. Shorter periods of time yield higher