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Medicare Policies Affecting Medical Technology

Life can only be understood backwards, but it must be lived forwards.
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INTRODUCTION

Because of its size and scope and because other third-party payers often follow its example, the Medicare program is a major force in the structure and performance of the U.S. health care system. Medicare currently accounts for more than 35 percent of national health spending for hospital care and more than 18 percent of national spending for physicians' services (135). Furthermore, in fiscal year 1984, program spending is expected to increase by 16.3 percent to \$66.5 billion (340). Medicare's policies and procedures affect all aspects of health care delivery in the United States, including financing, administration, organization, and personnel. Medicare also affects the content of U.S. health care by its influence on the development and diffusion (i. e., adoption and use) of medical technology.

Despite its importance, however, the Medicare program is only one of many institutions that affects the development and diffusion of medical technology. Other institutions that affect the direction and pace of technological change include Federal agencies such as the National Institutes of Health and the Food and Drug Administration

(FDA), as well as private organizations ranging from manufacturers of drugs and devices, hospitals, private insurers, and professional medical societies.¹ Some programs, such as the certificate-of-need program, have been enacted to influence medical technology but have not had the intended impact.

This chapter analyzes the extent and limits of Medicare's contribution to the development and diffusion of medical technology. It begins by describing a model of the process of technological change and then considers the effects on this process of Medicare's eligibility, benefits, and payment (including beneficiary cost-sharing) policies. The effect of medical technology on Medicare costs, another important interaction between Medicare and medical technology, will be considered in chapter 3.

¹ For an analysis of public and private sector roles in the development and diffusion of medical technology, see earlier OTA reports, including *Strategies for Medical Technology Assessment* (359) and *The Impact of Randomized Clinical Trials on Health Policy and Medical Practice* (352), as well as *Toward Rational Technology in Medicine* by H. D. Banta, C. J. Behney, and J. S. Willems (241).

DEVELOPMENT AND DIFFUSION OF MEDICAL TECHNOLOGIES²

Broadly defined by OTA, medical technologies are the drugs, devices, medical and surgical procedures used in medical care, and the organizational and supportive systems in which such care is provided (341). In the past few decades, numerous and impressive changes have been made in the types of medical technology available to the

health care system. In the case of drugs, devices, and procedures, many new technologies, new uses of established technologies, and improvements on technologies have been developed and marketed. Furthermore, sophisticated managerial technologies, such as computer-based hospital information systems, are being purchased and used with increasing rapidity. Alternatives to the traditional modes and sites of health care delivery—the hospital and the physician's office—that have proliferated recently include a variety of alternative organizational arrangements, including hospital

² The development and diffusion of medical technology are described in detail in previous OTA reports, including *Assessing the Efficacy and Safety of Medical Technologies* (341) and *The Impact of Randomized Clinical Trials on Health Policy and Medical Practice* (352).

chains, hospital management corporations, free-standing emergency care centers, and ambulatory care centers (see ch. 8).

The process of technological change occurs in two stages: the development of a technology and the subsequent diffusion of the technology into medical practice (24). This process may be divided into sequential steps within the developmental and diffusion stages for the purpose of analysis, as shown in figure 1. But the process of change is often less linear and systematic than the generalized version depicted in the figure.

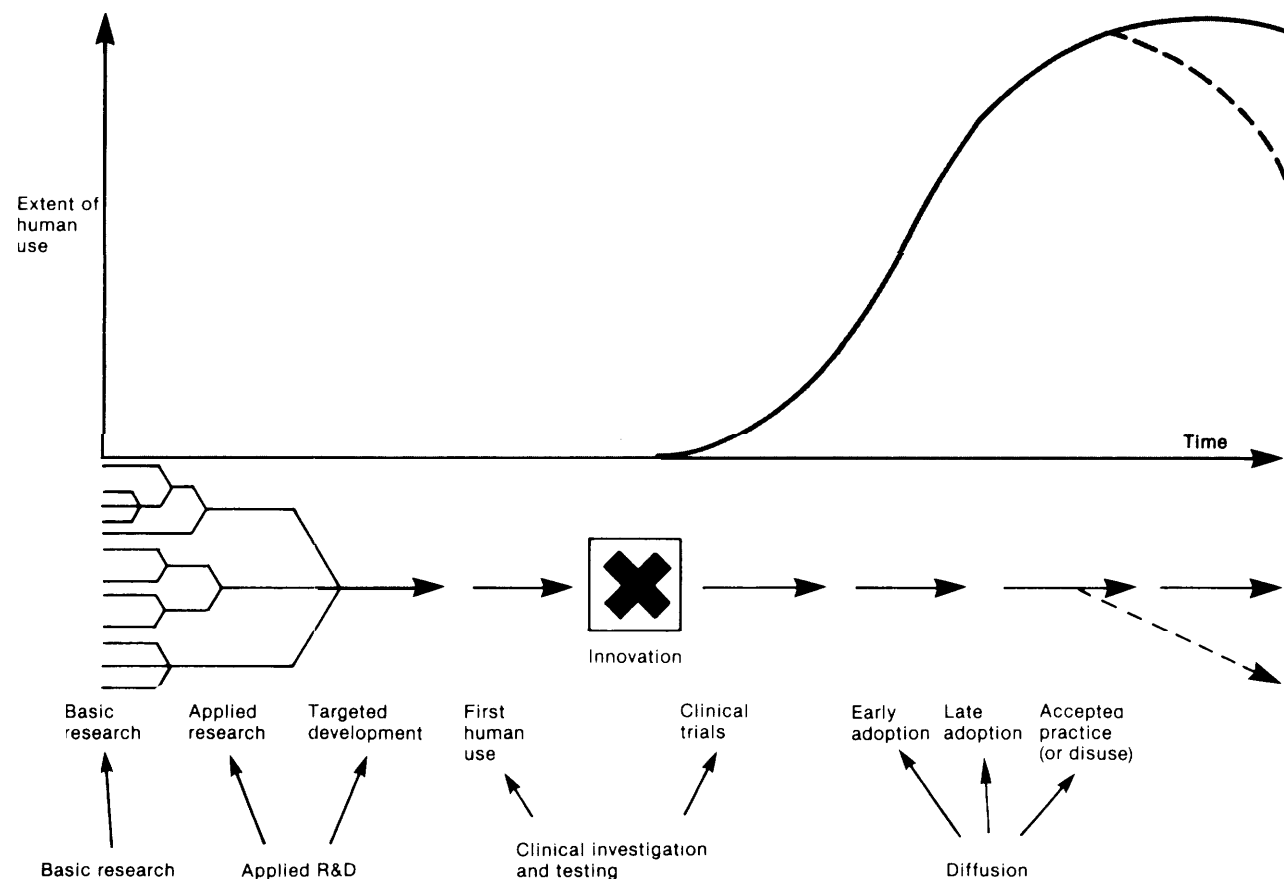
The development of medical technology occurs in various sites and with a variety of funding sources, depending on the type of technology. While most of the basic biomedical research and some applied research and technology develop-

ment in this country is funded by the Federal Government, the greatest portion of applied research and technology development is funded by private industry. Much of modern medical technology is a combination of drugs, medical devices, and human skills, and its development is very complex and not well understood.

The role of Medicare and other payment systems in the development of drugs, devices, and procedures has received little study.³ In theory, however, payment systems can influence the development of some types of technology that are produced by the private sector. In order for a private firm to justify committing funds for the

³The forthcoming OTA report, *Federal Policies and the Medical Devices Industry* (345), will provide information on the role of payment systems in the development of medical devices.

Figure 1.—A Model for the Development and Diffusion of Medical Technologies



SOURCE: Office of Technology Assessment.

research and/or development of a potential new medical device, for example, the firm must perceive the existence of a market for the innovation (345). A **payment** system that favors the adoption of new devices would help a firm make a decision to proceed with development. The development of technologies such as hospital information systems may be subject to market influences as well. Theoretically, Medicare's new inpatient hospital payment system mandated by the Social Security Amendments of 1983 (Public Law 98-21) should stimulate the development of new hospital information technologies. It is clear that payment systems have played an important part in the development of some new organizational patterns of medical care such as preferred provider organizations or multihospital systems (325).

The *diffusion* of a medical technology into the health care system has two phases: the initial phase in which decisions are made to adopt the technology, and a subsequent phase in which decisions are made to use the technology (24). Adoption has been studied far more by researchers than use has and has also been the subject of much greater direct involvement by the Government (24). Decisions to adopt medical technology within organizations such as hospitals are made by physicians, hospital administrators, and purchasing departments. Decisions about using technology are primarily made by physicians, although patients' decisions are also important. The use of a technology is obviously dependent on its adoption. The exact relationship between the two phases, however, has not been established.

Before *adoption* (or rejection) can occur, knowledge about a technology must be communicated to potential adopters (24). One focus of

studies on the adoption of medical technology, therefore, is how knowledge about technology is communicated. Research on communication about drugs has led to the description of a two-step model. The first step is the flow of information from industry to those physicians who are opinion leaders. The second step is the transfer of information from the physician opinion leaders to their followers through informal channels (324). Recent research on the adoption of hospital information systems found a similar two-step model (16).

Another focus of studies on the adoption of medical technology is on the factors influencing adoption. Such factors include the characteristics of the technology (e. g., the complexity of understanding and using it), the characteristics of the adopter (e. g., level of training in the case of physicians, organizational structure in the case of hospitals), and characteristics of the environment (24). Third-party payment, including Medicare payment, is one of the environmental factors affecting medical technology adoption. Third-party payers pay more than 90 percent of all hospital expenditures, thus facilitating the adoption of costly hospital technologies (24).

The factors affecting the *use* of technology include physician training, increasing physician specialization, concerns about malpractice suits, industry promotion of its products, the organization of medical care, and payment for medical services (24). Unfortunately, however, the degree of their influence is not known. How physicians behave in their use of medical technologies and how payment methods and other characteristics of the health care system influence their behavior are questions addressed in chapter 7.

OVERVIEW OF MEDICARE POLICIES THAT AFFECT MEDICAL TECHNOLOGY

The principal intent of the 1965 legislation that established Medicare *under* Title XVIII of the Social Security Act (Public Law 89-97) was to increase elderly persons' access to medical services by removing financial barriers to such services, particularly to needed hospitalization (317). In

1965, there was less concern about the cost of the services than there was about the problems of access, primarily because there was little reason for concern. After the inception of the program, however, the costs of Medicare escalated dramatically, as did all health care costs. Thus, most of the

Medicare legislation enacted after 1965, with the exception of laws increasing the numbers and kinds of populations eligible for Medicare (see section on eligibility), has been passed with the intention of holding down Medicare's cost increases (see table 1). Efforts to control costs to date have met with little success.

One of the factors that contributes to Medicare costs and to health care costs as a whole is the adoption and use of medical technology. How the adoption and use of medical technology influences the cost of the Medicare program will be discussed in chapter 3. This chapter provides an overview of Medicare's eligibility, benefits, and payment (including beneficiary cost-sharing) policies and briefly describes the influence of each of the policies on the adoption and use of medical technology.⁴

Eligibility

To increase elderly persons' access to mainstream health care services, the Medicare law mandated eligibility for insurance benefits, including specific technologies, for most Americans 65 years and over. Eligibility was extended to disabled persons and most persons with end-stage renal disease (ESRD) on July 1, 1973, by the Social

⁴As noted in ch. 1, "medical services" is often used interchangeably with "medical technology" in this report.

Table 1.—Limitations Placed on Medicare Payment Levels

Public Law 92-603 (Social Security Amendments of 1972):

- Limits on hospital routine operating costs
- Use of a Medicare Economic Index in limiting rises in physician fees
- Authority for prospective reimbursement experiments
- A Professional Standards Review Organization to review medical necessity of services

Public Law 97-35 (Omnibus Reconciliation Act of 1981):

- Limitation on Part B premium increases suspended for 1 year so that premiums could be increased to comprise 25 percent of Part B costs

Public Law 97-248 (Tax Equity and Fiscal Responsibility Act of 1982):

- Per case limit on operating costs in hospitals, with potential to keep some of the savings as an incentive
- Extension of limits on hospital routine operating costs to ancillary services

Public Law 98-21 (Social Security Amendments of 1983):

- Diagnosis Related Groups (DRGs) for hospital payment

SOURCE: Office of Technology Assessment

Security Amendments of 1972 (Public Law 92-603). Largely because of increases in the number of Americans who are 65 and over, the size of the Medicare population has increased substantially since the program's inception (see table 2). This trend is expected to continue.

As of July 1, 1982, Medicare beneficiaries numbered close to 30 million people, about 12.7 percent of the U.S. population. Because of the size and characteristics of the population eligible for Medicare benefits, there is a substantial market for medical technology. By definition, Medicare enrollees are either aged or disabled and thus are disproportionately high users of health services in general and of medical technology in particular (see ch. 3). Elderly people represent **90 percent of Medicare beneficiaries (see table 2). Chronic conditions, most often conditions of middle and old age, require medical services for** long periods of time (273). The elderly population visits physicians and uses hospitals and nursing homes (organizational medical technologies) much more often than the younger population (194). In 1982, for example, people aged 65 or over represented only 11 percent of the noninstitutionalized population but accounted for 29.8 percent of the hospital short-stay days of care (408). The older the elderly individual, the more health care services are provided, particularly hospitalization and skilled nursing care (328). And the proportion of older individuals in Medicare's elderly population is increasing. In 1966, 37 percent of Medicare's elderly enrollees were **75 years or older; in 1981, however, the figure was 41 percent (328).**

Disabled people represent only 11 percent of Medicare enrollees (see table 2). Nevertheless, their eligibility for Medicare benefits has affected Medicare expenditures for services (328). The Congressional Budget Office estimates that in 1984, Medicare payment for a disabled person will be \$2,136, while payment for an elderly enrollee will be \$1,773 (328). The patterns of use of health care services by the disabled, however, have not been studied (328).

People with ESRD require some form of dialysis or kidney transplants to prolong their lives. Medicare's ESRD population represents 0.26 percent of Medicare enrollees (see table 2). An estimated 93 percent of the U.S. population with ESRD is

Table 2.—Number of Elderly and Disabled Beneficiaries Enrolled in Medicare by Type of Coverage, Selected Years From 1966 to 1982

Enrollment year ^a	Total number of Medicare beneficiaries	Number of elderly ^b beneficiaries	Number of disabled ^c beneficiaries	Number of elderly and disabled beneficiaries with ESRD ^d
1966	19,108,822	19,108,822	—	—
1973	23,545,363	21,814,825	1,730,538	NA ^e
1974	24,201,042	22,272,920	1,928,122	18,564
1979	27,858,742	24,947,954	2,910,788	60,608
1982	29,494,219	26,539,994	2,954,225	76,117

^aEnrollment year begins July 1^bAll beneficiaries aged 65 and over, including those with end-stage renal disease^cAll beneficiaries under age 65, including those with end-stage renal disease^dEnd-stage renal disease^eNA — information not available

SOURCE U S Department of Health and Human Services, Health Care Financing Administration, *1966-1979 Data* Notes Persons Enrolled for Medicare, 1979, HCFA Publication No 03079 (Baltimore, Md HCFA, January 1981); and H A Silverman, Medicare Program Statistics Branch, Health Care Financing Administration, personal communication, August 1983

enrolled in Medicare (195). Thus, Medicare policies can be clearly identified as a major influence on the diffusion of the technologies used in the treatment of this disease. The effects of Medicare benefits and payment policies in this area are discussed further below.

Benefits

Title XVIII of the Social Security Act specifies the broad categories of benefits for which the Medicare program will pay under the two parts: Part A, Hospital Insurance, and Part B, Supplementary Medical Insurance.⁵ Part A's primary purpose is to provide insurance against the costs of inpatient hospital care. Other benefits include payment for post-hospital extended care services, home health services, and, as of April 1, 1982, inpatient alcohol detoxification services (see table 3). Part B covers medically necessary physician services, outpatient hospital services, outpatient physical therapy and speech pathology services, and various other limited ambulatory services and supplies, such as prosthetic devices⁶ and durable medical equipment (see table 3). Part B also covers home health services for those Medicare beneficiaries who have Part B coverage only. Part A is an entitlement program and is available with-

out payment of a premium to those eligible.⁶ Participation in Part B is voluntary and requires payment of a monthly premium.⁷ Except for individuals who choose not to participate in Part B, premiums are deducted automatically from social security checks. In 1982, 99 percent of the elderly and 92 percent of the disabled people enrolled in Part A were also enrolled in Part B (328).

Although Medicare pays for a wide variety of services in a variety of settings, Medicare's benefit package is concentrated primarily on acute care technologies provided in institutional settings, particularly those provided as inpatient hospital services. Of Medicare's \$52.2 billion in payments for 1982, \$34.6 billion (66.3 percent) was for inpatient hospital services (135,151). In 1978, Medicare paid for almost 75 percent of the elderly's hospital bills; other public sources paid for almost 13 percent, and the remaining 12 percent was paid for by private health insurance (7 percent) or directly by the patient (5 percent) (124). Medicare's impact on hospital use can be seen from examining hospital discharge rates. From 1965 to 1982, the discharge rate for persons 65 years and over (i. e., Medicare beneficiaries) from acute care hospitals increased 36 percent. The discharge rates for other age groups during the same period, how-

⁵The Medicare law specifies broad categories of services, such as hospital inpatient services, that the program will pay for or "cover." It also lists a number of specific services that it will not cover. HCFA or Medicare contractors decide the coverage status of particular technologies not mentioned in the legislation. For a full discussion of coverage policy for such specific technologies, see ch. 5.

⁶Individuals not eligible for Part A include those who work for a nonprofit organization that has chosen not to join Social Security, those who work for a foreign employer overseas, the President of the United States, and others.

⁷The Part B premium was \$14.60 month as of Jan. 1, 1984, and is due to increase on Jan. 1, 1985.

Table 3.— Medicare Benefits and Limitations, as of January 1984

Kind of care	Medicare pays	Beneficiary pays	Comments
Part A			
Hospitalization	1.60 days 61-90 days 91-150 days After 150 days— no coverage	Initial deductible (\$356) Daily copayment (\$89) Daily copayment (\$1 78)	Deductible and copayments are adjusted annually 150 days of coverage includes a lifetime reserve of 60 days that can be used only once
Psychiatric Skilled nursing facility ^a	Same as hospitalization 1-20 days 21-100 days After 100 days—no coverage	Same as hospitalization Nothing Daily copayment (\$45)	Only 190 days of coverage, usable only once
Home health services ^b	Unlimited visits Reasonable costs	Nothing	Beneficiary must be eligible for Part A
Part B			
Home health services	Unlimited visits Reasonable costs	SMI basic premium= \$14 60/mo Nothing	Beneficiary eligible for Part B only
Physician and other medical services	800% of approved charges after deductible is met	Initial yearly deductible (\$75)	—
Immunizations	Pneumococcal vaccine and those required for treatment and ordered by physician	Deductible does not apply	—
Chiropractors' services	Manual manipulation of the spine	All other costs	
Most routine foot care	Nothing	All costs	
Dental care	Jaw surgery and setting	All other costs	
Dentures	Nothing	Total costs	
Hearing and eye exams	Nothing	Total costs	
Eyeglasses and hearing aids	Nothing	Total costs	—
Routine physical exams	Nothing	Total costs	
Prosthetic devices	Those needed to substitute for an internal body organ, i.e., heart prostheses. Also artificial limbs and eyes, arms, legs, back, and neck braces	All other costs	
Durable medical equipment	If rented, help with approved charges, if bought, monthly payments until Medicare's share is paid or equipment no longer necessary. If equipment is for long term use, payment is made in a lump sum		—
Medical supplies	Dressings, splints, and casts	All other costs (i.e., common first aid supplies)	
Blood	For all but first three pints	First three pints or replacement	
Outpatient mental illness	\$250/yr	All costs above \$250/yr	
Outpatient physical therapy or speech pathology	As treatment In doctor's office, 80% of approved charges after deductible From physical therapist, \$400/yr maximum From clinic, home health agency, or other agencies, 80% of approved charges after deductible	\$75 deductible 20% coinsurance All costs above \$400/yr \$75 deductible 20% coinsurance	—
End-stage renal disease treatment	80% of approved charges. Hospital outpatient dialysis \$131, treatment Independent clinic dialysis: \$127/treatment Home dialysis \$127/treatment	\$75 deductible, 20% coinsurance	Coverage ends 12 months after the month maintenance dialysis treatment stops or 36 months after month of kidney transplant
Hospice	Prospectively per day, the following —Routine home care ..\$4625 —Continuous home care ^c Total cent care rate \$35867 For 8 hrs cent care 11956 Hourly rate 1494 — Inpatient respite rate 55.33 —General inpatient care rate 27100	5% of cost to program for —Drugs and biologicals (per drug) (not to exceed \$5 per prescription) —Inpatient respite care (per day) (not to exceed inpatient hospital deductible)	Beneficiary also pays Medicare deductibles and coinsurance payments, and the difference between reasonable and actual charges on unassigned claims for covered services other than hospice care. Hospice coverage consists of two 90-day periods and one 30-day period, to be taken in that order

^aCoverage for skilled nursing facility services was limited to only 9.1 enrollees per 1,000 in 1980 (*Medicare and Medicaid Data Book*, 1983).^bCoverage for home health agency services was limited to only 33.6 enrollees per 1,000 in 1980 (*Medicare and Medicaid Data Book*, 1983).^cRespite care is defined in the regulations as short-term (not reimbursed after 5 days) inpatient care provided to the individual only when necessary to relieve the family members or other persons caring for the individual during period of hospice election.

Data Sources:

1. U.S. Department of Health and Human Services, Health Care Financing Administration, *Your Medicare Handbook*, January 1983 edition, SSA publication No. 05-10050 (Baltimore, Md.: Social Security Administration, January 1983).
2. *Federal Register*, 48(243):56008, Dec. 16, 1983.
3. *Federal Register*, 48:21254-21291, May 11, 1983.
4. U.S. Department of Health and Human Services, Health Care Financing Administration, Division of Public Information, personal communication, Jan. 23, 1984.

SOURCE: Office of Technology Assessment.

ever, either decreased, remained the same, or increased slightly (see ch. 3).⁸

Medicare's benefit policy has favored the development of some technologies in an inpatient setting. For example, Medicare coverage emphasizes treatment for alcoholism provided in traditional acute care institutional settings, rather than that provided in the freestanding inpatient alcoholism facilities that have developed over the last 15 years or in outpatient alcoholism treatment centers. As a result, a substantial network of inpatient alcoholism treatment facilities has developed, despite evidence that outpatient treatment may be as effective and certainly is less costly (348).⁹

Since Medicare's enactment, practically all of the Nation's elderly have gained access to services provided in hospitals and to a lesser extent to services provided in ambulatory settings (81). Some analysts contend that the quality of life for Medicare beneficiaries has improved with access to inpatient hospital services such as surgical services. The frequency of certain surgical procedures that improve the functional status of the elderly, such as cataract operations and arthroplasty,¹⁰ has increased dramatically as a result of Medicare (91, 92). Furthermore, U.S. mortality rates, which had been reaching a plateau in the early 1960's, resumed their decline in the 1970's (406). From 1968 to 1977, death rates for elderly men declined at an average annual rate of 1.5 percent and for elderly women at an average annual rate of 2.3 percent (406). The decline in U.S. death rates is almost twice the decline in Canada and European rates over the same period (81). The beginning of the sharp decline in mortality rates among older people in the United States was coincident with Medicare's enactment. Some analysts have attributed the decline to improved medical care treatment (284), and more specifically, to the services available under the Medicare program (92).

⁸This example illustrates the increase in hospital services for elderly people relative to the general population. It does not, however, demonstrate an increase in hospital services relative to outpatient care.

⁹*The Effectiveness and Costs of Alcoholism Treatment* OTA Health Technology Case Study #22 [348], analyzes the reimbursement issues concerning the treatment of alcoholism in depth.

¹⁰Arthroplasty is plastic surgery of a joint or joints or the formation of movable joints.

At the same time that the *mortality rates* from many diseases, including heart disease and diabetes, have been falling among the elderly, however, the *prevalence* of such diseases has increased. The reason may be that improved medical treatment of acute episodes of these conditions decreases mortality rates and thereby increases the prevalence of these conditions as chronic illnesses. The prevalence of other major illnesses—atherosclerosis, cancer, emphysema, cirrhosis, osteoarthritis—has also increased among the elderly (128). Chronic conditions require long-term care more than episodic acute care. Long-term care for the elderly requires social services as well as health services. Indeed, there is a school of thought that considers medical services to have a subsidiary role in long-term care (137). Thus, the most appropriate role of Medicare, a health insurance program, with respect to chronic conditions and long-term care is a matter of debate.

Medicare's benefits do not include all health-related services. Section 1862 of Title XVIII of the Social Security Act specifies that, notwithstanding other provisions of the title, "no payment may be made under part A or part B for any expenses incurred for items or services . . . which are not reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member." Section 1862 specifically excludes Medicare coverage of many preventive services (including routine physical checkups; eyeglasses and examinations for the purpose of prescribing or fitting eyeglasses; hearing aids and examinations for hearing aids; and immunizations other than pneumococcal vaccinations, which were added as a benefit in 1981), custodial care, most cosmetic surgery and dental services (except for special cases that require hospitalization), personal comfort items, and orthopedic shoes.

In part because of funding disapprovals by Medicare and other third-party payers, assistive communication devices, used in the rehabilitation of persons disabled by severe speech impairments, are little used (351). Although Medicare covers such devices under Part A (i. e., for use only while

¹¹See the forthcoming OTA report *Technology and Aging in America* (summer 1984) for a detailed discussion of long-term care including technology and financing issues.

the person is actually in the hospital) so as to **enable nonvocal patients to communicate with hospital and skilled nursing facility staff (351), it does not cover these devices under Part B because of an administrative decision that the devices are not prosthetic devices needed for the functioning of a malformed body member. Not only has sales volume** been lower than anticipated, but innovations in the field appear to have been held back, in part, by the lack of coverage by Medicare and other insurers (351).

Clearly, many medical technologies have been developed and diffused without Medicare coverage. One example is eyeglasses and vision aids. In 1977, among those 65 years of age and older, 193 per 1,000 population purchased glasses or contact lenses or had them repaired. The major source of payment, 78.8 percent, was the family (394). Whether there would be greater adoption and utilization by the elderly of vision aids such as eyeglasses and contact lenses if the technologies were covered by Medicare is not known.

Payment

For many years, reimbursement by Medicare has been based on reasonable costs in the case of hospitals and other institutional providers and reasonable charges on a fee-for-service basis in the case of physicians and other noninstitutional suppliers of services. Under these payment methods, providers receive greater reimbursement when they use more technology, so they have little financial incentive to use technologies judiciously, with consideration of their costs and benefits. In particular, cost-based reimbursement policy has been instrumental in facilitating the acquisition by hospitals of sophisticated, capital-intensive technology (24),

In an attempt to change the financial incentives to provide hospital care, the Social Security Amendments of 1983 (Public Law 98-21) changed the basis of Medicare payment for inpatient hospital services from retrospective cost-based reimbursement to prospective payment based on Diagnosis Related Groups (DRGs).¹² The DRG

prospective payment system does not apply to all hospitals or to many other segments of the health care delivery system. The system is still being implemented, and it is too early to evaluate its effects. Medicare's method of paying physicians and other noninstitutional suppliers of services on the basis of reasonable charges has changed little since Medicare was enacted.

Payment for Hospital Services

Box A describes Medicare's traditional method of payment for hospital services. The Medicare law passed in 1965 specified that Medicare pay hospitals the reasonable cost of providing services to beneficiaries. The method or methods to be used in determining reasonable cost were left to administrative decisions. Since Medicare purchased only a portion of each hospital's costs, the costs attributable to Medicare patients ("allowable costs") had to be calculated. Like Blue Cross, Medicare adopted a method that allowed hospitals considerable discretion in calculating attributable costs (104). Under Medicare's cost-based payment method applied to inpatient services, there was no financial reason for a hospital not to spend money on technology, because it was assured of reimbursement.

There have been a number of changes in the rules and guidelines in attempts to moderate Medicare's hospital expenditures, but such attempts have had only qualified success. Until 1982, the single most important innovation in the Medicare hospital reimbursement system was the 1974 implementation of "Section 223" limits (see Box A). Although the objectives of Section 223 were to moderate the rate of increase in Medicare's hospital outlays (362), the results were disappointing. The new limits affected only a few high-cost hospitals and were relatively easy to circumvent by reclassifying formerly routine services into ancillary (and therefore chargeable) items. Section 223 limits may also have encouraged the spread of intensive care unit beds (32). The limits may have encouraged hospitals to increase lengths of stay. Finally, the limits never pertained to capital costs (depreciation, interest, and in the case of for-profit hospitals, return on equity). Hospitals were paid depreciation based on actual historical expenditures and interest payments as incurred.

¹²See discussion section for an overview and ch. 6 for a detailed discussion of Medicare's current hospital payment system and its expected effects on medical technology.

Box A.—Retrospective Cost-Based Reimbursement to Hospitals Under Medicare

Under Medicare's traditional hospital payment method, which is currently being replaced by DRG payment, hospitals are to be reimbursed the necessary costs incurred in the support of patient care facilities and activities for Medicare beneficiaries. * Each hospital is required to submit to Medicare through local contractors known as intermediaries a cost report with the *full* costs of each revenue-generating department. Allowable costs (i.e., costs Medicare will pay for) are determined by:

1. calculating a ratio of Medicare beneficiary charges to total patient charges for each ancillary department in the hospital and then applying this to total allowable charges to determine Medicare's share;
2. calculating a separate average per diem cost for general routine services and for each special care unit in the hospital; and
3. calculating Medicare costs for malpractice insurance and self insurance fund contributions and summing the calculations.

Medicare intermediaries audit the cost reports to determine whether the costs are allowable (340). In verifying whether a cost is allowable, the intermediaries employ the "prudent buyer" principle, i.e., the costs should not exceed what a prudent and cost-conscious buyer would pay for a given item or service.

In addition to operating costs, allowable costs include the depreciation cost on buildings and equipment used to render care covered by Medicare. Depreciation is based on the original cost of the building or equipment with special rules in place for assets purchased before 1966. Medicare does not require hospitals to set aside the amount allowed for depreciation to replace the depreciated asset (funding of depreciation). Other allowable costs are the interest on current and capital indebtedness, the net cost of approved educational activities, and the return on equity capital of for-profit hospitals. Bad debts, charity, and courtesy allowances for the most part are not allowable costs. Research costs that are over and above those related to usual patient care are among other categories of costs excluded from allowable costs.

The Social Security Amendments of 1972 (Public Law 92-603), among other things, imposed caps known as "Section 223 limits" on allowable inpatient operating costs in order to moderate the rate of increases in Medicare's hospital outlays. Beginning in 1974, allowable inpatient routine operating costs per patient day were capped by an amount equal to 120 percent of the mean of such costs in a similar group of hospitals. Between 1975 and 1982, the cap was gradually reduced to 108 percent of the mean cost per day in the peer group hospitals.

● This method remains in place for those hospitals not yet under DRG payment and for excluded hospitals and hospital units.

Cost-based treatment of capital costs, which remains to this day, provides no disincentive for hospitals to adopt the capital-intensive technologies that they wish to adopt. The inclusion of depreciation cost as an allowable cost means that the cost of the equipment and buildings is passed through the hospital to the Medicare program. The treatment of capital costs by Medicare has also facilitated the ability of hospitals to borrow capital with little risk. Low-cost borrowing has made it easier for hospitals to purchase buildings and equipment than it would be if the hospitals found it necessary to generate capital for such ex-

penditures internally. Medicare's traditional approach to capital investment is seen in another capital-related provision. Profitmaking hospitals can include a reasonable return on equity (capital invested and used in providing patient care) as an allowable cost. Thus, with limited financial constraints, it has been to some hospitals' advantage to increase their technological capability in response to demand rather than through a process of assessment of need, however defined. Until very recently, the organization of the hospital industry has also provided incentives for technology adoption.

In August 1982, Congress made some major revisions in Medicare's traditional cost-based reimbursement system for hospitals by passing the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) (Public Law 97-248). Among other things, TEFRA imposed a hospital-specific limit on the amount of inpatient operating costs per case that Medicare would reimburse (see Box B). Medicare's inpatient hospital payment method was changed more dramatically when the Social Security Amendments of 1983 (Public Law 98-21) mandated the phasing in over a 3-year period beginning in October 1983 of a new inpatient hospital payment method based on a national set of per case prices for patients in 470 separate DRGs (see Box B). The DRG prices will apply to virtually all short-term acute-care general hospitals in the United States. Capital costs will continue to be paid as under the old system until the end of the transition period. At the time Congress passed the 1983 amendments, it contemplated, but did not specify the method for, the incorporation of payment for capital into the DRG pricing system.

Payment for Physicians' Services¹⁴

Except for the imposition of minor restraints on the rate of increase of physicians' upper limit payment levels, Medicare's method of paying physicians and other noninstitutional suppliers of services for charges on a fee-for-service basis has changed little since Medicare was enacted. Box C provides a description of this payment method. Most charge-based payment by Medicare—over 70 percent in 1982—is made to physicians for care provided in ambulatory and institutional settings (338).

Under Medicare's current method of payment for physician services, most of the charge for a service is passed through to the beneficiary, who, in turn, is protected from some part of the charge by Medicare.¹⁵ This method of physician payment

encourages the use of medical technology by providers, particularly if the charge-to-cost ratio is high. When payment is based on a fee paid for each service, physicians' revenues are determined to a large extent 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).

Medicare's method of paying physicians also gives them an opportunity to acquire and use expensive, technically sophisticated technology in their offices. When a technology is provided as an office service, the physician's capital investment in the technology may be incorporated into the charge to the patient for the service. In 1980, 18.9 percent of the 1,471 operational computed tomography (CT) scanners, were in private offices and clinics (347). At the time, scanners were expensive. Even the so-called lower priced models of head scanners listed from \$95,000 to \$200,000 (347).

Although no payment method automatically provides incentives for one technology over another, any payment method can be structured to do so. The payment levels that Medicare and other third-party payers have established under the charge-based method of paying physicians provide incentives for the use of new and often expensive technologies. As noted in Box C, Medicare carriers refer to relative value systems when establishing charges for new technologies.¹⁶ In most instances, the reimbursable charge was established at an early point in the history of the technology (52). Although later 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 physicians' fee level or Medicare's reimbursement level (235). Furthermore, the payment level that Medicare has established for complex and expensive technology is

¹³See OTA's technical memorandum entitled *Diagnosis Related Groups (DRGs) and the Medicare Program: Implications for Medical Technology* (343) for further discussion of Medicare's new hospital payment system.

¹⁴See ch. 7 for a detailed discussion of physician payment and medical technology.

¹⁵The effect of Medicare's beneficiary cost-sharing policy on technology is discussed in a following section.

¹⁶Relative value systems establish a quantitative but nonmonetary scale on the worth of one procedure as compared to all other procedures (315). For example, if administration of a measles vaccine had a relative value of 2.2 and the conversion factor is 10, then the payer would pay the physician a maximum of \$22 for the immunization.

Box B.—Prospective Per Case Payment to Hospitals Under Medicare

The Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) (Public Law 97-248) made major revisions in Medicare's retrospective cost-based hospital reimbursement system. In addition to extending the existing "Section 223 limits" (see Box A) to include ancillary and special care unit operating costs, TEFRA imposed a hospital-specific maximum limit on the amount of inpatient operating costs per case that would be reimbursed. The new approach, which became effective in October 1982, has two key elements: 1) the limit is determined either by the hospital's own per case cost in a previous year or the average per case cost of similar hospitals; and 2) the hospital stands to gain a small portion of per case savings it can generate. TEFRA put no limit on capital costs (depreciation and interest), direct teaching expenses, or outpatient services. These remained "pass-through" items, i.e., items not subject to the new system's controls.

A more sweeping revision of Medicare's hospital payment system was signed into law in April 1983. The Social Security Amendments of 1983 (Public Law 98-21) mandated the phasing in over a 3-year period of a prospective payment system for inpatient hospital services. Payment is to be based on a national set of per case prices for patients in 470 Diagnosis Related Groups (DRGs). DRGs are a set of patient classes developed to reflect differences in resource needs among different kinds of patients. Several types of hospitals (psychiatric, long-term, children's, and rehabilitation hospitals) and hospital units (psychiatric and rehabilitation units operating as distinct parts of acute care hospitals) are excluded from the prospective payment system and will continue to be reimbursed on the basis of reasonable costs. Capital costs and the costs of direct medical education remain pass-through items.

Under the DRG system, Medicare payment is made at a predetermined, specific rate for each discharge. During the 3-year transition period, which began in October 1983, a declining portion of the total prospective rate is to be based on hospital's historical costs in a given base year, and a gradually increasing portion is to be based on a blend of federally determined regional and national rates. Beginning in the fourth year, Medicare payment for inpatient care will be based on a set of national DRG rates. The price for a DRG will be adjusted for the hospital's urban or rural location and area wage rate. For 1984 and 1985, the prospective payment system must be "budget neutral," i.e., payments may not be greater than nor less than the payments that would have been paid under TEFRA.

The DRG prospective payment system applies to all inpatient discharges from short-term acute care general hospitals in the United States except for a small number of cases (set by statute as 6 percent of the total) with unusually long lengths of stay or high charges. The rate of payment for these "outlier" cases will be increased by the estimated cost of care during the extended stay.

The initial set of DRG prices is based on the 1981 average inpatient operating cost per case for each DRG in a 20 percent sample of Medicare claims. The law requires that the DRG prices be updated regularly in two ways. First, an overall annual rate of increase is applied to all DRGs to keep pace with the general level of inflation and rate of technological change in the economy. Second, the relative weights (i.e., the ratio of one weight to another) must be assessed and recalibrated at least once every 4 years, with the first recalibration scheduled for October 1985. The recalibration must reflect changes in treatment patterns, technology, and other factors that alter the relative use of hospital resources among DRGs. A Prospective Payment Assessment Commission established by the law is responsible for making recommendations regarding the annual payment increase and recalibration and for evaluating any such adjustments made by the Secretary of the Department of Health and Human Services.

Public Law 98-21 requires the Medicare program to participate in any State-legislated alternative prospective payment program that: covers at least 75 percent of the State's population; makes provisions for competitive health plans; assures the Federal Government that access to hospital care for Medicare and Medicaid beneficiaries will not decline; and assures the Federal Government that hospital costs will not be higher under the State program. Thus, it encourages States to experiment with hospital payment systems that cover third-party payers in addition to Medicare and differ from DRG payment.

Box C.—Charge-Based Reimbursement to Physicians Under Medicare

Title XVIII of the Social Security Act specifies that payments for physician services under Part B of Medicare are to be made on the basis of reasonable charges. The criteria for determining reasonable charges are described in both statute and regulations. The criteria are applied by Medicare contractors known as carriers in determining the reasonable charge for each service provided in the absence of unusual medical complications or certain other circumstances.

Medicare carriers maintain records of the services provided and the charges billed by physicians in an area. Then they develop individual and areawide statistical profiles of physician charges. The reasonable charge is the lowest of a physician's actual charge, a physician's customary charge, or the area's prevailing charge. The actual charge is a physician's billed charge for the service provided. The customary charge is the median of the charges filed by a physician during the previous year for the service. Until 1976, the prevailing charge was the 75th percentile of the distribution of customary charges of all area physicians the previous calendar year, weighted by the number of times each physician billed for the service.

The calculation of prevailing charges was changed by the Social Security Amendments of 1972 (Public Law 92-603), which placed limitations on the yearly increases in prevailing charge levels beginning 1976. The amendments established a Medicare Economic Index that limits the rate of increase in physicians' fees to the rate of increase in their costs. Prevailing charges are now calculated by multiplying the 1973 prevailing charges by the current index (35). The index is promulgated annually for the 12-month period beginning July 1.

Prevailing charges vary widely from community to community, and in some areas, different payment levels are calculated and applied to general practitioners and specialists.

When there is no reliable statistical base for determining a physician's customary charge or the prevailing charge for a medical procedure in the area, Medicare carriers may use a relative value system (235). Medicare carriers refer to relative value systems when establishing charges for new procedures, since the systems describe and code particular physician services.

Medicare permits physicians the option of being paid directly by Medicare, called "accepting assignment," or being paid directly by the patient. Assignment is accepted on a bill-by-bill basis. If a physician accepts assignment, he or she bills the program directly and is paid Medicare's reasonable charge. If a physician does not accept assignment, the Medicare charge, which is paid directly to the patient, may be lower than the physician's actual charge, and the beneficiary is responsible for any difference between the two. In all cases, the beneficiary is responsible for 20 percent coinsurance on the reasonable charge (see Box D). The assignment rate has declined from a high of 61.5 percent in 1969, leveling off at about 50 percent (118).

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usually disproportionately high. Relative value scales place higher values on "technology-oriented" procedures and devices than on other services, such as cognitive procedures and office visits (235).

Payment for Treatment of End-Stage Renal Disease

The Social Security Amendments of 1972 mandated payment under Medicare's ESRD program for both hemodialysis and kidney transplantation.

Before the ESRD program was established in 1973, there were few freestanding dialysis centers, and most hemodialysis was performed in hospitals or in patients' homes. The original Medicare regulations pertaining to ESRD included financial disincentives for home dialysis as compared to facility dialysis.¹⁷ By 1977, there were 895 approved

¹⁷For example, out-of-pocket costs were required for home dialysis supplies and equipment, and reimbursement was not provided for the services of a home dialysis assistant nor for renting equipment, ordering supplies, and other bookkeeping requirements. Home dialysis patients also incurred out-of-pocket costs for home modification and higher electric and water bills.

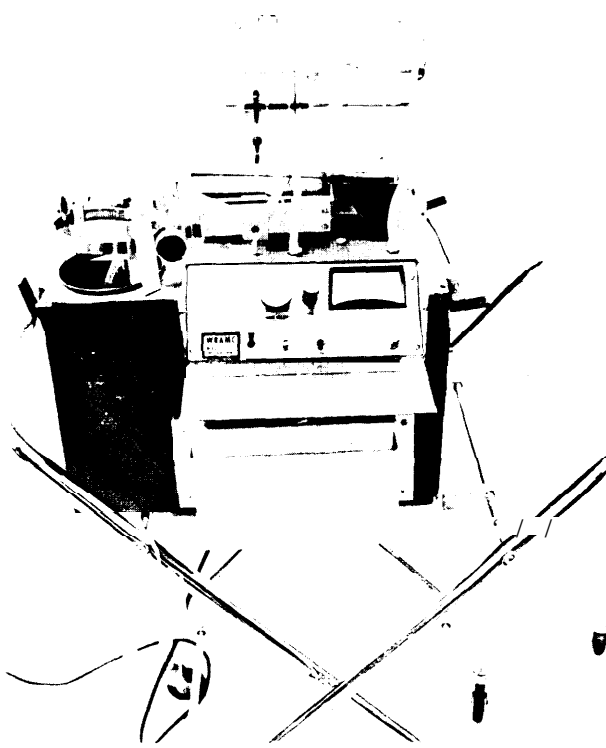


Photo credit: National Kidney Foundation, Washington D. C.

Payment and coverage policies for end-stage renal disease technologies have fostered their use

dialysis centers in the ESRD program (262), and the percentage of patients on home dialysis had decreased significantly (see table 4). Some of the decrease in home dialysis may have been due to the stresses on family life, which led patients to use facility dialysis when Medicare coverage became available. Other factors contributing to the increased use of facility dialysis included the personal philosophy of the physician or hospital treating the patient, increased age and morbidity of dialysis patients that reduced their suitability for home dialysis, and the for-profit status of a significant percentage of dialysis facilities.

The number of patients receiving kidney transplants increased strikingly in 1973 (see table 4). After 1973, the number grew at a slower pace and then plateaued between 1977 and 1978 because of the lack of improvement in graft success rates, a decreased donor pool, and financial disincentives for undergoing transplantation that were in the Medicare regulations. When the financial disincentives, including termination of benefits the 12th month after transplant surgery, were removed in 1978, the number of transplants started to increase (359).

Escalating costs of Medicare's ESRD program were addressed in two revisions to the original

Table 4.—ESRD Patient Population, 1972 to 1982

Year	Number of kidney transplants ^a	Number of hemodialysis patients	Percentage of patients on home dialysis ^b
1972	1,993 (2,852)	10,000	40 %/0
1973 „ „ „ „ „	3,017	11,000	35.9
1974 „ „ „ „ „	3,190	18,875	32.7
1975 „ „ „ „ „	3,730	22,000	28
1976 „ „ „ „ „	3,504	30,131	23.7 (13)
1977 „ „ „ „ „	3,973	32,435	11.6 (20)
1978 „ „ „ „ „	3,949	36,463	12.4
1979 „ „ „ „ „	4,271	45,565	13.0(10)
1980 „ „ „ „ „	4,697	50,000	
1981 „ „ „ „ „	4,885	NA	
1982 „ „ „ „ „	5,358	NA	

^aNumbers in parent thesis reflect conflicting reports in the literature
^bNA—information not available

SOURCE: Office of Technology Assessment, *Strategies for Medical Technology Assessment*, OTA-H-181 (Washington, D.C.: U.S. Government Printing Office, September 1982); and National Kidney Foundation, Washington, D.C., personal communication, Feb. 9, 1984.

law. The End-Stage Renal Disease Program Amendments of 1978 (Public Law 95-292) established a prospective reimbursement method to encourage efficiency and cost effectiveness. To encourage home dialysis by eliminating the 20-percent coinsurance requirement and to avoid high equipment rental payments, one of the provisions provided for reimbursement by Medicare of the full costs (100 percent) of home dialysis equipment, installation, maintenance, and repair.

The Omnibus Budget Reconciliation Act of 1981 (Public Law 97-35) discontinued 100-percent reimbursement for home dialysis equipment but called for further changes to promote home dialysis. Under regulations implementing the law, each dialysis facility receives a certain payment rate per treatment, adjusted for geographic wage differences, regardless of whether the treatment is furnished in the facility or supervised in the patient's home. Dialysis facilities have to accept the prospective payment rate as payment in full. Physicians receive a monthly cavitation payment that is equal for home dialysis and facility dialysis (111).

Financial incentives favoring one dialysis location over another are related to the difference between reimbursement rates and unit costs. The difference between reimbursement rates and unit costs creates strong disincentives for performing hemodialysis in hospital dialysis centers, moderate incentives to perform hemodialysis in independent centers, and very strong incentives for home dialysis supervised by either hospital or independent centers. The strong incentive for home hemodialysis could be moderated somewhat if unit costs rise as a result of the need for more home health aides for sicker patients or those without much family support.

Average physician cavitation fees under the **1983 composite rate formula will increase from \$1,848 per year to \$2,208 per year (+ 19 percent) for home dialysis, and decrease from \$2,640 per year to \$2,208 per year (— 16 percent) for center dialysis. Thus, changes in cavitation rates for physician supervision of dialysis also heavily favor home dialysis over center dialysis (344).**

Beneficiary Cost-Sharing

“In one sense . . . Medicare can be said to have been designed to increase utilization” (318). Yet cost-sharing provisions were included in the original Medicare legislation as a possible moderating influence on the unnecessary utilization of services (322). Box D describes the beneficiary cost-sharing provisions of the Medicare program.

The premise behind deductibles, copayments, and coinsurance is that price deters patients from seeking care and thereby lessens the use of unnecessary services. Furthermore, once beneficiaries decide to seek care, price is considered to influence patients and providers to choose less expensive technologies.

Premium payments, another form of cost-sharing, are not considered an obstacle to the use of services (28,253). premium cost is too far removed from the use of a technology to affect patients' or physicians' behavior at the time of its use.

A number of studies of populations not in the Medicare program suggest that cost-sharing restrains the use of medical services (30,138,244, 245,246,255,259,260,261,299). When beneficiaries must immediately pay for part of the cost of additional services, they choose to use fewer services than when fully insured. Low-income groups, in particular, are deterred from using services as a result of cost-sharing (30,299).

Early results of a large, well-designed and executed study—the Rand National Health Insurance Study (247)—substantiate the above findings. Individuals enrolled in health insurance plans with high coinsurance rates (50 or 95 percent, similar to income-related catastrophic coverage) were less likely than individuals enrolled in plans with no coinsurance or a low coinsurance rate (25 percent) to visit a physician and to be admitted to a hospital. Individuals in plans with higher co-

¹⁸For a general discussion of cost-sharing and the adoption and use of medical technology, see the OTA assessment *Medical Technology Under Proposals To Increase Competition in Health Care* (355).

Box D.—Beneficiary Cost-Sharing Under Medicare

Beneficiaries' expenses in the Medicare program consist of deductibles and copayments under Part A (Hospital Insurance) and premium payments, deductibles, and coinsurance under Part B (Supplementary Medical Insurance). Those over **65** who are not automatically entitled to Medicare (e.g., those who work for a nonprofit organization that has chosen not to join Social Security) can participate by monthly payments of the actuarial cost of coverage.

Part A deductibles and copayments are calculated on the basis of a benefit period (a benefit period begins when a beneficiary enters a hospital and ends when the beneficiary has been out of a hospital or skilled nursing facility for **60** days in a row). During each benefit period, Part **A** will pay for **90** days of inpatient hospital care of which the beneficiary has to pay the first **\$356**. After **60** days of inpatient hospital care, the beneficiary is required to pay a daily copayment of **\$89** until the 90th day of care. If more than 90 days of care are required in any one benefit period, the beneficiary can draw upon a lifetime reserve of **60** days that requires a copayment of \$178 per day. Part A also requires a beneficiary copayment of \$45 per day for the 21st through 100th day in a skilled nursing facility.

Under Part B, the beneficiary is responsible for the first \$75 of approved charges in a calendar year and coinsurance of **20** percent for the remainder of approved charges. If a physician does not accept assignment (agree to accept the level of reimbursement calculated by Medicare in exchange for direct payment of Medicare's 80-percent share), the beneficiary is financially responsible for the difference between the charge billed by the physician and the allowable charge determined by Medicare.

In **1966**, premiums contributed half of Part B revenues, while general revenues subsidized the other half. Subsequent legislation limited increases in the premiums to no more than the percentage increase in Social Security cash benefits. By **1978**, the percent contribution of premiums to meet Part B program costs had fallen to below **25** percent (**134**).

The Omnibus Budget Reconciliation Act of **1981** (Public Law **97-35**) and the Social Security Amendments of **1983** (Public Law **98-21**) suspended the limitation on Part B basic premium increases for the period between July 1, **1983** and **January 1, 1984**. During this period, premiums increased so that they represent **25** percent of program costs. Premiums rose from \$13.50/month on July 1, 1983, to \$14.60/month on January 1, **1984**.

insurance rates also had a lower number of physician visits. There was no significant difference in hospital spending per hospital admission.

Applying results of available studies of cost-sharing on different age and sex groups to the Medicare beneficiaries may not be appropriate. There is evidence that the influence of cost-sharing on hospital use is sensitive to the age and sex of the patient (243). There are crucial differences in health status and health practices between the Medicare population and others. Not surprisingly, even before Medicare was enacted, the elderly used hospitals more than others. For example, from July 1962 to June 1964, those 65 years and older represented 9 percent of the population, but used over 25 percent of hospital days (318).

Little empirical evidence is available on the effects of deductibles, copayments, and coinsurance specifically in the Medicare program on the adoption and use of technology. However, a study of the use of supplementary health insurance by Medicare beneficiaries provides some insight into how Medicare's cost-sharing policy has affected the adoption and use of technology (199). Public and private supplementary (Medigap) health insurance is used extensively by Medicare beneficiaries. In 1976, 63 percent of aged Medicare beneficiaries had some form of private supplementary health insurance and 14 percent had public supplementary coverage, primarily from Medicaid (6 percent had both public and private supplementation). Only 29 percent had no supplementary insurance.

The study found that supplementary insurance increased the use of both hospital and physician services by elderly Medicare beneficiaries (197). Supplementary health insurance greatly increased the use of inpatient hospital services by elderly Medicare beneficiaries with or without chronic health problems. Most of the gains in utilization of hospital services came from the admission of more people into hospitals rather than from increases in length of stay. The investigators suggest that the “Part A deductible (approximately equal to the average charge for an inpatient hospital day) represents a significant barrier to the utilization of hospital services by the elderly” (199).

The effect of cost-sharing under Part B of Medicare on the use of physicians’ services depended on whether the elderly Medicare beneficiary did or did not have a chronic health problem (approximately 78 percent of the elderly Medicare population have a chronic health problem). Part B cost-sharing provisions did not deter individuals with chronic health problems from seeking health care from physicians (199). On the other hand, the Part

B deductible and coinsurance provisions had a decided effect on the use of physicians’ services by elderly Medicare beneficiaries without chronic conditions.

Thus, it appears that cost-sharing under Medicare “leads to significantly lower levels of hospital and physician utilization than would have prevailed in the absence of the program’s deductibles and coinsurance” by some members of the elderly Medicare population (199). The more fundamental question of whether cost-sharing affects the use of necessary services by the elderly requires health status data. A recent Rand study of nearly 4,000 people found that there were only small differences at the end of the study between the health status of those people with “free care” (no cost-sharing) and people who were required to pay a portion of their medical bill (various levels of cost-sharing were aggregated for the analysis) (49). However, the study population was limited to individuals between the ages of 14 and 61 without any disability, making the applicability of its findings to Medicare beneficiaries questionable (270).

DISCUSSION

Medicare policies—payment policies, in particular—have influenced the adoption and use of some medical technologies. Cost-based hospital reimbursement, with pass-through for capital expenditures, has not discouraged hospitals from purchasing new technologies. Payment for physician services and technologies at hospitals and other health care delivery sites provided financial incentives for their use without careful consideration of their impacts on costs.

Medicare payment policies generally have assured hospitals that they would be paid for the cost of new technologies. This assurance has had a direct effect on hospitals’ decisions to *adopt* new technologies. Russell found that adoption of cobalt therapy, for example, was influenced by Medicare (289). In addition, since hospitals have fewer nonpaying patients since the inception of Medicare and Medicaid, they are not losing as much

money to bad debt, so they are better risks for loans. Thus, the presence of Medicare patients also has an indirect effect on hospitals’ decision-making regarding adoption of medical technologies.

The *use* of medical technologies is largely the responsibility of physicians. Under Medicare policies of retrospective, charge-based reimbursement, physicians have had no financial constraints on the number of such technologies provided. Instead, they have known that the hospital gained revenue for each test or procedure, Medicare’s coverage policy excludes payment for items that are “not reasonable and necessary” for diagnosis, treatment, or improved functioning of a malformed body member. This has allowed physicians much flexibility in their medical technology use (see chs. 5 and 7). Under the new Medicare DRG prospective hospital payment system, with

its incentives to reduce ancillary services, hospital administrators will have to work more closely with physicians regarding use of technologies.

It is important to remember that physicians have always been important actors in both the adoption and use of medical technologies. In addition to purchasing new technologies for their office practices, physicians are often the ones who suggest the purchase of new technologies to hospital administrators or boards of trustees. In their decisions, the administrators or boards may consider the importance of the individual physicians in admitting patients and the various specialties competing for the technologies, as well as the cost of the new equipment and its benefits to patients. They also may consider the extent to which the physicians use the technologies already available.

The DRG hospital payment system may change the impact of Medicare on technology. Use of hospitalization and tests and procedures during hospital stays are constrained under the new system.

Efforts to control costs during hospitalizations may extend to the adoption of technologies that will lower hospital costs per case. More technologies may be moved out of inpatient settings to ambulatory settings, where Medicare payment has not yet changed. Such movement depends on the development of specific technologies, also (e. g., those used in freestanding ambulatory surgery centers—see ch. 8).

Thus, the Medicare program has influenced technology adoption and use. Yet, the strength of this influence has been limited by the fact that it is only one payer among several. Where Medicare beneficiaries make up a large portion of the patient population, such as in hospitals, Medicare policies have more impact. Medicare's influence with physicians—because physicians are the strongest factor in technology adoption and use decisions—needs to be strengthened in order to contain program costs and to rationalize technology decisions.