

Further economic questions, not covered directly in the foregoing list, concern the rising costs of research activity and the estimation of potential results.

It has been observed that medical research has been greatly spurred by public interest in a faster flow of research findings and their application. It has been spurred also by tremendous and rapid technological strides that now permit investigators to probe and discover significant new knowledge in areas where a few years ago they could only ruminate. Public interest and technical advances, however, are not the only major forces involved in the increased level of research outlays. The cost of conducting a given quantity of research (however "quantity" is to be defined in this context) also appears to have risen rapidly. Maintenance of a given level of research effort apparently requires a larger financial commitment with each successive year. Advancing costs are not at all peculiar to health-related research. The problem is that for the health field, as for other fields of research, there appear to be no specialized cost indexes or other guides whereby real outlay may be compared from year to year. We may be sure that a general-purpose price index is not a dependable measure for estimating how many more technicians' man-years or other units of resources and effort this year's health-research appropriations will buy than were obtainable with appropriations of prior years. Presumably a special index could be devised to measure these relationships, though the task would be exceedingly complex.

More difficult conceptually, and perhaps unattainable in practice, is another type of explicit measurement which would be of great help to administrators and legislators concerned with our health research programs. Apart from dollar costs and numbers of researchers engaged, there are no standard units for measuring research effort and, of course, none for assessing research output. The findings, products, discoveries, insights, and applications that flow from research seem to defy quantitative summary. Yet each decision on research financing requires implicit judgments about the comparative return to be expected from given increments of research effort. When action is taken to increase the manpower, equipment, and other resources allocated to any given field of research, an impressionistic or intuitive judgment is necessarily made, to the effect that knowledge will be significantly increased, that the additional knowledge will be at least commensurate with the additional effort, and that no part of the incremental effort is apt to prove more productive if devoted to applications of present knowledge instead of the search for new knowledge.

With the national health research effort measured in billions of dollars and employing thousands of scientists and technical assistants, it is now more important than ever that we seek to make explicit the multitude of factors and the variety of questions that are involved in decisions affecting the magnitude and orientation of these efforts.³⁶

All these questions concern economic aspects of medical research. Some call for evaluations from the special point of view of medical re-

³⁶ On questions raised here, see also the report (cited at p. 56) of the Senate Committee on Government Operations, Subcommittee on Reorganization and International Organizations, 87th Cong., 1st sess., S. Rept. 142, pp. 90-93. See also the introduction to the National Science Foundation general answer to question 9, in pt. III of this report.