Systematic Evaluation of Medical Technology: An Urgent Need

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The last few years have seen increasing and well-placed concern over the counterproductive effects of the rapid and often premature diffusion and application of medical technology in the United States.[1-3] The negative effects of inappropriate application of medical technology are pervasive, including their influence on escalating costs of health care and the frequently marginal outcomes of the services provided.

National health expenditures have doubled in the last 20 years, and are projected to exceed ten percent of the Gross National Product by 1981.[4] It has been estimated that 25 to 50 percent of these cost increases are due to the introduction of new technology.[1] Several examples illustrate the dimensions of the problem. In 1978, $12 to $14 billion were spent on laboratory tests, and the volume of these tests is increasing at a rate of about 15 percent per year.[5] The number of laboratory tests used per patient with uncomplicated acute appendicitis increased from 5 in 1951 to 30 in 1971.[6] The total cost of diagnostic radiologic procedures last year was about $8 billion including about $600 million for CAT scanning.[7] By 1976, the national annual cost in fees for coronary artery surgery was about $750 million (about $3.50 per US citizen and almost one percent of the total national health care cost).[8] The costs of coronary bypass operations and hemodialysis for end-stage renal disease are doubling every few years.[7] An increasing proportion of health care expenditures are directed to the care of a declining proportion of the population—in 1974, for example, the medical expenses of 1.2 percent of the population accounted for 20 percent of the total national expenditures for health care.[9] Despite these massive and increasing expenditures, the outcome in terms of improved patient care is frequently unknown, marginal, or at times even hazardous.

Several recent initiatives have been taken to address the need for more effective evaluation of medical technology. The National Institutes of Health have established advisory panels to assess the implications of advances in biomedical research for the practice of medicine. A National Center for Health Care Technology has also been

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established, but to date is inadequately funded to carry out a major program of technology assessment. After three years of study, the National Research Council's Committee on Technology and Health Care, organized jointly in 1976 by the Assembly of Engineering and the Institute of Medicine, has just released an excellent and useful report (*Medical Technology and the Health Care System: A Study of the Diffusion of Equipment-Embodied Technology).*[10] This group called for the use of five general evaluative criteria in assessing the role and value of equipment-embodied technology: (1) technical validity, (2) effectiveness or efficacy, (3) cost effectiveness, (4) net social benefit, and (5) societal impact. Beyond some efforts to demonstrate the technical validity of new medical technology, this committee recognized the present lack of any systematic process of technology assessment.

Among the recommendations made by the Committee on Technology and Health Care are the following[10]:

- A national coordinating body should be established in order to:
  1. identify the need for evaluative information on equipment-embodied (and perhaps other) technology,
  2. fund planning and evaluation studies where existing funding programs are not adequate,
  3. collect and disseminate available information regarding new and existing technologies to users,
  4. encourage and foster national and international efforts to standardize equipment-embodied technology to achieve economy of equipment design, safety, and comparability of data,
  5. conduct and sponsor research into methodologies for evaluating medical technology, and
  6. coordinate evaluative programs of federal agencies.
- Current methods of reimbursement for health care services should be revised to promote appropriate incentives with respect to the adoption and use of equipment-embodied technology.
- Policies that alter incentives without the need for detailed regulation are preferable to policies based on new or additional regulation.

These developments represent important and much needed responses to a fundamental set of problems in American medicine. As a major provider of primary health care in this country, family practice has a special interest in the formulation of effective methods of technology assessment. Family physicians play a central role in helping to assure the safe and useful application of medical technology at reasonable cost through education of their patients, their own care of patients, and their choice of consultants. Family physicians also have much to contribute to the process of technology assessment, particularly where cost-benefit and net social benefit are concerned. These issues need to be addressed in family practice teaching programs; in this connection, the above mentioned Report of the Committee on Technology and Health Care is recommended for inclusion in all of our teaching libraries.[10]*

References

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*Available from Office of Publications, National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, DC 20418.