1.

Introduction and surnmary

A rational man *acting in the real world maybe* **defined as one who decides where he will strike a balance between what he desires and what can be done. it is only in imaginary worlds that we Can do whatever we wish.**

— Walter Lippmann

Contents

Page

Scope of the Report 6
Organization of the Rest of the Report 6
Summary 7
Medicare Policies Affecting Medical Technology 7
The Impact of Medical Technology on Medicare Costs 9
Overview of Areas for Change in Medicare 11
Specific Technologies: Linking Coverage Policy and Technology Assessment To Contain Costs 11
Medicare Hospital Payment and Medical Technology. 13
Medicare Physician Payment and Medical Technology 15
Alternative Approaches to Changing Incentives for Medical Technology Adoption and Use 16
Policy Options.. 17

Introduction and Summary

U.S. health care costs have escalated rapidly over the past 15 years, and medical technology[1] is a primary cause of the increase. Furthermore, now that controlling health care expenditures has become an issue of national prominence in the public and private sectors, increasing attention is being paid to the financial impact of the use of new and existing medical technologies.

A major focus of Federal policy makers' concerns about rising health care expenditures is the Medicare program, which provides payment for hospital and other acute care health services for over 30 million elderly and disabled Americans. Since 1974, Medicare expenditures have been increasing at an average annual rate of 19 percent (135). Largely because of the Medicare program, the Federal share of national health expenditures has risen continuously since the program's inception in 1966. Medicare expenditures, which represented 48.9 percent of total Federal expenditures for personal health care[2] in 1970, represented 60.8 percent in 1982 (135). In 1982, Federal expenditures under Medicare totaled $52.2 billion. Of that amount, $36.3 billion went for hospital care, and $11.4 billion went for **physicians' services (135).** Program expenditures in fiscal year 1984 are expected to reach $66.5 billion (340).

Medicare's beneficiaries, elderly and disabled Americans, are on average sicker than the general population. Furthermore, they are disproportionately high users of health care services in general and medical technology in particular. Every class of medical technology—with the exception of obstetrical, pediatric, and possibly preventive interventions—is on average applied more often to Medicare beneficiaries than to the population as a whole. In 1980, those over the age of 65 accounted for 11.2 percent of the population but 31.4 percent of health care costs (265). Both percentages are expected to rise significantly in the future because of the aging of the U.S. population.

To aid in congressional efforts to contain Medicare costs, the House Committee on Energy and Commerce and its Subcommittee on Health and the Environment and the Senate Committee on Finance, Subcommittee on Health asked OTA to assess a broad range of mechanisms to 1imit or reduce Medicare costs related to medical technology. In addition, they requested a study of the proposed use of Diagnosis Related Groups (DRGs) as Medicare's inpatient hospital payment mechanism and several case studies of particular interest to the Medicare program. These are published as separate volumes. This report focuses on the policy mechanisms to limit or reduce Medicare costs related to technology but draws from the study of DRGs and the case studies.

The present assessment explores the dual relationship between medical technology and the Medicare program: Medicare policies affect the adoption and use of medical technologies, and the patterns and levels of use of medical technologies significantly affect Medicare costs. It reviews specific Medicare policies-eligibility, benefits, payment, and beneficiary cost-sharing policies—that have had an influence on the adoption and use of medical technology. It also examines the con-

[1] OTA defines medical technology as the drugs devices, and surgical and medical procedures used in medical care and the organizational, and supportive systems within which they are provided.

[2] Personal health care expenditures are national health care expenditures minus administrative costs.

Photo credit E. I. du Pont de Nemours & Co.

In 1982, Medicare had over 30 million elderly and disabled beneficiaries

tribution of medical technologies to increases in Medicare costs.

OTA identified several possible changes in Medicare policies that could be used to influence medical technology adoption and use and to restrain Medicare program costs. These mechanisms generally fall into the following categories:

- changes in Medicare's coverage policy for specific technologies;
- changes in the methods of Medicare payment to hospitals;
- changes in the methods of Medicare payment to physicians; and
- approaches to changing the incentives for the adoption and use of technology that do not directly involve, but may be related to, the Medicare payment mechanism (e.g., encouraging the development of alternative cost-effective health care delivery systems).

Because of the vast number of medical technologies being developed or used and the decentralized administration of the Medicare program, technology-specific approaches are likely to be of limited value in containing Medicare costs.[3] For that reason, broader approaches, many of which involve the use of hospital or physician payment mechanisms to change providers' or consumers' financial incentives to use medical technology, are generally considered the major means by which the cost-containment objectives of the Medicare program might be achieved. The change in Medicare's inpatient hospital payment system—from retrospective, cost-based payment to prospective, per case payment based on DRGs, as mandated by the Social Security Amendments of 1983 (Public Law 98-21)–provides a striking example of such an approach.

Other broad approaches do not involve the payment mechanism directly but are usually considered in conjunction with payment mechanism changes to alter the incentives for technology use. These include stimulating competition among providers of health care by encouraging the development of alternative sites or organizations (e.g., health maintenance organizations) of health care delivery. They also include administrative changes in the Medicare program (e. g., merging Parts A and B of Medicare) for the purpose of changing incentives for technology adoption and use,

There are two additional broad approaches to containing Medicare costs, but they are not discussed extensively in this report. The first approach is simply to limit the amount of money available for Medicare. Applying such a financial squeeze would give providers and patients strong incentives to adopt and use technologies efficiently. However, applying such a limitation to the Medicare program alone, while saving Federal dollars, would likely either shift costs to the private sector or result in Medicare beneficiaries' reduced access to certain technologies. The second approach is to use the conditions of participation for Medicare providers (i. e., requirements providers must meet in order to be eligible to receive payment from Medicare) to change the incentives for technology use.

Several points should be kept in mind while reading this report. These points are not presented in order of importance, primarily because the issues involved are intertwined.

First, the impact of medical technologies on Medicare costs, or health care costs in general, should not be assessed in isolation from the effect that such technologies have on quality of care. The impact of cost-containing measures on both quality and access is one of the most difficult policy issues to be faced, because the Medicare program was instituted to increase elderly persons' access to acute care services. In order to control Medicare costs in the long run, some restrictions on quality or access are likely to be necessary. Unfortunately, the rapid rate of growth in health or Medicare expenditures cannot be stemmed simply by eliminating technologies that do not provide any benefit, because most technologies do provide some benefit, however small or costly the benefit may be (25).

Nevertheless, there is substantial evidence to suggest that inappropriate use of medical technology is common and raises Medicare and health system costs without improving quality of care. Many surgical procedures seem to be overused in

[3]Technology-specific approaches may be particularly valuable, however, in enhancing the adoption of socially valued technologies that may be cost-raising.

the United States compared to other countries (26). Laboratory examinations and other diagnostic tests are used at high rates and at times when not indicated by the suspected conditions (90,120,296). Lengths of stay in the hospital are higher in many cases than can be justified by medical evidence of benefit ***(3.50).*** Thus, one way to reduce Medicare costs is to encourage the appropriate *use* of new and existing medical technologies.

Second, there are interactions between Medicare and the rest of the U.S. health care system. Because of its size and scope, and because other third-party payers often follow Medicare's example, Medicare's policies and procedures affect all aspects of health care delivery, including financing, administration, organization, and personnel. Furthermore, the program affects the content and costs of health care by its influence on the development, adoption, and use of medical technology.

Nevertheless, it is important to keep in mind that **the Medicare program is only one of many public and private institutions that influence the development and diffusion of medical technology.** Other important influences are the Food and Drug Administration, the National Institutes of Health, manufacturers of drugs and medical devices, hospitals, private health insurers, and professional medical societies, The long-term costs of the Medicare program are linked with those of the overall health care system, and the leverage of using Medicare-specific policies to achieve Medicare cost-containment objectives may be limited.

Third, reimbursement policy by Medicare and other third-party payers has contributed to the rapid adoption and often excessive use of medical technology. Therefore, policymakers have looked to changes in reimbursement policies to alter the financial incentives for providers and consumers to use medical technology. **However, reimbursement is only one of several factors that contribute to the tendency to adopt and use medical technology.** Other factors include public demand for sophisticated technologies, the desire of physicians to do as much as possible for their patients, competition among hospitals to achieve quality and prestige so as to attract patients and physicians, the fear of malpractice suits, and uncertainties about what constitutes appropriate *use.*

Fourth, because of spillover effects from one part of Medicare to another, policy mechanisms involving only one part of the Medicare program may have serious limitations in terms of containing Medicare costs or affecting technology adoption and use. Medicare's DRG hospital payment system, for example, excludes physicians' services and outpatient care. These exclusions not only provide incentives for the shifting of costs out of inpatient hospital settings but leave physicians' incentives to use medical technology unaffected. Any cost-containment effort must take into account the fact that physicians play a central role in determining what services are provided to patients in both hospital and other settings.

Fifth, what constitutes rational and appropriate adoption and use of medical technology depends on whether the question is being viewed from a soaetal perspective, from the perspective of the Medicare program, or from the perspective of individual providers or patients. A rational decision to adopt or use a medical technology is a decision based on the consideration of costs and benefits. A decision by hospitals or physicians to adopt **a** medical technology that improves the quality of care provided to patients may also raise the costs of the Medicare program. From the perspective of the providers or patients, such a decision may be entirely rational. However, the costs and benefits to providers and patients are different from those to the Medicare program. Thus, unless the marginal increase in the benefit of improved patient care justifies the marginal increase in costs to the Medicare program, the decision may not be rational for Medicare. Furthermore, what is rational and appropriate from the standpoint of Medicare is not necessarily rational and appropriate from the standpoint of society as a whole.

Sixth, the social and political climate today is quite different from that in 1965, **and now that Medicare's goal of improving access to health care for the Nation's elderly has been largely achieved, the primary focus of policy makers is on containing Medicare costs.** The principal intent of the 1965 legislation establishing the Medicare program under Title XVIII of the Social Security Act (Public Law 89-97) was to increase elderly Americans' access to acute care medical services by removing financial barriers, particularly to hospitaliza-

25-337 10 - 84 - 2

tion (317). There was far less concern about the cost of services than about the problem of access. The concern about access was also prominent in 1972, when eligibility was extended by Congress to disabled persons and people with end-stage renal disease (ESRD). More recently, however, the costs of the program have soared, and the pressures for cost containment have increased. Thus, the challenge that remains for Federal policymakers today is to solve the problem of controlling Medicare costs without diminishing past success,

SCOPE OF THE REPORT

This report examines medical technology's impact on Medicare costs and Medicare's past and future impact on the development and diffusion of medical technology. Medical technology is the major component of medical care. The incentives that govern the provision of medical care services work in the same direction (and are of the same magnitude) as those that govern the adoption and use of medical technology. In this report, therefore, the term "medical technology" is sometimes used synonymously with "medical care" or "medical services. "

The bulk of the increases in health and Medicare costs in the past 20 years is attributable to factors other than changes in the patterns and levels of use of medical technology, such as general wage and price inflation and growth in the size of the U.S. population age 65 and over. A detailed examination of these factors, however, is beyond the scope of this report.

The policy options presented in this report emphasize controlling costs by changing the incentives for technology adoption and use, primarily through Medicare's hospital and physician payment mechanisms. The report does not discuss changes in Medicare eligibility or in the broad Medicare benefit package. A serious problem needing attention that this report does not address is the widening gap between the Medicare beneficiary population's needs and the benefit package actually provided. Medicare's benefit package was modeled after insurance plans of the early part of the century, when acute illness was the primary concern and when most patients either got well or died rather quickly (317). Some services critical to chronic disease—preventive measures, custodial or long-term care, drugs in outpatient settings, and many rehabilitative services—were excluded from covered benefits, Ironically, as Medicare has achieved its objective of improved access to acute care services and mortality rates among the Nation's elderly have decreased, morbidity from chronic diseases has increased because of the aging of the population. Thus, elderly individuals who cannot afford uncovered services remain an underserved segment of the population,

This report does not consider how much money is appropriate to expend on Medicare beneficiaries, That decision is essentially a political one. As noted earlier, one way to cut Medicare costs, and change the incentives for technology use and adoption, is simply to cut money out of the system. The options presented in this report could be implemented regardless of the political decisions about how much money is appropriate to spend.

ORGANIZATION OF THE REST OF THE REPORT

The rest of this chapter presents a summary of the report and briefly lists the issue areas for which there are policy options. The body of the report is organized in three parts.

Part One presents information on the interactions between medical technology and Medicare. Chapter 2 discusses Medicare's impact on the adoption and use of medical technology. After

presenting a brief overview of general policies, the chapter describes the specific Medicare policies that have been important to the development and diffusion of medicaI technology. In chapter 3, the emphasis turns to medical technology's impact on Medicare costs. The chapter examines the patterns of medical technology use experienced by the Medicare population compared to the general population. Then, it reviews the evidence on the contributions of medical technology to general health care costs and to Medicare costs. Those contributions are discussed in the aggregate and with respect to particular technologies.

Part Two contains chapters providing information about policies that have been and could be taken to restrain the costs of medical technologies in the Medicare program. Chapter 4 provides an overview of the issues underlying the remaining chapters. Chapter 5 reviews Medicare's coverage policy and process for individual medical technologies and discusses possible linkages between technology assessment and coverage for the purpose of containing costs. Chapters 6 through 8 examine broader policies that have impacts on medical technology adoption and use. Chapter 6 analyzes the implications for medical technology of current and potential methods of hospital payment. Chapter 7 presents a similar analysis of physician payment methods. It also includes a discussion on how physicians influence technology use and how physician cost consciousness may be enhanced. Chapter 8 presents information on broad approaches (those other than direct Medicare payment changes) to change the incentives for medical technology adoption and use, primarily by stimulating competitive behavior among providers.

Part Three (ch. 9) presents the main findings and policy options of the study, organized by issue area.

Appendix A describes the method used by OTA to conduct the assessment and lists the background papers (including case studies) prepared in conjunction with the project. Appendix B contains the acknowledgments and the membership of the Health Program Advisory Committee. Appendix C provides information on public and private technology assessment activities. Appendix D is a descriptive overview of selected alternatives to traditional health care delivery. Appendix E presents the results of a survey of Medicare contractors.

A series of case studies was used to provide specific examples of issues and problems (see app. A). The report makes reference to the case studies throughout. The full cases themselves are printed as separate volumes of OTA's Health *Technology Case Study Series.* In addition, a technical memorandum entitled *Diagnosis Related Groups (DRGs) and the Medicare Program: implications for Medical Technology* was prepared as part of this study and published in July of 1983.

Finally, a summary booklet is available. It contains information similar to the following summary section and the chapter on policy options.

SUMMARY

Medicare Policies Affecting Medical Technology

The very existence of Medicare and other third-party payers expands the market for medical technologies and influences the quantity and kinds of medical technologies that are used and the settings in which they are used. Since the enactment of the Medicare program in 1965, a great deal of legislation has been passed with the *purpose* of curbing the escalation in Medicare's costs and controlling the diffusion of medical technology. To date, such efforts have been largely ineffective. Indeed, Medicare's policies concerning eligibility, benefits, and payment have acted to promote technology adoption and use.

Medicare's *eligibility* policy has made more medical technology available to millions of the Nation's aged and disabled people. When the program began in 1966, 19,1 million people aged 65 and over were eligible to enroll. By 1982, the number of Medicare enrollees had increased to 29.5 million. The increase in the size of the Medicare

population is due largely to the growth in the size of the elderly population, but some of it reflects the extension of Medicare eligibility to people with disabilities and ESRD on July 1, 1973.

Medicare's *benefit* policy has had a profound effect on the types and location of modern medical technologies. The Medicare law specifies broad categories of benefits for which the program will pay under two parts: Part A, the Hospital Insurance program, and Part B, the Supplementary Medical Insurance program.[4] The law excludes most preventive services and certain other services, such as custodial and long-term care. Medicare's benefit package has undergone few major changes since the program's beginnings.

Although the Medicare program covers a variety of services in a variety of settings, its benefit package is concentrated primarily on acute care technologies provided in institutional settings, particularly those provided as inpatient hospital services. In 1982, 66.3 percent ($34.5 billion) of Medicare's $52.2 billion in payments was for inpatient hospital services. **There are numerous incentives inherent in Medicare's benefit policy to provide too many of some kinds of medical technologies and too few of others.** Coverage of some technologies (e.g., medical devices, drugs), for example, varies according to the characteristics of the technology, of the user, and of the setting in which the technology is used. In some cases, as in treatment for alcoholism, Medicare's benefit policy has encouraged the development of a technology in an inpatient setting, despite the fact that treatment in other settings maybe as effective and is certainly less costly (348). Medicare's exclusion of benefits for some technologies, including assistive communications devices (351), has had an unfavorable influence on their development and diffusion.

A dramatic specific example of how Medicare's eligibility and benefit policies have affected the development and diffusion of costly medical technologies is provided in the case of technologies used to treat ESRD. People with ESRD require some form of dialysis or kidney transplantation to prolong their lives. In 1972, before Medicare eligibility was extended to persons with ESRD, about 10,000 persons were receiving hemodialysis. By 1980, following the extension of eligibility, 50,000 were being dialyzed (359). There was also a significant increase in kidney transplantation following implementation of the ESRD program (359). Currently, an estimated 93 percent of the U.S. population with ESRD are Medicare beneficiaries (195). Thus, Medicare policies can be clearly identified as a major influence on the diffusion of the technologies used in the treatment of ESRD.

Photo credit Natlonal *Kidney* Foundation, *Washington, D. C.*

Medicare policies are a major influence on the development and diffusion of hemodialysis and other technologies used in the treatment of ESRD

[4]Part A benefits include inpatient hospital care, post-hospital extended care services, home health services, and as of Apr. 1, 1982, inpatient alcohol detoxification services. Part B benefits include medically necessary physiaan services, outpatient hospital services, outpatient physical therapy and speech pathology services, home health services for those not eligible for Part A, and various other limited ambulatory services and supplies (e. g., prosthetic devices and durable medical equipment).

Medicare's payment policies have had the most profound effect on medical technology adoption and use of any of the program's policies. For many years, Medicare has paid hospitals and other institutional providers on the basis of reasonable cost and paid physicians and other noninstitutional providers reasonable charges on a fee-for-service basis. Under both payment methods, providers receive more reimbursement when they use more medical technology. Thus, these payment methods offer providers little deterrent to the increased use of technology and little incentive to choose less costly technology.

Although Medicare's hospital payment system is now in the process of change, [5]17 years of cost-based hospital payment have shaped the health care system today. The original Medicare legislation left the specific method of determining reasonable cost to administrative decisions. The method adopted was very liberal in allowing hospitals considerable discretion in calculating the costs attributable to Medicare (104). Thus, because hospitals have been assured of reimbursement by Medicare and by other third-party payers, they have had no financial reason not to spend money on medical technology, especially on socially valued technology,

Medicare's method of paying physicians has changed little since Medicare was enacted, although minor restraints have been imposed on the rate of increase of physicians' payment levels, Most physicians' incomes are determined by the number and intensity of services delivered and the fee received for each service. The use of technology by fee-for-service physicians is sensitive to the additional revenue they receive (229).

In addition, although not intrinsic to the fee-for-service payment method, physician payment levels that Medicare has established for complex and expensive medical technologies are usually disproportionately high (235). In most instances, the reimbursable charge for a technology was established at an early point in the technology's history. Although subsequent technological advances and higher rates of utilization may have substantially reduced the time, judgment, skill, and cost required to use the technology, this change is not reflected in the physician's fee or Medicare's reimbursement level. Furthermore, the existing payment system provides incentives for the *use* of "technology-intensive" medical care. Under current fees, what are sometimes referred to as "technology-oriented" services, such as diagnostic tests and surgical procedures, are valued higher than "cognitive" services, such as taking medical histories and counseling.

Medicare's *beneficiary cost-sharing* provisions were the only measures specifically included in the original legislation to help moderate the unnecessary utilization of services. Although there is little empirical evidence concerning the effect of deductibles, copayments, and coinsurance on the use of medical technology specifically in the Medicare program, it is generally believed that such cost-sharing has had little impact on technology use. Supplementary health insurance ("Medigap") is used extensively by Medicare beneficiaries, and it often substantially diminishes or eliminates the burden of these cost-sharing requirements. Premium payments, another form of cost-sharing, are clearly not an obstacle to the use of services (28,253).

The Impact of Medical Technology on Medicare Costs

Changes in the kinds of medical technologies available and changes in the patterns of use of technologies already available continually influence health care costs—at times moderating cost increases and at times exacerbating them. How medical technology contributes to health and Medicare costs is a question that can be addressed either in the aggregate or with respect to particular technologies or classes of technologies.

The question from the aggregate perspective is whether changes in medical technology use as a whole have raised or reduced health care *or* Medicare costs and, if so, by how much. The aggregate perspective is useful, because it puts technology's relationship to costs into a policy perspective.

[5]Medicare's hospital payment method was changed by the Social Security Amendments of 1983 (Public Law 98-121), which mandated the phasing in beginning in October 1983 of a prospective per case inpatient hospital payment system based on Diagnosis Related Groups (DRGs). The implications of DRG hospital payment are discussed in a following section.

The most widely used approach to estimating technology's aggregate contribution to health care costs is to separate the change in total expenditures for health care into its component parts: population or enrollment changes, overall wage and price inflation, wage and price inflation in medical care in excess of general inflation, and changes in service intensity.[6] Changes in technology use are included in the latter two measures, although these measures also reflect other factors.

Using this general approach, OTA estimates that increases **in service intensity (labor and nonlabor inputs) per capita accounted for** 24 percent of the 93-percent increase in per capita hospital costs from 1977 to 1982. The increase in service intensity is due in part to an increase in the hospital admission rate (a 5-year increase of 2.1 percent), but the overwhelming part of the increase is due to the provision of a greater quantity of services per hospital admission. Moreover, OTA's empirical and literature analysis supports the general conclusion that **changes in service intensity have contributed substantially to the growth in hospital costs over the past** 20 **years.**

Increasing intensity of care appears to be a less important source of expenditure inflation in total personal health care expenditures in the United States than it is for the hospital sector alone. **The combined effect of increasing intensity of care and increasing health care prices in excess of the Consumer Price Index accounts for only about** 16 percent of the growth in per capita personal health care expenditures between 1977 and 1982. During that 5-year period, **however, these two technology-related components of cost together increased real per capita personal health expenditures at an average annual rate of** 2.8 percent.

It is possible to account for the components of Medicare cost increases, but the interpretation of the estimates is even more clouded than is the interpretation of increases in general health care costs. Changes in program eligibility or in covered benefits can lead to dramatic changes in measured service intensity that have little to do with changes in medical technology but instead represent a shift in the burden to payment for services already available and used. Changes in per capita service intensity do indicate how much more or less Medicare is paying for now than at some earlier date. Between 1977 and 1982, Medicare expenditures per enrollee increased 107 percent. OTA's analysis indicates that nearly 30 percent of the increase in Medicare costs per enrollee from 1977 to 1982 can be attributed to increased use of covered services (25 percent) and increased medical prices **in excess of general inflation (3 percent).**[7]

Although none of the approaches to measuring technology's aggregate contribution to health care or Medicare costs is entirely satisfactory, **taken as a whole, the available evidence leads to the conclusion that health care costs have increased in part because more is being done for patients today than ever before.** More and better trained personnel, more procedures, more drugs, and more and higher priced equipment, materials, and supplies are being used in the delivery of health care to Medicare patients and to the population as **a** whole. So far, the trend toward "more" does not appear to be abating. It is not just at the margin, however, that there is an opportunity to reduce Medicare costs. There are many opportunities to save health and Medicare costs by altering longstanding patterns of use of medical technology.

Furthermore, the aggregate approach to estimating medical technology's contribution to health care or Medicare costs is limited, because it ignores the patient benefits associated with cost increases or decreases, it does not take into account the underlying reasons for changes in medical decisions or practices, and it does not show that cost-saving and cost-raising changes in technology are not scattered evenly across illnesses. **Summary statements about technology's net influence on health care or Medicare costs mask the**

[6] "'Service intensity" reters to the quantity of inputs that go into producing a given unit of health care. These inputs include labor, supplies, materials, and equipment used in the provision of care. Service intensity is associated wlth, but not identical to, medical technology use.

[7] The percent due to medical price inflation may be overstated, and the service intensity percentage correspondingly understated, because the amount Medicare actually pays for services (i. e., the effective price) probably lies somewhat below stated prices.

rich assortment of ways in which changes in medical technology shape the health care system, the population's health status, and its costs.

Thus, in order to provide insight into the underlying reasons for change in medical decisions or practices and to highlight the extent to which the costs of the Medicare program are altered by new technologies, OTA examined seven specific technologies first introduced in the 1960's or 1970's: coronary artery bypass surgery, the drug cimetidine, therapeutic apheresis, pneumococcal vaccine, intensive care units, total parenteral nutrition therapy, and kidney dialysis.

All seven of the technologies have clear patient benefits—in some cases, they are life saving—but for all of the technologies, there is controversy about the most appropriate indications for use. Two of these technologies have been or may be cost saving to Medicare, but five of them have raised or have the potential to raise Medicare costs, in some cases significantly. Above all else, these technologies illustrate how exposed the Medicare program is to changes in medical technology that are largely beyond its control. The challenge to Medicare in the face of new technologies that offer both patient benefits and higher costs is how to encourage the most cost-effective use of the most cost-effective technologies. The overall remaining issue is how Medicare policy can be structured to bring about more cost-effective use of both existing and new medical technologies.

Overview of Areas for Change in Medicare

OTA's discussion of potential areas for change under Medicare is organized in two parts, corresponding to the two types of policy mechanisms discussed previously. The first part—policies directed at individual technologies—explores linking Medicare's coverage policy and technology assessment to contain costs. The second part—policies providing broad incentives to encourage appropriate adoption and use of technologies—is divided into three sections: hospital payment, physician payment, and alternative or systemwide approaches to changing incentives.

Specific Technologies: Linking Coverage Policy and Technology Assessment To Contain Costs

A potential method of containing Medicare costs is by influencing the diffusion (i. e., adoption and use) of medical technologies. It is generally agreed that Medicare's coverage policy—policy that governs the eligibility of services (technologies) for payment—has influenced decisions about the purchase of some expensive, visible medical technologies. The precise relationship between coverage policy and adoption of other kinds of technologies or *use* of any technologies remains speculative.

Although Medicare and other insurance plans designate broad categories of services, such as inpatient services, as being covered, or eligible, for payment, specific technologies, with few exceptions, require individual coverage decisions. Medicare coverage policy for particular technologies not mandated by law has been decided on a case-by-case basis according to Section 1862 of Title XVIII of the Social Security Act. Section 1862 prohibits Medicare payment for items and services that are "not reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member. "

Medicare has refrained from establishing a definitive interpretation of "reasonable and necessary" and has relied on a loosely structured and decentralized mechanism to determine whether a technology is covered. The criteria used to determine if a technology meets the broad statutory language of "reasonable and necessary" are: 1) general acceptance as safe and effective, 2) not experimental, 3) medically necessary, and 4) provided according to accepted standards of medical practice in an appropriate setting. Traditionally, coverage policy has been made in light of Medicare's principles of not interfering with the practice of medicine and assuring beneficiaries a free choice of providers.

Some coverage decisions are made *at the national* level by the central Health Care Financing Administration (HCFA) office, while others are made by regional HCFA offices. Most of the deci-

sions, however, are made by Medicare contractors, called intermediaries and carriers, who perform the Medicare program's claims processing and payment function at the local level under the policy and operational guidance of HCFA. Although the details vary, the coverage process is the same at the national level or at the contractor level. First, new technologies and new uses of covered technologies are identified. Second, a decision is made about covering the identified technology for Medicare payment. The decision-makers (contractors or HCFA) may receive advice, which usually involves an evaluation of the safety and effectiveness of the technology. The final step is implementing the coverage decision.

Because of the general language of Section 1862 and the absence of regulations or guidelines that implement the section, Government officials and Medicare contractors have had considerable latitude in determining which technologies are to be covered for reimbursement. Contractors vary widely in their identification of uncovered technologies, their decisions about the coverage of specific technologies, and their implementation of national coverage decisions (54,86,143,353). As a result, some technologies may be covered and paid for in one area and not in another. There is no national or local listing of procedures that are not covered (163).

Problems pertaining to the administration of the coverage process that need attention include: 1) the inadequate identification of emerging and outmoded technologies for coverage decisions; 2) the lack of uniformity in implementing national coverage decisions; 3) the timelag involved in the coverage process, including technology assessment; 4) the complex coding system and proliferation of codes; and 5) the incomplete dissemination of information. These problems all potentially raise Medicare's costs, although some of them (e.g., numbers 2, 3, and 5) may actually decrease Medicare expenditures.

Of particular interest to cost-containment efforts is Medicare's policy of not explicitly considering cost or cost-effectiveness information in making coverage decisions. Also of interest is the fact that Medicare has refrained from a policy of limiting coverage of particular technologies to restricted circumstances (e.g., institutions offering specific services or having specialized equipment) and to physicians with specific skills. Although the notion of limiting coverage to selected sites and providers has gained importance with the increasing development of sophisticated technologies that require particular expertise, Medicare's principles of refraining from interfering with medical practice and assuring beneficiaries a free choice of providers appear to have limited its application. On the other hand, Medicare does limit coverage of some technologies to appropriate medical conditions. For example, therapeutic apheresis is currently covered for six disease indications.

In theory, one way to use **coverage** policy to assist in containing Medicare costs would be to include cost criteria in technology **assessments.** Cost-benefit analysis (CBA) and cost-effectiveness analysis (CEA) are formal analytical techniques for comparing the positive and negative consequences of alternative ways of allocating resources **(353).** The methodological strengths and weaknesses of CBA/CEA and the potential for expanding their use in coverage decisions was discussed in OTA's 1980 report The *Implications of Cost-Effectiveness Analysis of Medical Technology.* **A** methodological issue of particular importance to beneficiaries of the Medicare program is whether to include discounted future medical care costs (due to longer lifespans for patients resulting from the use of medical technology) as a direct cost of a technology.

Incorporating cost criteria into an assessment, however, would not necessarily lead to the identification of cost-saving technology, Achieving the objective of identifying technologies that save or raise costs to Medicare before they become established in medical practice is problematic. The technical complexity of determining the cost effects of emerging and new technologies is compounded by the problem of defining a cost-saving or cost-raising technology. Differences in perspective impede arrival at a universal definition of a cost-saving or a cost-raising technology.

A new issue for Medicare is how to coordinate coverage policy with the DRG hospital payment system. Although the coverage process and the

process of adjusting DRG rates share a similar "approval for payment" function, they differ in that a coverage determination focuses on specific technologies, while adjusting DRG payment rates focuses on the larger entity of a diagnostic group, which includes particular technologies. Moreover, the DRG rate adjustment process must include issues of cost as an integral issue, while the coverage process at present does not consider cost issues. Nonetheless, the technology **assessments performed for the coverage and DRG rate adjustment processes no doubt will have similarities and their coordination should be encouraged.**

Medicare Hospital Payment and Medical Technology

The retrospective, cost-based hospital reimbursement system under which Medicare operated from 1966 until fiscal year 1983 was significantly altered first by the Tax Equity and Fiscal Responsibility Act of 1982 (Public Law 97-248) and then by the Social Security Amendments of 1983 (Public Law 98-21), The latter mandated the phasing in over a 3-year period of a prospective, per case hospital payment system based on DRGs. The new prospective payment system for inpatient operating costs places hospitals at financial risk but also enables them to keep whatever surpluses can be generated.

Although capital, outpatient, and direct teaching expenses remain pass-throughs, s Medicare's DRG hospital payment system has radically changed the financial incentives for the adoption and use of specific medical technologies in hospitals.[9] Hospitals now have a financial incentive to increase hospital admissions and decrease lengths of stay. Some patients may be admitted unnecessarily, others may be discharged too early, and some may not get all the elective care in one hospital stay. Thus, hospital admissions and readmission will need to be monitored,

The DRG payment system also provides hospitals with incentives to reduce the number and cost of ancillary services. Prior to the implementation of DRG payment, hospital administrators had financial reasons to encourage physicians to use available technologies. Now, hospital administrators will need to gain the support and cooperation of their physicians in order to keep their inpatient care within the price range of DRG payments. Under the new system, hospital administrators are likely to discourage physicians from using many high-cost technologies. **In some cases, the substitution of low-cost technologies for high-cost technologies may result in a decline in quality of care. Thus, quality of care remains an important issue under DRG payment.** Congress has provided some control over quality of care by mandating the utilization and quality control peer review organizations (PROS). Hospitals must have signed agreements with these organizations in order to receive Medicare payments. One of the responsibilities of the PROS will be to monitor the potential admission /discharge/readmission problem.

Despite the recent establishment of the DRG hospital payment system, it is quite possible that changes in hospital payment by Medicare will be actively considered in the future. Part of the reason is that pressure for cost containment at the Federal level may continue, and part is that individual States may enact hospital cost control systems in which Medicare will agree to participate. Alternative approaches that have been suggested or applied by public or private payers and that might be considered for implementation by Medicare generally fall into four major categories:

- alternative hospital prospective payment methods or modifications of Medicare's DRG hospital payment system,
- capital payment methods,
- Ž limited provider contracts, and
- . increased patient cost-sharing for hospital services.

Congress has adopted DRGs for the Medicare hospital payment system, but improvements of DRGs and of the payment system should be pursued. Case-mix classification systems with more desirable properties than DRGs may become available in the future. **Innovations in medical devices, drugs, and medical techniques that raise the quality of care** for the Medicare population

[8] Pass-throughs are those elements of cost that are not part of the prospective payment system,

[9] OTA's technical memorandum entitled *Diagnosis Related Groups (DRGs) and the Medicare program: Implications for Medical Technology* (343) provides a detailed analysis of these incentives.

Photo credit University of Utah Med/ca/ Center

Updating the DRG hospital payment system will be necessary to encourage the adoption of technologies that raise the quality of care provided but also raise hospital per case costs

but also increase hospital per case costs may not be readily adopted unless DRG payment rates are updated. Refinements of Medicare's DRG-based hospital payment system are anticipated in light of the series of congressionally mandated studies and the charge to the Prospective Payment Assessment Commission to recommend changes in DRG relative weights and categories. Other approaches to prospective payment of hospitals are certainly possible, and the current Medicare law encourages States to experiment with these as part of all-payer systems. Innovative prospective payment methods such as per capita hospital payment and area-wide global budgeting may hold promise in some areas.

How Medicare will pay for hospitals' investments in capital plant and equipment under DRG payment is an issue that has yet to be resolved. Traditionally, Medicare has reimbursed hospitals for interest and historical cost depreciation expenses associated with all capital equipment. This payment method has increased hospitals' demand for capital but has also made it difficult and costly for some hospitals to obtain additional debt financing. Currently, under DRG payment, capital costs are treated as pass-throughs (i.e., reimbursed, as they always have been, as they are incurred with no limit on the amount that a hospital can be paid). Of particular concern with a capital cost pass-through under **DRG payment is the incentive for hospitals to adopt expensive capital equipment that reduces operating costs but raises total costs per case.** Congress has recognized that capital costs are still a problem for Medicare, and Public Law 98-21 requires the Department of Health and Human Services to study how capital costs should be paid in connection with the DRG hospital payment system.

Two possible alternatives to the pass-through are to incorporate a flat rate for hospital capital into the DRG rates and to build hospital-specific capital allowances into the DRG system. Although the flat rate approach is generally more efficient than pass-through capital payment, it does raise questions of fairness among hospitals and equity of access to medical technologies among patients. In a flat rate payment system, hospitals that in the past had lower ratios of capital to operating costs would receive more payment than they had in the past. The hospital-specific approach would tend to reward those hospitals that were most highly capitalized in the past, leaving those with less capital forever to receive lower payments.

Two additional approaches to affecting the use of medical technologies through hospital payment are limited provider contracting and increased beneficiary cost-sharing for hospital services. Both methods have significant limitations. Limited provider contracts for hospital carel" would involve selecting certain hospitals for the provision of inpatient care to Medicare beneficiaries. Overall, although contracting may save program dollars, it represents an abandonment of the principle of assuring beneficiaries freedom of choice of pro-

[10]Currently, State Medicaid agencies may apply for waivers from the freedom-of-choice provision of the Social Security Act, Most waivers to date have been for case management systems that restrict the providers from whom a Medicaid beneficiary can obtain primary care, although California has adopted an approach of contracting with hospitals for inpatient care for Medicaid beneficiaries.

viders on which Medicare was built and forces subsidies of hospital care from other payers.

Medicare Physician Payment and Medical Technology

Any cost-containment effort must take into account the fact that physicians are key decision-makers with respect to the use of medical technologies. Physicians determine the amount of medical services to be provided, when patients need hospitalization, and when they need other types of care.

There is substantial evidence to suggest that inappropriate use of medical technologies is common and raises costs without improving quality of care. Such excessive use exists within the norms of medical practice and across the spectrum of technologies available to physicians. Physicians' habitual behavior can cause excessive use of medical services. Until recently, medical education trained physicians to do all they could for their patients' well-being without concern for the cost. In response to restraints in their payment, physicians have changed the number and mix of services they provide. The practice of defensive medicine in response to fears of lawsuits may also increase unnecessary use, and thus cost, of medical technologies.

Physician behavior with regard to the use of medical technologies may be modified by financial incentives, educational programs, utilization review programs, and other programs such as second surgical opinion programs. Studies show that the results of different programs and interventions vary both in effectiveness and longevity.

Changes in physician payment methods can also influence physicians' incentives for the use of medical technologies. Physicians who are paid on a fee-for-service basis have financial incentives to see more patients more often and provide more technologies. Physicians (or practice plans in which they participate) paid on a per capita basis have financial incentives to increase the number of their patients but to keep the number of patient visits low (or nonexistent) and to use particularly low-cost technologies. The financial incentives under a fee schedule system depend on the particular type of schedule adopted. Under fee schedules based on patient visits, physicians have incentives to schedule more visits but disincentives to use a large number of technologies (particularly those whose costs are high in relation to the fee per visit received). Under fee schedules based on episodes of illness, physicians have incentives to treat for more episodes but to keep patient visits for each episode and the use of costly technologies at a minimum.

Most changes in Medicare physician payment methods would necessitate a reformulation of the diagnostic and procedural codes for physician services that are currently used by the program. The present coding system makes it fairly easy for physicians to adopt and use medical technologies. Furthermore, the large number of procedural codes makes it fairly easy for physicians to bill for expensive services and to make expensive coding errors.

Changes in Medicare's physician payment methods that could help contain costs for the Medicare program by influencing the adoption and use of medical technologies are of two general types. One is requiring patients to assume more responsibility for their health care costs, either through increases in beneficiary cost-sharing or a reduction in the types of benefits Medicare covers. It should be noted, however, that elderly beneficiaries already have greater out-of-pocket expenses than the younger population, and increased cost-sharing may reduce their access to health care. The second type of change involves restraining the amount *or* changing the methods of Medicare payment to physicians (e. g., by fee schedules or freezes on current fee levels), Either approach could result in cost savings for the Medicare program, but each would have different effects on the adoption and use of medical technologies and on access to medical care by Medicare beneficiaries. Changing Medicare's claim-by-claim voluntary physician assignment policy[11] would

[11] Medicare permits physicians the option of being paid directly by Medicare, called "accepting assignment, " or being paid directly by the patient. If a physician does not accept assignment, the Medicare reasonable charge, which is paid directly to the patient, may be less than the physician's actual charge, and the patient is responsible for the difference between the two.

strengthen the implementation of the other changes, although it might discourage some physicians from treating Medicare patients.

Alternative Approaches to Changing Incentives for Medical Technology Adoption and Use

Alternative approaches that could be used by Medicare to foster the appropriate adoption and use of medical technologies, and ultimately save costs, include two general policy mechanisms: 1) methods to foster competitive behavior by providers, and 2) administrative changes in Medicare. These mechanisms include changes involving the general health care system that Medicare could embrace and changes in the structure of the Medicare program itself.

It is generally believed **that increases in the costs of the Medicare program and of the overall health care system can be contained by the rational adoption and use of medical technologies, which includes using technologies in appropriate settings. An important method of stimulating such adoption and use is to foster competitive behavior by providers.** In most **cases,** it is through policies encouraging the use of alternative sites and organizations for health care delivery that competitive behavior is expected to occur. Alternatives to fee-for-service, solo physician office practices and traditional inpatient hospital settings include site alternatives, such as freestanding ambulatory surgery centers, emergency care centers, hospices, hospital outpatient departments, home health care, and nursing homes; and organizational alternatives, such as health maintenance organizations, the use of primary care gatekeepers, and preferred provider organizations.

PIoto credit" National /Institutes of Health

Home health care **as** a substitute for an extended hospital stay may be underutilized

Long-range cost containment in the Medicare program is constrained by the kinds of health care delivery systems available and the limited influence that Medicare financing can have on the settings of care and kinds of technologies provided. In recent years, the Medicare program has granted exceptions to specific alternative sites of care (e.g., freestanding ambulatory surgery centers) and encouraged the demonstration and evaluation of alternative organizations for health care delivery (e.g., preferred provider organizations). Thus, Medicare's efforts in developing competition with the types of care predominantly available have been to identify and encourage other types of provider practices and modes of delivery. In the long run, it is hoped, alternatives of these types will lead to cost-effective health care.

A complementary approach to increasing competition among providers involves moving from the current Medicare program structure to making available other types of health insurance coverage to beneficiaries. The most discussed possibility is the use of vouchers, wherein Medicare beneficiaries would receive a specified amount of money to purchase health insurance from the marketplace instead of participating in the traditional Medicare program. Important decisions regarding competition for policymakers in the Medicare program are: 1) the relative emphases to be placed on the insurance versus the alternative delivery systems approach, and 2) the pace of adopting the various competitive approaches into Medicare. To increase the capability of Medicare to embrace competitive approaches, the program could undergo an administrative change—merging Parts A and B. Merging the two parts could alleviate the financial problems of the Medicare program and improve the quality of care for patients.

POLICY OPTIONS

The final chapter of this report presents policy options for congressional consideration. Rather than to recommend specific actions, OTA'S policy is to provide Congress with a series of alternative actions and discussions of the possible consequences of implementing them. The policy options in this report are organized by the following issue areas:

- How can the Medicare coverage process for specific technologies be improved?
- How can Medicare's hospital payment system incorporate appropriate incentives for generating effective and efficient adoption and use of technology?
- How can Medicare's physician payment method be used to improve incentives for appropriate technology adoption and use?
- What broad approaches, other than those directly involving Medicare's payment mechanism, could be used by Medicare to encourage the appropriate adoption and use of medical technology?

Findings and options related to each issue are presented in chapter 9.

Part One