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Health Care Financing and Information Technology: A Historical Perspective

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After reading this chapter, you should know the answers to these questions:

- How did health care insurance contribute to rapid growth in health care spending during the 1970s through the 1980s? What helped to stem the growth of health care spending in the mid-1990s? What new and old causes contributed to accelerated growth again in the late 1990s and early 2000s?
- How has health care financing influenced the development of health care information technology?
- What are health maintenance organizations (HMOs), prepaid group practices, preferred-provider organizations (PPOs), point-of-service (POS) plans, and high deductible plans? How do these groups provide incentives to reduce health care costs?
- How have employers and managed care organizations acted to improve health care quality and to reduce health care spending?
- How have changes in fiscal designs and incentives affected the development and adoption of health care information technology?
- How can health care information systems help health care institutions to respond to the changing financial environment?

23.1 Introduction

Why is a chapter on health care financing and delivery included in a book about computer applications in medicine? In much the same way that financing is an important factor in determining the organization of health care delivery in general, financing may be the single most important driver of developments in the field of health care information.

Fiscal issues have become increasingly important to the study of medical informatics, with growing pressures on hospitals and other health care providers to deliver care more efficiently, to generate and use information more effectively, and to deal optimally with a complex array of reimbursement schemes. Information technology has become an essential part of these functions, and new approaches to collecting and using data and to providing information will have a profound effect on the ability of the health care community to respond to this increasingly challenging financial environment.

In this chapter, we provide an overview of the U.S. health care economy and describe how health care institutions are reimbursed for the services that they provide. We describe how the public and private health care financing and delivery systems have evolved from an era of open-ended spending through a series of attempted public and private reforms in the decades of the 1980s, 1990s, and 2000s to its current financing and organizational forms. The remainder of the chapter explores the relationships among health care finance, health care delivery, and health care information technology. We address the implications of changes in health care financing on health care information technology and how these changes have affected both its introduction and its use. We also examine the implications of new information technology for health care delivery, management, and administrative functions and conclude by acknowledging the challenges health care organizations face in implementing and capturing value from technological innovation.

23.2 The Era of Open-Ended Spending

The period from 1960 to 1980 can be characterized as the era of open-ended financing in health care. During those two decades, national health care spending increased from about \$27 billion to nearly \$250 billion (Table 23.1), from about 5 percent of the gross domestic product (GDP) to nearly 9 percent (Table 23.1). Public-sector spending on health care increased from \$6.6 billion to nearly \$105 billion. Aggregate private health care insurance premiums increased from \$1.2 billion to \$12.1 billion. In this section, we consider the ways in which patients managed to pay for their care as costs soared dramatically during the 20-year period.

Table 23.1. National health expenditures (NHE) by year.^a

Spending category	1960	1970	1980	1990	1993	1999	2000	2001
In billions National health expenditures	26.9	73.1	245.8	696.0	888.1	1219.7	1310.0	1424.5
Public	6.6	27.6	104.8	282.5	390.4	550.0	591.3	646.7
Private	20.2	45.4	140.9	413.5	497.7	669.7	718.7	777.9
Cost of private health insurance	1.2	2.8	12.1	40.0	53.3	73.2	80.7	89.7
As a percentage of the gross domestic product (GDP)								
NHE as percent of GDP	5.1	7.0	8.8	12.0	13.4	13.2	13.3	14.1
Average annual percent change in NHE	—	10.5	12.9	11.0	8.5	5.4	7.4	8.7
GDP	\$527	\$1,040	\$2,796	\$5,803	\$6,642	\$9,274	\$9,825	\$10,082
Average annual percent change in GDP	—	7.0	10.4	7.6	4.6	5.7	5.9	3.6

^aTable 23.1 tracks the dramatic growth of NHE and its relationship to the growth in GDP.

(Source: HCFA Office of the Actuary: National Health Statistics. Levit K. [2001]. Trends in U.S. Health Spending, 2001, Health Affairs, January/February 2003.)

23.2.1 *Private (Employer-Paid) Health Care Insurance*

Although the antecedents to modern health insurance began in the nineteenth century, and several formative decisions were made in the 1930s, health insurance in the United States did not become a large-scale enterprise until World War II. About 12 million people had insurance for health care expenses in 1940; nearly 77 million had insurance by 1950 (Figure 23.1) (Health Insurance Association of America, 1991, 2002). Most were insured through their employers. Several trends encouraged this development. Collective bargaining was an important factor, as union leaders considered employer-paid health insurance to be an attractive bargaining prize. Employers of nonunionized personnel also generally were willing to provide insurance because they wished to avoid grievances that would encourage unionization. Perhaps the most influential factor was that employer-paid health insurance was excluded from the taxable incomes of employees; thus, health insurance was a form of tax-free compensation. Health insurance as a fringe benefit continued to grow rapidly in the 1950s. In 1959, legislation was enacted to cover all federal employees. By 1960, about 123 million people were covered, at least for hospital expenses.

During this period, health insurance generally was of two types. Commercial insurance companies offered **indemnity insurance**, modeled on casualty insurance. The typical form was payment of a specified amount for a hospital day or for each of a list of surgical procedures. Commercial insurance companies had no contractual link to providers. Their role was to indemnify patients for medical expenses as part of a package that included group life and disability insurance. As time went by, coverage became more comprehensive. Frequently, it was backed up by **major medical insurance** that paid 80 percent of all the patient's outlays after the patient had paid a specified amount or **deductible**.

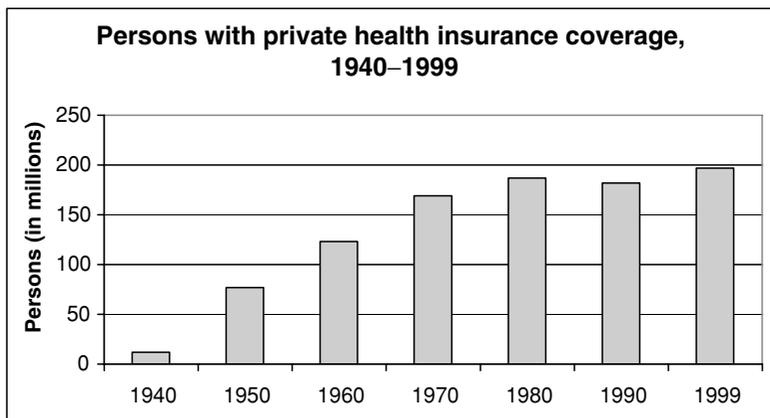


Figure 23.1. Persons with private health insurance coverage. Health insurance, through a variety of favorable incentives, became widespread after World War II. (Source: Health Insurance Association of America.)

The other type of health insurance was called **service benefit**, offered by Blue Cross and Blue Shield. Blue Cross plans were independent local nonprofit insurance companies sponsored by hospital associations. Blue Shield plans were sponsored by medical societies. These organizations were created to ensure that the providers would be paid in the manner most acceptable to those providers—that is, they could choose to be paid through cost reimbursement or through payment of billed charges to hospitals and fee-for-service (FFS) payment to physicians. Most hospitals and physicians participated in Blue Cross and Blue Shield (the “Blues”). In the former case, participation usually meant that hospitals would give Blue Cross a discount from the fees charged for patients who were insured by other carriers. In the latter case, it usually meant physicians would agree to accept Blue Shield fees as payment in full.

These insurance systems shared certain features. First, they reimbursed physicians for services based on **usual, customary, and reasonable fees**. They paid hospitals on the basis of billed charges or of retrospective cost reimbursement. Thus, they assigned providers no responsibility for the total cost of care. They did not create incentives to analyze or control costs. On the contrary, they paid providers more for doing more whether or not more is necessary or beneficial to the patient. If outlays exceeded premium revenues, future premiums were raised to make up the difference. Second, these insurance systems were based on the principle that at all times the patient must have free choice of provider. It was even against the law for the insurer to influence the patient's choice of provider. In such an arrangement, the insurer has no bargaining power with providers and thus no way to control prices or costs. Third, these financing systems generally covered entire employee groups. They were not conceived as competitors in situations in which individual employees would have a choice among health care-financing plans.

During the era of open-ended spending, the number of persons covered and the scope of private health insurance coverage increased markedly. The number of people with private insurance protection increased from 123 million in 1960 to 187 million by 1980 (Health Insurance Association of America, 1991) (Figure 23.1). This increase was encouraged by federal and state tax laws. The inflation that started in the late 1960s and intensified in the 1970s pushed people into higher and higher income-tax brackets. As this shift occurred, it became increasingly advantageous for employers and employees to agree that an employer would pay for comprehensive health insurance with before-tax dollars rather than paying the same amount in cash to employees and letting them pay for the insurance with net after tax dollars.

By 1980, the average taxpayer was in about the 40 percent marginal tax bracket, counting both income and payroll taxes, i.e., of the final dollar earned by an average taxpayer, about 40 percent went to federal and state income and payroll taxes. In 1981, this tax subsidy for health insurance (in which employers used nontaxed dollars to purchase insurance for employees) cost the federal government about \$20 billion in foregone tax revenues (Figure 23.2) (Ginsburg, 1982). The same subsidy continues today and was calculated to reduce federal income and payroll tax revenues by \$120 billion in 2001 (Congressional Budget Office, Budget Options, February 2001).

In the 1970s, high interest rates made it more advantageous for large employers to self-insure. Instead of paying a premium to an insurance company that would keep the money for perhaps 3 or 4 months before paying the bills, a growing number of large

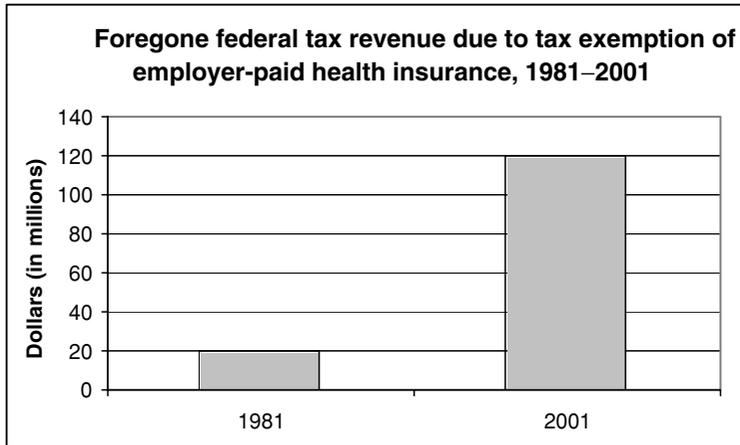


Figure 23.2. Foregone federal tax revenue. By allowing employers to purchase tax-free health insurance, the government foregoes billions of dollars in tax revenues. (*Source:* Ginsburg P. [1982]. *Containing Medical Care Costs Through Market Forces*, and Congressional Budget Office [2001] *Budget Options*.)

employers decided to pay their employees' medical bills directly, to hire insurance companies to perform claims processing or **administrative services only (ASO)**, and perhaps to buy insurance for only truly catastrophic cases. Under the Employee Retirement Income Security Act (ERISA) of 1974, these **self-insured plans** were also exempted from state regulation of insurance, which could be cumbersome and expensive. In effect, being self-insured means the employer takes on the health insurance function and risk directly. Although most practical for large employers, the availability of reinsurance or **stop-loss coverage**, which shifts the risk of a catastrophic case to an insurance company, has made it possible for small employers to self-insure as well. In 2002, about 66 percent of all employees, including 62 percent of employees in firms with between 200 and 999 workers and 12 percent of employees in firms with 3 to 199 workers, were covered by self-insured conventional indemnity plans (Kaiser Family Foundation 2002) (Figure 23.3).

The most important exception to the private-sector FFS system of health care finance was **prepaid group practice**, in which members paid an annual fee set in advance and received comprehensive health care during the year. In 1960, membership in prepaid group practice plans was small (about 1 million nationwide). The plans' importance lay in the concepts on which they were based. Kaiser Permanente, the largest and most successful of these organizations, adopted the following principles (Somers, 1971):

- Multispecialty group practice.
- Integrated inpatient and outpatient facilities.
- Direct prepayment to the medical care organization.
- Reversal of economics: providers are better off if the patients remain well or have their medical problems solved promptly.

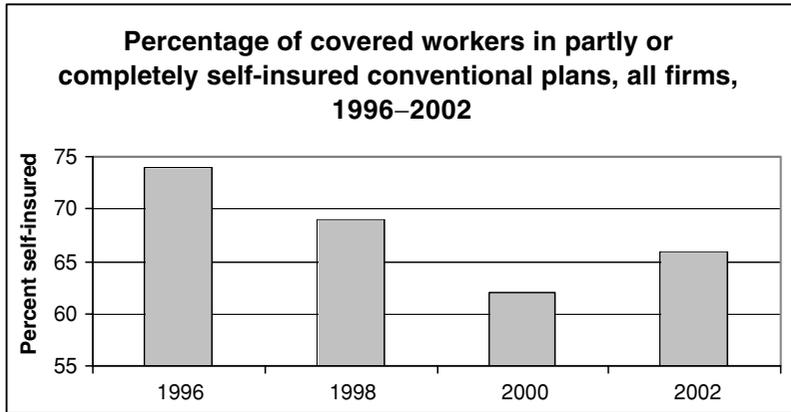


Figure 23.3. Percentage of covered workers in partly or completely self-insured conventional plans in 1996–2002. To realize the benefits from interest accrued on insurance premiums rather than handing it over to insurance companies and to avoid state regulation, many employers choose to self-insure. (Source: The Kaiser Family Foundation and Health Research and Educational Trust [2002]. Employer Health Benefits.)

- Voluntary enrollment: every enrollee should have a choice among competing alternatives.
- Physician responsibility for quality and cost of care.

The principle of voluntary enrollment was the beginning of the competition among health care financing and delivery plans that became widespread by the mid-1980s. Direct prepayment could reflect the overall efficiency of the provider organization, as well as the health risks and problems present in the enrolled population. Direct prepayment implies a reversal of the economic incentives in the FFS system, such that doctors prosper by keeping patients healthy and by diagnosing and solving their patients' medical problems promptly and effectively. Tertiary care (e.g., open heart surgery and organ transplants, which are usually done in regional referral centers), seen as a major profit center in the traditional system, became a cost center. Under the traditional paradigm, filled beds were an indicator of success; under the new paradigm, it was better to minimize hospital utilization. In theory, direct prepayment holds providers accountable for costs and for the costs of poor quality. If a procedure is done poorly and leads to complications and the need for more treatment, providers, rather than insurers or patients, pay the extra costs.

23.2.2 Public-Sector Insurance

In 1965, Congress enacted the Medicare and Medicaid programs in Titles XVIII and XIX of the Social Security Act. **Medicare** is the federal program of hospital and medical insurance for Social Security retirees. In 1972, legislation added coverage for the

long-term disabled and for patients suffering from chronic renal failure. By 1980, Medicare covered 25.5 million aged and 3 million disabled persons (Figure 23.4).

Medicare was based on the same principle of payment as the Blue Cross and Blue Shield plans: reimbursement of reasonable cost to hospitals and fees to physicians. Patients were given unlimited free choice of provider, so a Medicare beneficiary received no financial advantage from going to a less costly hospital. The Medicare law did provide for certain deductibles and coinsurance to be paid by the patient who was receiving services. For example, under the Medicare system as of 2003, the hospitalized patient was charged a deductible that approximates 1 day's cost at the average hospital's per diem rate. After an annual deductible, Medicare paid 80 percent of the doctor's usual and customary fee; the patient is responsible for the rest. The coinsurance was the remaining 20 percent that the Medicare beneficiary was responsible for paying. However, any cost consciousness that cost sharing might encourage was attenuated, because almost 90 percent of Medicare beneficiaries have some form of supplemental insurance that offsets or removes the cost sensitivity intended by the cost-sharing features of Medicare. Of those with supplemental coverage, 72 percent have employer-sponsored or individually purchased private supplemental insurance that helps to pay the coinsurance and deductibles. Another 27 percent have private or Medicare health maintenance organization (HMO) coverage, which generally provides comprehensive benefits and low out-of-pocket costs. Finally, 9 percent of beneficiaries with supplemental insurance are considered to fall below the federally defined poverty level and thus are jointly covered by Medicaid, which has no coinsurance, and deductibles (Medicare Current Beneficiary Survey, 1999). **Medicaid** is a program of federal grants to help states pay for the medical care of welfare recipients and of other people who resemble welfare recipients (people in welfare categories, above the welfare income line). Only about one-half of the population below the poverty line is covered by Medicaid. For example, care for medically indigent adults has

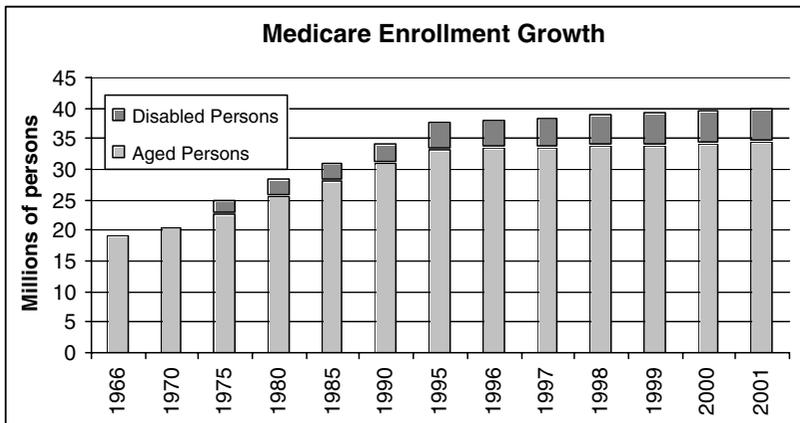


Figure 23.4. Growth of Medicare enrollment. With the enactment of the Medicare program, elderly Americans were ensured access to health care. (Source: Centers for Medicare and Medicaid Services, "Medicare Enrollment; National Trends 1966-2003" available at <http://www.cms.hhs.gov/statistics/enrollment/natlrends/default.asp>, accessed September 15, 2005.)

remained the responsibility of local—usually county—governments. Under Medicaid, the federal government sets elaborate standards that a state program must meet to be eligible for federal subsidies. The federal government pays a share of the cost (minimum 50 percent; average 57 percent as of 2001), depending on the state's per capita income. Like Medicare, Medicaid was based on the principles of FFS, cost reimbursement, and free choice of provider. Many physicians, however, choose not to participate in Medicaid because reimbursement is low.

In an effort to slow the growth of federal and state health care outlays for Medicare and Medicaid, the federal government imposed numerous regulatory restraints during the 1970s, with little success. Examples include institution of reimbursement limits on daily routine hospital care, creation of local nonprofit physicians' organizations called Professional Standards Review Organizations (PSROs) to review use of Medicare and Medicaid services and to deny payment for unnecessary services, and tying of the growth in reimbursable physician fees to an index of wages. These restraints were ineffective; Medicare and Medicaid outlays grew by about 17 percent per year through the 1970s.

23.3 Cost Growth and Strategies for Reform in the 1980s and 1990s

The cost-increasing incentives in the FFS model, fueled by information and medical technology, continued to increase the costs of health care in the 1980s at rates faster than inflation. National health expenditures increased as a percentage of GDP from nearly 9 to 12 percent, from nearly \$250 billion in 1980 to nearly \$700 billion in 1990—an average annual increase of 11 percent (see Table 23.1). Private-sector spending on health care increased from about \$141 billion to \$413.5 billion, and public-sector spending increased from nearly \$105 billion to \$282.5 billion. From 1980 to 1990, Medicare outlays grew from \$37.4 billion to \$110.2 billion, or 11.4 percent per year (Table 23.2).

Table 23.2. Medicare and Medicaid expenditures aggregate (in billions) by year.^a

Spending category	1960 ^b	1970 ^c	1980	1990	1993	1999	2000	2001
Medicare	NA	7.7	37.4	110.2	148.3	213.6	224.4	241.9
Average annual percent change in Medicare	NA	NA	17.1	11.4	10.4	6.3	5.1	7.8
Medicaid ^d	NA	5.2	26.0	73.6	121.6	186.0	202.4	224.2
Average annual percent change in Medicaid	NA	NA	17.5	11.0	18.2	7.3	8.8	10.8
Average annual percent change in GDP	NA	7.0	10.4	7.6	4.6	5.7	5.9	3.6

^aMedicare and Medicaid expenditures have grown faster than the gross domestic product (GDP) in every year except 2000.

^bNA=not applicable; Medicare and Medicaid became effective in July 1966.

^cAverage annual growth, 1960–1970.

^dIncludes SCHIP (Title XXI).

(Source: HCFA Office of the Actuary: National Health Statistics Group. Levit, K. (2003). Trends in U.S. Health Spending, 2001, Health Affairs, January/February 2003.

Medicaid outlays grew from \$26 billion to \$73.6 billion, or 11 percent per year between 1980 and 1990. By comparison, the GDP grew about 7.6 percent per year between 1980 and 1990.

Despite the similarities in the problems they faced, the public and private sectors responded differently. Legislators attempted to control spending in the Medicare and Medicaid programs by making changes to the existing programs but leaving their FFS incentives intact, whereas private-sector purchasers more willingly embraced the logic of the incentives inherent in the prepaid group practice model.

23.3.1 Public-Sector Reform

Fiscal pressure in the early 1980s led to legislative activity designed to change the government's commitment from open-ended, cost-unconscious retrospective payment to alternatives that placed providers at greater financial risk for the costs of care. The most significant changes were the adoption of prospective payment and, for the Medicaid program in particular, limited choice of provider. These efforts, however, were not generally successful.

The Omnibus Budget Reconciliation Act of 1981 (OBRA, 1981) included many changes in Medicare and Medicaid. Two changes in Medicaid were particularly significant. First, federal matching payments to each state were reduced. States could avoid part of these reductions if they took certain actions to control costs. Second, Congress granted states more discretion in changing the features of their Medicaid programs to control costs. In particular, the law provided that the Secretary of Health and Human Services (HHS) could waive the provision for freedom of choice of provider in Medicaid law and could thus allow states to engage in selective provider contracting. This flexibility led certain states, such as California, to enact legislation to require their Medicaid programs to contract selectively on the basis of price and to seek competitive bids from hospitals.

The Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982 put two new constraints on the all-inclusive cost per case for Medicare. First, it placed a limit on total inpatient operating costs, applied on a cost-per-case basis, adjusted for each hospital's severity of case mix. Second, it placed a new limit on each hospital's rate of increase in cost per case, based on an index of the wages and prices that hospitals pay. The same law provided that Medicare could contract with HMOs or with other "competitive medical plans" to care for Medicare beneficiaries. Medicare paid these plans on the basis of a fixed prospective per capita payment equal to 95 percent of the adjusted average per capita cost to Medicare of similar patients who remained with FFS providers.

In the Social Security Amendments of 1983, Congress enacted the **prospective payment system (PPS)** for Medicare inpatient cases. Under PPS, Medicare pays hospitals a uniform national fixed payment per case based on about 468 **diagnosis-related groups (DRGs)**, adjusted for area hospital wage levels. The DRG classification system was derived empirically; diagnoses were assigned to a group based on major diagnostic category, secondary diagnosis, surgical procedure, age, and types of services required. The DRG classification system was intended to produce homogeneous groups from the point of view of resource use. Within each DRG, the average length of stay was expected to be similar. The PPS created hospital responsibility for effectively integrating

the pieces of the inpatient care process and powerful incentives to reduce the cost of inpatient cases. The PPS thus successfully slowed the growth of cost of inpatient services, but its introduction was followed by a rapid acceleration in the growth of outpatient services and, later on, home health agency services.

In the Omnibus Budget Reconciliation Act of 1989 (OBRA, 1989), Congress embarked on the **Resource-Based Relative Value Scale (RBRVS)** and **Volume Performance Standard (VPS)** systems for paying for Medicare physicians' services. RBRVS was intended to correct the large inequities and perverse incentives in Medicare's "customary, prevailing, and reasonable" (CPR) payment system. Medicare's CPR payment system reimbursed practitioners generously for doing procedures but poorly for providing cognitive services such as history taking and advice giving. RBRVS was intended to produce relative prices for physicians' services that approximated what would exist in an effective market system—that is, prices proportional to marginal costs. The intention of RBRVS was to diminish the incentives that providers had to perform expensive procedures. VPS was intended to control volume but may have instead motivated an increase in physician services as doctors sought to protect their real incomes in the face of controlled prices and a surplus of doctors.

The legislative changes in the 1980s did little to stem growth in the overall costs of Medicare and Medicaid. From 1990 to 1993, Medicare expenditures continued to grow at 10.4 percent—almost the same rate as the previous decade—to \$148.3 billion. Medicaid outlays increased faster than they had in the 1980s, by 18.2 percent between 1990 and 1993, to \$121.6 billion by 1993. In contrast, the GDP slowed during this period, growing by only 4.6 percent per year (see Table 23.2).

23.3.2 *Private-Sector Reform*

Pressure for changes in the private sector intensified as costs increased. Rather than trying to improve on the inherently flawed incentives intrinsic in the existing FFS model, the private sector turned to managed care for cost relief.

Managed care was intended to be a complex bundle of innovative solutions to the problems of the traditional FFS system. There was great variation among individual managed care organizations in the extent to and success with which principles were applied in practice, and ultimately most managed care organizations, with the notable exception of Kaiser Permanente, abandoned many of these strategies in the face of pressure from consumers and physicians. The essential principles of managed care were as follows.

- *Selective provider contracting.* Insurers selected providers for quality and economy. Quality was important because people demanded high quality of care; employers cared about the health and satisfaction of their employees (if they did not, their trade unions were likely to care); because insurers cared about their reputations; and because mistakes cost money. Historically, quality and economy have often gone hand in hand. That is, many efforts to improve quality and to reduce rework and mistakes resulted in lower costs. Providers were also chosen for their willingness to cooperate with the managed care organization's quality and utilization management programs and reporting requirements.

- *Utilization management.* This principle varied from the crude to the sophisticated. For example, some managed care organizations retained actuarial consulting firms to develop guidelines for how long various types of patients should be hospitalized, and these guidelines were translated into limits on what the insurance would pay. Many employed **primary care gatekeepers**—primary care physicians who controlled referrals to specialists. Many managed care organizations dealing with doctors from the FFS sector who were thought to be overutilizers required prior authorization before a patient with a nonemergent problem could be hospitalized. An insurance contract might have included, for example, a \$200 deductible for hospitalizations, waived if the patient obtained authorization. Some managed care organizations employed concurrent review, whereby utilization management professionals checked regularly on the hospital inpatient's condition and planned prompt discharges.

The more advanced form of utilization management was based on the recognition that medical uncertainty is often great and practice variations are wide. Teams of physicians studied particular medical conditions, reviewed the medical literature, analyzed and studied their own data, and developed recommended practice guidelines based on professional consensus within the team. Typically, the guidelines reflected the least costly way of achieving the best obtainable outcomes.

- *Negotiated payment.* The basic idea of negotiated payment was to trade higher patient volume for lower prices. Compared with the usual and customary fees in the FFS system, managed care organizations typically obtained discounts in the range of 20 to 40 percent. These negotiated payments often included some bundling of services—for example, all-inclusive payments per inpatient day (for different types of patient) or per inpatient hospital case.
- *Quality management.* For example, a managed care organization might have surveyed patients about their satisfaction and rewarded with bonuses those providers who scored well. Providers who scored poorly might not have been offered a renewal of their contracts. Sophisticated organizations attempted to measure outcomes of care, or performance of processes of care, and reported these measurements to consumers and purchasers.

In some communities, prepaid group practices, such as Kaiser Permanente, were successful and growing during this period. The term **health maintenance organization (HMO)** was coined in 1970 by Paul Ellwood to describe prepaid group practices, which were the earliest form of managed care (Ellwood et al., 1971).

In general, an HMO is a health insurance carrier that covers a comprehensive list of health care services: physician, hospital, laboratory, diagnostic imaging, and usually prescription drugs. The coverage provides for nominal copayments at the point-of-service (POS) (e.g., \$10 per doctor office visit), but there is no deductible and in general, no limit on the amount that the HMO will pay. Copayments are not supposed to be so large as to constitute a barrier to care.

HMOs contract with employers and individual subscribers on the basis of per capita prepayment. In this contract, the HMO bears the full risk for the cost of medical care. The amount and type of risk sharing that the HMO then arranges with providers varies widely, but usually the HMO shares some risk, explicitly or implicitly. An explicit risk-sharing

arrangement might be a contract with a medical group to provide all necessary professional services for a fixed per capita payment. An implicit risk-sharing arrangement might pay individual doctors on a discounted FFS basis, but the HMO would then keep track of the per patient costs of each doctor, adjusted for age, gender, and possibly diagnosis; doctors whose costs consistently exceed norms might receive extra counseling on practice patterns or might not have their contracts renewed (Table 23.3).

Originally, HMOs were of several types. **Group-model HMOs** were based on contracts between physicians organized in a medical group and the HMO. The medical group accepted risks of costs of care and usually rewarded the partners if the group was successful in managing costs. **Staff-model HMOs**, in contrast, retained doctors on staff and paid them as salaried employees. Although the two are usually considered to be substantially similar organizational forms, there is an important difference. The doctors in group-model HMOs were more likely to see themselves as part owners of the enterprise and to feel more responsible for its success. Both types attempted to organize comprehensive care systems. Their doctors cared exclusively for patients enrolled in their affiliated health insurance plan. They generally cared for patients in HMO-owned or HMO-leased facilities.

Doctors in FFS solo practice, feeling competitive pressure from prepaid group practices, formed **individual practice associations (IPAs)**, also known as **network-model HMOs**, through which they could offer patients the financial equivalent of the prepaid group practices. Independent medical group practices and individual doctors generally contracted with several insurance carrier IPA HMOs to see the patients enrolled with those carriers while also continuing to see patients enrolled in traditional insurance, Medicare, Medicaid, other, or no coverage. The doctors continued to practice in their own offices. The medical groups were paid on a per capita basis for professional services under contracts that included incentives for efficient hospital use. A typical contract might have provided a fixed-dollar monthly amount per enrolled person for professional services plus a risk-sharing arrangement for hospital costs. Individual doctors were paid negotiated FFSs, with incentives for economical behavior, and were usually monitored for the economy of their practice patterns. A typical contract might have paid primary care doctors 80 percent of their fees soon after delivery of services, with the other 20 percent withheld to be sure that there was enough money in the pool. At the end of the year, the doctors were paid in proportion to their billings if there was money left over. In addition, the pool of primary care doctors may have shared in the savings from efficient specialist referrals and hospital use.

Table 23.3. Comparisons between fee-for-service and managed care.^a

Fee-for-service	Managed care
Providers are paid a fee for each service provided	Providers are paid a fixed payment per member per month
Potential incentive for unnecessary services	Potential incentive for underprovision of services
Patients see any provider	Patients see selected providers
Little or no quality or utilization management	Features quality and utilization management

^aManaged care constitutes a reversal of the economic incentives in fee-for-service insurance.

In response to the early development and acceptance of HMOs, in 1973 Congress passed the HMO Act. The HMO Act (1) defined HMOs as being of either the group practice or the individual practice variety; (2) provided grants and loans to help start nonprofit HMOs; and (3) required that all employers of 25 or more employees, subject to the Fair Labor Standards Act, who were offering traditional insurance, also offer to their employees the choice of one group-practice and one individual-practice HMO as alternatives to traditional health insurance if such HMOs served the areas where their employees lived and asked to be offered; and (4) overruled state laws that inhibited HMO growth.

The HMO Act had an important effect in opening up the market to competition. These provisions also helped to expand access to HMOs and thus the number of HMOs. By 1978, there were 7.3 million members in 195 operating HMOs. At that time, the HMO industry was made up almost entirely of local nonprofit HMOs and of Kaiser Permanente, which was then a large national organization serving 3.5 million enrollees in six states—a multistate or national HMO. By 1996, 623 mostly for-profit HMO firms served 60.6 million enrollees (Table 23.4). Between 1978 and 1996, HMO annual enrollment growth exceeded 12.5 percent.

Some employers wanted to be able to offer employees health insurance based on selective provider contracting—that is, insurance that resembled the traditional model except that employees would be offered preferential terms of coverage if they used contracting providers. Then, employers and insurers would be able to negotiate prices and utilization controls with providers. Until 1982, however, in compliance with the principle of free choice of independently practicing providers, this kind of insurance was illegal under the insurance codes in most states. In 1982, a major legislative battle erupted in California. Employers, insurers, and labor unions teamed up to defeat the California Medical Association and to secure the enactment of new legislation permitting insurers to contract selectively and to pass on the savings to the insured. Most other states followed. Thus, the states authorized **preferred-provider insurance (PPI)**, another form of managed care.

PPI represented less change from the traditional FFS model than did HMOs. Some people used the term **preferred-provider organization (PPO)** to parallel the better-established term “HMO.” These entities were not, however, medical care organizations; they were insurance companies that contracted with large numbers of providers that were not otherwise related to one another (Boland, 1985). The typical preferred-provider insurer

Table 23.4. Health maintenance organization (HMO) growth by year.^a

	1978	1985	1996	1999	2001
HMOs	195	485	623	617	533
Members (millions)	7.3	21.0	60.6	80.0	78.1
Members by model type (millions)					
Staff	—	3.0	0.7	0.4	0.2
Individual practice association (IPA)	0.6	6.4	26.5	32.4	32.3
Network	—	5.0	3.6	6.9	7.8
Group	6.7	6.6	8.7	7.5	7.1
Mixed	—	—	20.9	32.7	30.1

^aBoth the number of and enrollment in HMOs grew rapidly since 1978, but started to decline in the late 1990s. (Source: InterStudy Publications.)

contracted with a large number of doctors, hospitals, laboratories, home health agencies, and so on. It created incentives for insured patients to choose contracting providers. For example, the insurance contract might have paid in full the negotiated fee for the services of contracting providers but paid only 80 percent of what it would have paid contracting providers for the services of noncontracting providers, with the patient liable to pay the rest. The insurer negotiated discounted fees, and the provider agreed to accept those fees as payment in full from contracting patients; that is, providers agreed to no balance billing. Finally, the insurer adopted utilization management tools, such as prior authorization for hospital admissions, length-of-stay guidelines, and review of provider credentials.

Some preferred-provider insurers covered comprehensive health care services. Others specialized, carving out a subset of comprehensive services, such as mental health, pharmacy, cardiology, or radiology. They served as subcontractors to insurers that covered comprehensive services. They could offer greater detailed knowledge of their particular specialty. They might also have contracted with several insurers that covered comprehensive care and subcontracted the components.

HMO providers differed from contracting PPI providers in that the former bore the financial risk associated with members' use of services, whereas the latter did not. The HMO agreed to provide all necessary services for a comprehensive per capita payment set in advance, independent of the number of services actually used. Contracting PPI providers did not suffer financially if the use of services increased, and they were not directly rewarded for reducing the use of services or for treating patients in less costly ways (Table 23.5).

Table 23.5. Characteristics of managed care organizations.^a

Plan characteristic	Health maintenance organization (HMO)	Preferred-provider organization (PPO)	Point-of-service (POS) plan	High deductible plan
Financing Arrangement	Insures via prepayment for comprehensive health services	Arranges discounted fee-for-service rates with contracted providers	Adds PPO option to HMO plan	<ul style="list-style-type: none"> • Requires a high deductible • Offers a health spending account to pay deductible and cost sharing • Functions like a PPO above the deductible
Provider Access	Choice of provider limited to those within HMO	Offers incentives for enrollees to use contracted providers	Allows for free choice of provider with financial incentive to use HMO providers	
Risk Bearing	Providers bear risk for the cost of care	Providers do not bear risks for the cost of care		

^aDifferent organizational forms present trade-offs between cost and access.

In the 1980s, PPI was introduced at a rapid rate, and participation in PPI grew continuously through the 1990s. By 1998, 98 million people were enrolled in PPOs (Aventis Pharmaceuticals, 2000).

In the long run, PPI are expected to be less effective at reducing costs than HMOs because the providers retained FFS incentives and were not financially constrained by a per capita budget. The PPI format did not reward providers for keeping patients out of the hospital, and keeping them out may be the single most important source of cost savings in health care. PPI did not organize the health care system for efficiency; it merely tried to shop for the lowest price in an inefficient system.

PPI was initially viewed as an important part of the transition from the traditional unmanaged FFS system to HMOs that use per capita prepayment. A group of doctors may have begun with a discounted FFS contract, acquired experience on which they could base a per capita payment, and then eventually converted to per capita prepayment.

For consumers, managed care, especially HMOs, required a change in patterns of access to doctors, from complete free choice to choice limited to the managed care plan's contracting providers. People who were accustomed to the traditional system often did not understand this change and the reasons for it. In addition, when they were seriously ill, some patients wanted to be able to go to a famous regional or national referral center and to take their insurance with them. In the mid-1980s, HMOs introduced the **point-of-service (POS)** plan to address this concern.

A POS HMO functioned as an HMO for those who wished to stay with the medical group that they chose within their HMO but added a PPI plan that the member could access by paying a deductible (typically, the first several hundred dollars of expense) and a fraction of each medical bill, and also a traditional insurance plan with an even stronger financial disincentive. This plan gave the covered person the full range of choice of provider but offered more favorable financial terms for sticking to the HMO primary physician network. Most people in these arrangements stayed with their primary care group for more than 90 percent of the services that they used. POS options were popular when introduced. It appeared that people simply wanted the comfort of knowing they had the option to choose. In March 1987, 11 HMOs reported POS enrollment of nearly 400,000. By July 1995, 318 HMOs served over 5 million enrollees in POS plans (American Association of Health Plans, 1995).

Some HMOs worked to improve customer service. For example, they tried to offer convenient access to **advice nurses** who could help patients to make good decisions about the care they sought. Some HMOs developed call centers to shorten telephone waiting time and to expedite appointments. Their standard of access to doctors was same-day appointments (with a doctor, if not with your own doctor) for people who thought they needed immediate care. Some HMOs designed open-access insurance plans that allowed members to see a doctor of any specialty within an HMO network without a referral. Innovations in information systems that allowed plans to keep the primary care physicians informed of interactions throughout the delivery system made feasible such open-access plans. As was the experience with POS plans, there seemed to be less-than-expected use of the open-access option among customers.

23.4 The Era of Managed Care: Adoption, Backlash, and Beyond

Employers responded to rapidly increasing health care costs and the threat of increased government regulation to control health care spending in the mid-1990s by turning to managed care, which promised to be a lower cost alternative (Table 23.6). Managed care plans, competing for customers, responded by lowering their prices and increasing their utilization and care management. During the 1990s, national health expenditures increased from nearly \$700 billion in 1990 to more than \$1.3 trillion in 2000, from 12 to 13.3 percent of the GDP (Table 23.1). The increase in overall private national health expenditures between 1990 and 2000 was greatly reduced compared with that in the previous decade. Private expenditures grew from \$413.5 billion in 1990 to \$718.7 billion in 2000—an annual average growth rate of 5.6 percent, just slightly faster than the GDP. Between 1993 and 1999, private health expenditures declined slightly as a percentage of the GDP from 7.5% in 1993 to 7.2% in 1999. Public-sector expenditures grew from \$282.5 billion to \$591.3 billion between 1990 and 2000. Medicare outlays grew from \$110.2 billion to \$224.4 billion, and Medicaid outlays grew from \$73.6 billion to \$202.4 billion, growth rates of 7.4 and 10.6 percent per year, respectively (Levit et al., 2003) (Table 23.2).

23.4.1 Medicare and Medicaid

The component of the health care system most resistant to change has been the Medicare program. Medicare built in virtually no quality management or improvement and required little accountability on the part of doctors, hospitals, or other providers. Although Medicare's risk basis contracting program has made HMO alternatives available to some beneficiaries, the government's reimbursement policy of 95 percent of the average adjusted per capita fee-for-service costs (AAPCCs) deprives the government of potential savings. If an HMO can provide Medicare's standard benefit package at lower cost than 95 percent of the AAPCC, the HMO must provide more benefits rather than offering a lower price. In addition, if the HMO enrolls a healthier-than-average population, government payments may greatly exceed 95 percent of the expenditures that the HMO enrollees would have generated if they had chosen the FFS option. If Medicare's reimbursement increases do not keep pace with medical inflation, as in the late 1990s, the government's policy drives plans to withdraw, depriving consumers of the choice to pay the extra cost if they believe a plan is worth the additional expense. As of 1998, 5.8 million, or 17 percent of, Medicare beneficiaries were enrolled in managed care plans compared with 64 percent of the total U.S. population (Figure 23.5). The pace of Medicare

Table 23.6. Comparison of fee-for-service and HMO insurance.^a

Fee-for-service insurers	Health maintenance organizations
Traditionally not cost accountable	Theoretically accountable for cost and quality
Providers are paid more for their services	Fixed reimbursement regardless of service quantity

^aHMOs attempted to create accountability for cost and quality by decoupling the financing from the quantity of services provided.

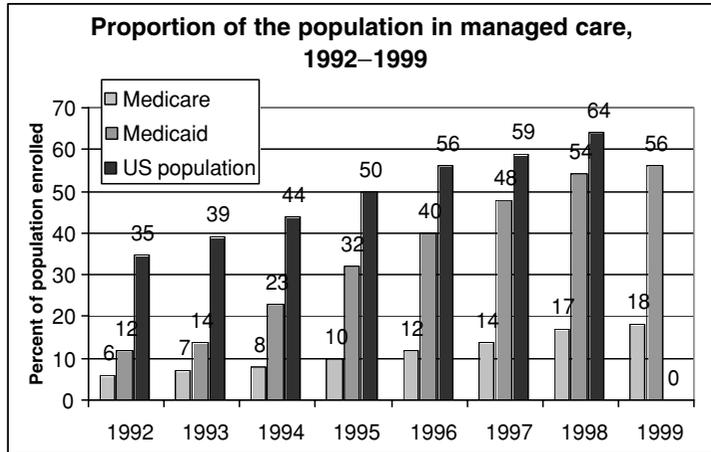


Figure 23.5. Proportion of the population in managed care. Enrollment in managed care plans has grown sharply for Medicaid recipients, but slowly for the Medicare population. (Source: Health Care Financing Review [1996–2001]. Medicare and Medicaid Statistical Supplements. InterStudy Publications [1996–2001], and Aventis Pharmaceuticals, Managed Care Digest Series Publications [1995–2000].)

managed care enrollment accelerated between 1995 and 1999 before declining again through 2001 (Levit, 2001; Cawley et al., 2002).

In contrast to Medicare, Medicaid has seen a rapid expansion of managed care, particularly in the form of risk-based programs. In 2001, Medicaid managed care enrollment was 20.7 million, up 28 percent per year from 3.7 million in 1992 (Health Care Financing Review, 2001). As of 2002, only three states—Alaska, Mississippi, and Wyoming—had no Medicaid managed care.

In 1997, Congress enacted the State Children’s Health Insurance Program, or S-CHIP, through the Balanced Budget Act to provide funds to states to initiate and expand child health assistance to uninsured, low-income children. State approaches to S-CHIP implementation vary. Some states expanded eligibility to children through Medicaid programs, other states established separate child health programs, and some states did both. Initial approaches to payment and delivery included FFS, managed care, primary care case management, and mixed systems. Forty-three states had a managed care delivery system, though managed care was dominant in 20, and the sole system in 8 states (Thompson, 2002). Enrollment of children in S-CHIP doubled from approximately 1 million in 1998 to 2 million in 1999 and reached 5.3 million in 2002.

By 1996, there was a consensus that the Medicare program was in dire need of reform. The trustees of the program predicted the impending expiration of the Medicare Trust Funds (Medicare Board of Trustees Reports, 1996). Federal outlays for Medicare were expected almost to double as a percentage of the nation’s GDP, to 4.2 percent by 2010 (the year 78 million baby boomers start to become eligible for Medicare benefits), up from 2.3 percent in 1995 (Federal Hospital Insurance Trust Fund, 1996; Congressional Budget Office, 1996). Medicare would thus become the federal government’s single largest expense.

By 2015, the elderly population will have increased to 43.7 million. By 2030 there will be just over two workers to support the costs of each beneficiary; in 1997, there were four. The proportion of elderly in the population is expected to be 20 percent—more than twice the proportion when the program was initiated (U.S. Bureau of the Census) (Figure 23.6).

In response to these grave predictions, Congress enacted major reforms to the Medicare program through the Balanced Budget Act of 1997 and the Medicare Prescription Drug Improvement and Modernization Act of 2003. The Balanced Budget Act introduced many provider and private health plan payment changes and established the Medicare+Choice program, which expanded private plan options to Medicare beneficiaries. Although this legislation should have encouraged beneficiaries' transition to managed care, it was not expected to solve the long-run problems of the program. In addition, when government payment rate increases did not keep pace with medical inflation, many managed care plans withdrew from or limited their participation in Medicare. Managed care plan departures resulted in a 10% drop in Medicare managed care enrollment in 2001 (Levit, Jan/Feb 2003). The Medicare Modernization Act added a drug benefit to fee for service Medicare, revised and expanded the managed care program now called Medicare Advantage, and created demonstration projects in chronic care, disease management and pay for performance to reward health plans that meet performance standard (<http://www.cms.hhs.gov/medicarereform>). These reforms, whose goals and features are diverse, in some cases promote value, but in their totality do not represent a systematic strategy to promote value-based purchasing in Medicare.

23.4.2 *Managed Competition and Purchaser Initiatives*

Employer interventions to reduce costs in a cost-unconscious environment dominated by forms of FFS insurance included requiring employees to pay a share of the cost for

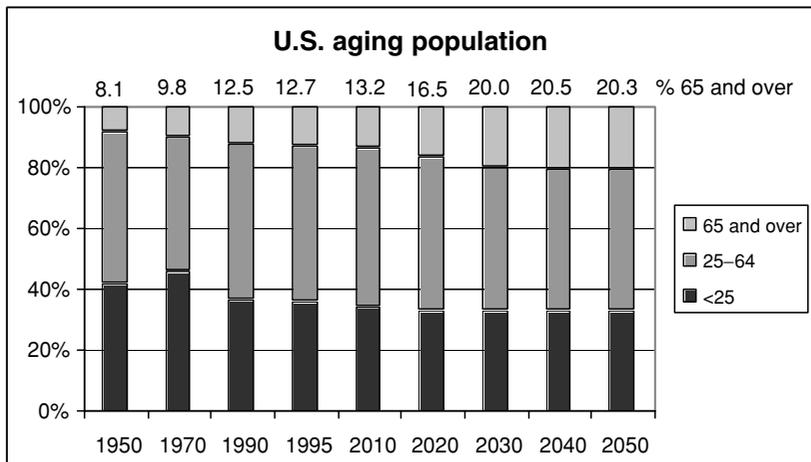


Figure 23.6. U.S. aging population. As the baby-boom generation approaches retirement age, problems with Medicare will grow dramatically. (Source: U.S. Bureau of Census, International Data Base <http://www.census.gov/cgi-bin/ipc/idbsprd> (last accessed July 17, 2003) for historical data and National Population Projections Summary Files: http://www.census.gov/population/www/*projections/natsum-T3.html (last accessed July 16, 2003) for projections.)

health insurance, consolidating the number of plans an employer offered so as to consolidate purchasing clout, and using self-insurance to eliminate administrative costs and to maximize the time value of money. Although these interventions may have reduced employer health care costs in the short term, they had no effect on health delivery and therefore could not reduce health care costs in the long run.

Dissatisfaction with these methods led many employers to embrace managed care. Initial efforts were only modestly effective at reducing costs, because most employers were unwilling or unable to make their employees responsible for premium price differences. Managed care organizations that competed with FFS plans recognized that they could attract customers by offering better service or benefits rather than by charging lower prices. Thus costs declined only modestly.

In contrast, some employers chose to hold health plans accountable for both the cost and the quality of the care delivered, thus intervening in ways that could affect care delivery and long-term costs if enough employers adopted these practices. **Managed competition** (Enthoven, 1993) is a strategy used to varying degrees by some purchasers of health care services intended (1) to create health services delivery organizations capable of acquiring appropriate health care resources, obtaining value for money, deploying the resources to care for an enrolled population, designing and executing care processes that produce good outcomes and value for money, and measuring and monitoring performance (outcomes, satisfaction, and cost) and continuously improving it (i.e., managing care); (2) to create a framework of incentives for such organizations to improve quality and reduce cost; and (3) to use market forces to transform the health care delivery system from its former fragmented, nonaccountable mode to efficient integrated comprehensive care organizations constantly striving to improve. In brief, managed competition refers to the rules of the game within which managed care organizations play (Table 23.7).

To manage competition, a “sponsor,” either an employer or a group of employers, continuously structures and adjusts the market to overcome attempts by health plans to avoid price competition. The sponsor offers its members a choice of standardized health care coverage options and provides them with information and incentives to choose a health plan that provides them the greatest value for money. The sponsor selects the managed care organizations or insurance carriers that compete; sets equitable rules for pricing and enrollment within which all health plans must compete and monitors compliance; organizes a coordinated annual open enrollment during which members have an opportunity to consider alternative health plans; and provides comparative information about health plan prices, performance, quality, and service.

Table 23.7. Principles of managed competition.

Sponsor establishes equitable rules within which multiple plans compete and administers an open enrollment process
Individual is responsible for premium difference among competing plans
Standardizes coverage contracts between sponsored groups
Provides for individual choice of plan rather than group choice
Information on quality, plans, and providers is accessible and understandable
Risk selection is managed by providing a single point of entry and standard coverage contracts, and by risk-adjusting premiums

Under managed competition, sponsors also require members to pay the full premium differences if they choose a plan whose premium is higher than the low-priced plan. This gives members an incentive to seek value for money and, more importantly, gives plans an incentive to offer the greatest value. In practice, few sponsors employ the principles of managed competition. Of employees offered a choice of carriers in 1997, about one-quarter received a fixed-dollar contribution from the employer, and only about 6 percent of the insured workforce had a cost-conscious choice of carriers. Even among Fortune 500 companies, fewer than 10 percent of employers offered such a cost-conscious choice (Enthoven, 2003). A complicating factor in creating subscriber premium responsibility is the fact that employer-based health insurance contributions are still tax-free without limit to the employee. The effect is that, at the margin, choices of more costly health plans are subsidized by the government. This could be corrected by a limit on the tax-free amount, set at the premium of the low-priced plan.

The sponsor should also design solutions to offset the profitability of “risk selection” to ensure that health care organizations focus on giving better care at lower cost rather than selecting only healthy enrollees.

Managed competition was introduced most extensively in California, mainly led by a few large employers and **purchasing coalitions**—groups of employers that together structured their health care benefits program and negotiated with health plans. Most employers, even in California, have not applied all or even most of the principles outlined here. Examples of each component of the strategy, however, do exist. The Pacific Business Group on Health, a private large-employer purchasing coalition, negotiates health plan premiums on behalf of member employers and requires participating health plans to meet performance standards on quality of care, customer service, and data provision. The HMOs each put a total of 2 percent of premiums at risk for all performance standards, weighted according to each health plan’s relative weaknesses. Pacific Health Advantage, formerly the Health Insurance Plan of California, a small-employer purchasing coalition, adjusts payments to health plans based on average risk profiles of enrollees, using diagnostic information to ensure that health plans that attract higher risk populations will be compensated for their additional costs. Several large employers are also now employing mechanisms that adjust for health status as well as demographic differences among the populations enrolled in the health plans serving their employees.

The California Public Employees Retirement System provides comparative price and quality information to state and other California agency employees. It has also done special analyses of the people who had been hospitalized or were frequent users of care to see if they were as satisfied as the healthy customers. Some California universities require their employees who choose a more expensive plan to pay the full premium difference. All these sponsors offer a choice of health plans and provide an annual open enrollment during which members choose plans. In response to these employer initiatives, competition among managed care plans became active in California, and health care costs decreased. In inflation-adjusted terms, the 1997 premiums for competitive HMOs were about 13 percent below their 1992 levels. These efforts, however, did not stave off premium increases for long.

Employers in other states also took an active role. Some formed coalitions to bargain collectively for health insurance premiums. Others supported the National Committee for Quality Assurance, and other organizations that measure the outcomes of care provided by health plans to provide information about quality. Increasing numbers of employers offered their employees a choice of health plans, and, although most do not require their employees to pay the full difference in price, many make their employees aware of price differences and require them to pay a portion of the difference. As a result, in the mid-1990s, national average HMO premium growth flattened. According to one survey, HMO average premiums fell by 0.2 percent between 1995 and 1996, down consistently from a 12.1 percent increase between 1990 and 1991 (Kaiser Family Foundation, 1999). Managed competition, however, was never implemented on a scale sufficient to reform health care delivery, and premiums began increasing again.

23.4.3 *Managed Care and Provider Opportunities*

Important gains in quality and economy of health care delivery could have been realized, given enough pressure from greater competition. At least seven forms of integration could be achieved through contractual relationship or ownership (Table 23.8). Selected managed care organizations attempted to integrate in some of these ways in the mid-1990s. However, most of these efforts were not sustained for a variety of reasons described below. Thus, these opportunities to integrate largely persist.

The first integration is between financial responsibility and delivery of care. It occurs with per capita prepayment by the purchaser to the chosen medical care organization. HMOs translated the broad incentive of **capitated** payment into payment to doctors in a great variety of ways. Some paid salaries. Others paid salaries with bonuses for productivity, patient satisfaction, and overall economic success. Others paid various forms of FFS with management controls. Some HMOs empirically tuned their methods, trying to discover what worked in their marketplaces. Some IPAs tried to select doctors and drive hard bargains with them as well as with the insurers with which they contracted. The best IPAs evaluated their primary care providers continuously and paid them in a manner that provided appropriate financial incentives. Good performers won cash bonuses; IPAs tried to drop poor performers from their programs. Some IPAs contracted with selected specialists on a discounted FFS basis and gave the primary care doctors as a group a financial incentive to control specialist referrals. More recently, HMOs participated in pay-for-performance initiatives, which reward physician groups that meet specified performance standards.

Table 23.8. Seven integrations of managed care.^a

Financing and delivery: responsibility for costs of health care delivery
Providers and populations: population-based medicine
Full spectrum of health care services: care provided in least costly appropriate setting
Doctors and other health care professionals: right numbers and types
Doctors and hospitals: vertical integration
Hospitals: horizontal integration
Information: information management

^aGreater integration can lead to better quality and lower costs.

Embedded in these reimbursement schemes were often incentives to improve quality. They motivated providers to “do it right the first time” because mistakes cost money. Patients with unsolved or poorly managed problems continued to impose costs on the health care system. Per capita prepayment facilitated the alignment of incentives of doctors with the interests of patients in high-quality economical care. It paid for and rewarded cost-effective preventive services, such as more outreach of prenatal care to reduce the costs of neonatology, or more effective management of chronic diseases to minimize acute episodes. It provided a framework for cost–benefit analysis, which helped to determine the most effective place to spend limited resources. It also rewarded cost-reducing innovation, such as the many incremental changes that reduced the length of hospital stays for total hip replacement operations from an average of 17 days in 1983 to 8 days in 1993, with several facilities achieving 3- or 4-day average stays (Keston and Enthoven, 1996).

The second integration is between providers and populations. This integration facilitated and encouraged population-based medicine that added an epidemiological perspective to encounter-based medicine. Providers looked behind the encounters with patients to the underlying causes of the patients’ complaints to see whether there were effective methods of prevention. One of the enduring legends of Kaiser Permanente is that the founding doctor, Sidney Garfield, who was treating construction site workers with nail-puncture wounds in their feet, went to the site with a hammer and pounded down the offending nails. Some HMOs gave children bicycle helmets and videotapes explaining why the helmets should always be used. Thus, HMOs could allocate resources to maximize the wellness of their enrolled populations through preventive and patient education services. Also, the defined population base enabled HMOs to match the numbers and types of doctors in their groups, and also other resources, to the needs of the enrolled population.

The third integration is the full spectrum of health care services: inpatient, outpatient, doctor offices, home nursing, and so on, as well as drugs and other services. HMOs put resources into improved preventive services and outpatient care and were compensated by reduced inpatient cost. They sought to deliver care in the least costly appropriate setting. They were motivated to organize seamless comprehensive care so that patients were not left to their own devices when they left the hospital. In the best-managed HMOs, committees of doctors and pharmacists chose drug regimens to produce the best outcomes and to minimize total costs of care rather than merely minimizing the cost of drugs.

The fourth integration is among doctors and other health professionals. The goal was the right numbers and types of professionals, the right specialty mix to ensure that patients had good access and to ensure that the specialists were proficient in caring for their patients. It included rational referral patterns and efficient specialist–generalist division of labor. For example, specialists might have served as consultants to generalists who delivered the care. It included efficient use of paramedicals, such as nurse practitioners and social workers, who might have worked in teams with primary care physicians.

The fifth integration is between doctors and hospitals: giving doctors a serious interest in reducing hospital costs. Aligning doctors’ and hospitals’ interests is difficult because most doctors are not employed by the hospitals in which they see patients. In a

well-integrated system, doctors developed practice patterns that facilitated efficient hospital operations. They worked with hospitals to reduce unnecessary record keeping, they supported “value for money” investment decisions.

The sixth integration is horizontal integration among hospitals. Groups of hospitals in a region combined to share administrative support functions, including management personnel, and tended to consolidate volume-sensitive clinical services, such as open-heart surgery and neonatology and laboratories.

The seventh integration is information. We describe this integration and its benefits in the remainder of this chapter. We argue that information, both clinical and financial, and its management are fundamental to successful integration of the delivery system.

In the mid-1990s, employers struggled with health care costs and believed that managed care organizations had the potential to offer increased value. As a result, managed care penetrated the markets of many states. By 1996, health plan enrollments in the private sector included 31 percent in HMOs and another 14 percent in POS plans (Kaiser Family Foundation, 2002) (Table 23.9). With the growth of managed care organizations, traditional, unmanaged FFS disappeared almost entirely in many areas. Even FFS insurers began managing their plans to avail themselves of the same purchasing preferences for buying large quantities and other economies of scale. By 2002, health plan enrollments in the private sector included only 5 percent in conventional FFS plans (Table 23.9) (Kaiser Family Foundation, 2002).

23.4.4 *The Managed Care Backlash and Its Aftermath*

Employers were only temporarily successful in their efforts to use managed care to control costs. Many managed care organizations moderated premium growth by squeezing provider payments and shortening hospital stays, not by fundamentally reforming health care organization and delivery. Consumers resented attempts to limit their care, and doctors and hospitals resisted attempts to limit their use of resources. Consumers became wary of providers who had real or imaginary financial incentives to limit service delivery. As patients, they began to demand greater responsibility for decisions about their care. The managed care backlash was accompanied by an intense onslaught from lawyers, politicians, consumers, and doctors. As a result, efforts to manage care were cut back or abandoned. The breakdown of managed care, in combination with other factors such as

Table 23.9. Health plan enrollments by year (in percent).^a

Health plan type	1988 ^b	1993	1996	1998	2000	2002
Health maintenance organization (HMO)	16	21	31	27	29	26
Preferred-provider organization (PPO)	11	26	28	35	41	52
Point-of-service (POS)	NA	7	14	24	22	18
Conventional with precertification	73	46	27	14	8	5

^aEnrollments in conventional fee-for-service plans decreased and in managed care plans increased in the 1990s and early 2000s.

^bNA=not applicable.

(Source: The Kaiser Family Foundation and Health Research and Education Trust, Employer Health Benefits [2002].)

the diffusion of expensive new technologies, caused health care inflation to resume and annual premium increases to take off. Average health insurance premiums increased 8.3 percent in 2000, 11.0 percent in 2001, and 12.7 percent in 2002 (Kaiser Family Foundation and Health Research and Educational Trust, 2002). Premium increases are expected to continue.

Two forms of HMO became distinguished during the mid-1990s. The first is “delivery system HMOs,” which provide health insurance for populations and deliver services through their own dedicated medical groups that are primarily paid on a capitated basis. These differ from “carrier HMOs,” which are insurance companies that offer a comprehensive benefit package, characteristic of HMOs, but deliver the services by contracting with independent doctors or medical groups whose main mode of payment remains FFS. Physicians contracting with carrier HMOs typically contract with many organizations, so many of their patients are insured by traditional plans with FFS reimbursement. Efforts by carrier HMOs to integrate failed, and introduction of rules and requirements, such as drug formularies and care guidelines, were lost among the competing policies issued by other carrier HMOs to the same providers. Physicians typically had little involvement in the design and development of these policies, limiting their effectiveness in controlling cost and raising quality of care. The comprehensive benefits offered by carrier HMOs, however, removed the financial restraint on consumers’ demands. By continuing to pay FFS, they perpetuated rewards for doctors to do more. When the carriers alone tried to restrain costs, against the desires of doctors and patients, they lost, if not immediately in practice, then through the court of public opinion and ultimately often through courts of law. Further, providers in many areas formed large groups to enhance their bargaining power and successfully negotiated large payment increases from carrier HMOs.

As a result, the promise of the seven integrations remains largely unrealized. The U.S. health care system remains oriented toward treatment of acute episodes rather than toward chronic disease management, despite the fact that some 60 to 75 percent of health expenditures are associated with people with chronic conditions (Hoffman et al., 1996). In the long run, chronic disease management could reduce complications, improve quality of life, and increase life expectancy at relatively low cost (Diabetes Control and Complications Trial Research Group, 1996). There remain wide variations in medical practice, which suggests much overuse and underuse. There is also evidence that care not only is variable but is often not compliant with guidelines (Wennberg and Cooper, 1999; McGlynn et al., 2003). Underuse can add to costs in the long run. Finally, costly problems of poor quality are rampant in our health care system, and there is a chasm between what our quality is and what it could reasonably be expected to be (Kohn et al., 1999; Institute of Medicine, 2001; Leape, 2005).

Employers retreated away from HMOs to less managed forms of health insurance. Enrollment in HMOs declined from a high of 31 percent in 1996 to 26 percent by 2002. POS enrollment also declined from 24 percent in 1998 to 18 percent in 2002. In contrast, PPI continued to experience gains in enrollment, reaching 52 percent of employees in 2002 (Table 23.9). Employers had no strategy to deal with the explosion in expenditures. Many, especially small employers, simply stopped offering health insurance to workers, sixty percent of U.S. employers offered health insurance in 2005, compared to 69% in 2000. (Kaiser Family Foundation and HRET 2005) Others sought to reduce premiums, by reducing benefits and increasing cost sharing by employees. While increased cost sharing

reduces utilization, particularly among poor people, excluding benefits and services is difficult, and significant premium savings cannot be achieved through minor increases in copayment and deductibles (Newhouse, 1993). Higher premiums have also encouraged some employers to turn to new PPI entrants offering high deductibles and medical spending accounts, and promising to empower and make consumers cost-conscious shoppers. **High deductible plans** combine a catastrophic insurance component with medical savings accounts and other features, designed to simultaneously make enrollees sensitive to costs while giving them the resources to pay for care when they need it. These high deductible or consumer-driven models are unlikely to stem health care inflation because health expenses are concentrated among high-cost patients whose personal expenses exceed deductibles. In 1998, 22 percent of the U.S. population with employment-based insurance who spent \$2,000 or more on health care accounted for 77 percent of employee-based insurance spending (Fronstin, 2002). For many people a high deductible provides little or no incentive to be cost-conscious consumers of medical care because a high-cost episode or a chronic illness will quickly absorb their deductible.

Large employers that continue to offer a choice of plans, comparative information, risk-adjusted contributions, and some incentive for selecting a plan that offers a high value are a minority. Collective action among purchasers through organizations such as the Leapfrog Group and the National Committee for Quality Assurance and initiatives including pay for performance supported by a series of Institute of Medicine reports documenting the quality chasm in the U.S. health care system and providing a prescription for reform have tried to create a more central role for value-based purchasing. Innovations in information technologies could facilitate value-based purchasing. For example, a stronger and more organized evidence base could facilitate the adoption of best practices, as well as the development of valid and reliable quality measures for priority conditions that could be used for both internal quality improvement and external accountability (IOM, 2001). However, without financial and organizational incentives better aligned toward this goal, its achievement will be difficult.

23.5 Relationships Among Health Care Financing, Health Care Delivery, and Health Care Technology

Health care financing, health care delivery, and health care technology are directly linked. The way in which health care professionals and health care organizations are paid creates incentives that have consequences both in the way they act and in the information that they seek.

23.5.1 Technology During the Era of Open-Ended Spending

The open-ended, third-party reimbursement that was widespread in both the public and the private sectors from the 1960s through the 1980s resulted, as we have said, in payments to doctors and hospitals for each service rendered. Logically, this system created an incentive for doctors and hospitals to maximize their incomes by performing—or at least billing for—as many services as possible, especially highly paid services. As a result

of this incentive, health care providers purchased computer applications for tracking and maximizing charges and for billing payers. Hospital financial systems that could do so thrived.

FFS reimbursement also gave hospitals an incentive to attract as many physicians as possible to use their facilities. More physicians admitted more patients. Each day that a hospital bed was filled, it generated additional income for the hospital. Thus, hospitals invested money and effort in pursuit of physicians who would keep their beds filled. More highly specialized physicians were more highly prized, because hospital charges for the admissions that their services required were higher. Hospitals often enticed specialists to use their facilities by acquiring high-technology equipment.

With the emphasis on reimbursement and high technology, administrative systems received limited attention and financial resources. Unlike most industries, which spend significant proportions of their budgets on quality control and administration, medical care viewed administration as wasteful. Selling, general, and administrative expenses in other industries range up to 44 percent of total expenditures (CFO, 1996). To this day, those who accuse HMOs of having high administrative costs fail to acknowledge the legitimate need for “administrative” expenditure on quality improvement and on cost and utilization management (Woolhandler and Himmelstein, 1997).

Some people view the health care information technology of this era as unsophisticated. By the 1980s, however, information technology, in general, had become much more sophisticated. Computer systems in the banking industry, for example, reported trades of shares of public companies on a stock exchange almost immediately all around the world and allowed bankers to track the performance of multiple stocks over time at a glance. By the mid-1980s, at least one, and often many, computer terminals sat atop the desks of most investment bankers.

Certain health care information technology was also extremely advanced. Medical devices and equipment used some of the most advanced technology in existence. Computer systems designed to track charges were extremely sophisticated. These technologies were perceived at the time as offering the greatest financial returns, so money and resources flowed in their direction. As the financial incentives in the health care system changed, these technologies became less central. Similarly, technologies that enabled health care organizations to respond to today’s incentives were unnecessary in an era of open-ended spending and thus were underfunded or not developed at all.

As interest shifted toward cost management, information systems that tracked charges became less useful because the relationship between charges and costs is inexact at best (Table 23.10). An emphasis on charges was acceptable in the 1980s when cost reduction was not an issue. Charge-based systems were also less useful when government and employer demands focused on quality because charge-based systems

Table 23.10. Fee-for-service and managed care systems generate different information needs.

Fee-for-service	Managed care
Bill charges for services without awareness of costs	Need to understand and be accountable for the costs of delivering services
Charge-based information systems	Cost- and encounter-based information systems

did not track information about provider performance. Patient outcomes were limited to crude measures, such as in-hospital mortality. Hospital computer systems could not assist in answering questions like whether a particular course of treatment improved a patient's functioning or whether a particular physician had greater success performing a procedure than one of his or her colleagues. Physicians staunchly refused to allow disclosure of physician-specific information and fought proposals that would do so (Millenson, 1997). Even hospital-level information was difficult to obtain (Singer, 1991).

23.5.2 New Incentives and Requirements Created by Managed Care, Value-Based Purchasing, and Responsible and Empowered Consumers

With a shift from loosely organized care toward managed care, value-based purchasing, and responsible and empowered consumers, the health care financing and delivery system faces a new set of incentives. These new incentives create a need for new types of technology and performance. The strength of these incentives has varied through the 1990s and into the 2000s.

The most important incentives created by these transitions fall into four broad categories: (1) incentives for purchasers and consumers to seek value and information, (2) incentives for health plans and providers to improve quality and to reduce costs, (3) potential incentives for providers to underserve patients, and (4) an incentive for health plans to attract the healthiest possible populations. The first two incentives are desirable and require information to implement; the second two conflict with social goals and require information to counteract.

Incentives for Purchasers and Consumers to Seek Value and Information

A variety of incentives have caused consumers to seek information more actively. Increasingly, individuals contribute directly to health insurance premiums and bear more of the costs of care out-of-pocket when they are insured. Many have also lost trust in the physician-patient relationship and seek independent information about their medical condition. Individuals with a choice of health plans need information with which to compare plans. Individuals responsible for cost sharing and those taking a more active role in their health and medical treatment also seek comparative price, volume, and quality information about doctors and hospitals. Large employers, seeking to reduce their own health care costs, also have an incentive to provide comparative information for their employees.

Information currently available includes measures of satisfaction of members enrolled in health plans; measures of access to providers, whether for scheduled appointments, on the telephone, or on an unscheduled basis; measures of quality as perceived by patients; and measures of compliance with guidelines for preventive services, such as providing immunizations for children or mammograms for women. Risk-adjusted, condition-specific, and population-based measures of outcomes are more desirable, yet more difficult to obtain. Although strong purchasers may demand this information, most providers have not yet been able to put in place systems that can track

outcomes (other than death) of the care that they provide or the health of the population that they serve.

Patients can get a variety of information over the Internet about their health plan's reimbursement rules, etc. about participating providers, and about general self-help and health maintenance activities. However, detailed information about provider quality is not generally available, and consumers often find it hard to identify trustworthy sources of information about specific conditions. Therefore, to date the Internet has only partially met their information needs.

Incentives for Health Plans and Providers to Improve Quality and Reduce Costs

In response to demands for better quality and value from purchasers and the public, health plans and providers need the ability to measure cost and quality. These incentives make it necessary to collect information that was not required in the past.

First, information is required for process improvement. For example, measuring variation and improvement in processes, outcomes, and costs among physicians and their practices would enable these physicians to compare themselves with their colleagues, to seek help from colleagues who have better results in certain areas, and to improve their practice patterns. In addition, the measurement of inputs and outputs would allow health care managers to track and improve productivity. Availability of this type of information would open up new areas for improved care management processes, such as closer monitoring of patients who have chronic conditions and case management of patients who have catastrophic illnesses.

Second, to improve continuity of care, it is no longer adequate to track patients within a single hospital stay; providers need to track patients in different care settings across the health system. If a patient visits a primary care physician in a clinic, has a series of outpatient visits, and is then admitted to the hospital for a procedure weeks later, information about that patient—including results of previous laboratory tests, prescription drugs, and so on—should be available to ensure continuity of care.

Third, to improve the health of the population they serve, health plans need information about enrollees even before those people receive medical care. This information is important not only to make health plan comparisons but also to identify enrollees at high risk of illness and disease. Quality would be enhanced and costs reduced if problems could be identified early or avoided completely because preventive measures are taken. Thus, health plans should want to have good information on the presence of chronic conditions even before patients present with complaints.

Fourth, information is required to enable the assessment of new technologies. Before the introduction of new technologies, payers should consider both the costs and the benefits. This process requires detailed information on operating costs and productivity in practice. Technologies that are not cost-effective or that do not provide benefit relative to technology that is already available should not be introduced.

Fifth, health care managers should conduct make-versus-buy analyses to evaluate, for example, whether they can obtain a test at less cost by contracting with an outside laboratory rather than by purchasing the testing equipment and running the tests

themselves. Information about the costs associated with providing services, equipment, and facilities in-house is vital for negotiating appropriate contracts with external vendors. Again, detailed information on operating costs would be needed.

Finally, health plans and providers should evaluate both physicians and health care facilities to determine where consolidation is appropriate. For example, the American College of Cardiology recommends that teams of physicians at any particular health care facility perform a minimum of 200 to 300 open-heart surgeries per year (California Office of Statewide Health Planning and Development, 1992). At a lower quantity, surgeons may not be proficient, and the facility is more likely to provide low-quality care. Thus, hospitals performing open-heart surgeries should track the number and outcomes of their procedures and should seek ways to concentrate such procedures at high-volume, high-quality centers.

Potential Incentive for Providers to Underserve Patients

Per capita prepayment is a double-edged sword. It gives providers an incentive to hold down costs. Ideally, providers would respond to this incentive by finding ways to become more productive, to keep people healthy, to avoid mistakes, and so on. Because capitation places providers at financial risk for services that enrollees consume, however, capitated providers may also have an incentive to underserve. Patients who need the most care are most vulnerable to underprovision of care not only because plans or providers may save money by holding back services but also because plans benefit if such patients “vote with their feet” by leaving for another health plan. This is a widespread and important fear among consumers.

In response to this fear, health plans and providers experimented with a variety of financial incentives designed to control costs while preserving quality. For example, to mitigate the intensity of the incentive to underserve, some plans based capitation payments on populations of patients rather than on individual patients. They also spread capitation across groups of providers so they would share the risk of a few expensive cases. They created tiered coverage categories to encourage enrollees to use low cost and high quality hospitals, provider networks, and drugs. In addition, plans used combinations of per capita prepayment with bonuses for high-quality care to prevent abuses.

Many provider organizations found it difficult to manage these population risks and, as they gained market power, many providers rejected global capitation, which provided perperson prepayment for all services, including prescription drugs. While some large provider organizations continue to accept capitation for outpatient services, many have returned to other forms of payment, including FFS and payments per day or per episode of care.

Capitation and related forms of payment created a host of information technology needs, including the need to track blatant abuses (a possible role for government), the need to monitor provider use patterns and outcomes, and also the need to provide access to information relevant to consumers, such as treatment options and provider characteristics. Technologies such as video and CD-ROM could be used to describe the costs and benefits of particular procedures to consumers to aid in their decisions.

Incentive for Health Plans to Attract the Healthiest Populations Possible

Health insurers have an incentive to attract to their plans those individuals and families who are likely to use the least medical care. One of the easiest ways to minimize health plan costs is to enroll a healthier population that has less total need for medical services. Plans that fail at this strategy may end up with the sickest or highest risk population. In this situation, even the most efficient plan may not be able to survive. Competition exacerbates this problem.

Assuming quality is constant, it would be best if the most efficient health plans were also the most successful. This outcome requires that health plans with a sicker and higher risk population than average be compensated for the additional expected cost of care. This requires a reliable risk adjustment mechanism; several have been developed and some of them have been applied in practice. The successful implementation of a risk adjustment mechanism requires substantial diagnostic and demographic information and coordination of information, which in turn requires large databases, analytical capability, and the ability to combine information from multiple technology platforms. The best-performing risk adjustment models are notable for their comprehensive data requirements; they use both inpatient and outpatient data and repeated observations on the same individual over time.

23.5.3 Implications of Developing Information Technology for Health Care Financing and Delivery

Just as the needs of the health care financing and delivery system direct development of new health care information technologies, the maturation of information technologies enables significant improvements in health care financing and delivery. In this section, we describe a few of the most important advances in information technology and discuss the progress that they will permit.

Cost-Accounting Systems

Based on cost-accounting applications in other industries, health care cost-accounting systems, adapted from cost-accounting applications in other industries, have been adopted widely. In health care, accounting for costs is extremely complicated because there are so many costs in even the simplest hospital stay and so many ways to account for them. In addition, health care organizations have not traditionally accounted for costs and so lack a time-tested, broadly accepted basis for defining costs. Difficulties in defining costs may be compounded by the large fixed costs of hospitals, which use expensive capital heavily, and the presence of joint production. Some resources are used for multiple activities, so allocation of their costs to any single activity is difficult and often arbitrary. Without a defined cost for items, even the most sophisticated cost-accounting systems cannot provide satisfactory answers to the most basic questions. For a typical hospital, the process of defining costs accurately may take years.

Cost-accounting systems enable the measurement of costs—the first step toward being able to manage costs. They enable the assessment of technologies on the basis of

costs relative to benefits, so decisions can be made about which technologies are cost-effective and which should be used sparingly or not at all. Cost-accounting systems enable organizations to profile and compare the utilization patterns of physicians, clinics, and hospitals on the basis of which they can target practice improvements, select a network, and determine bonuses. They empower organizations with information on the basis of which to negotiate contracts that cover at least variable costs. They enable organizations to determine that the costs of providing a service are higher than those of contracting it out. The better the ability to measure costs, the greater the capacity of the health care organization to survive in a competitive managed care environment. Cost-accounting systems, still new to many organizations, are an essential and important tool.

Internet or Intranet

The advent of the information superhighway expanded the possibilities for information and communication in the health care industry, as it did in other industries (National Research Council, 2000). The Internet, and its proprietary counterpart—intranets—enable new forms of interaction that promise to have a profound effect on health care delivery and administration. About half of the adult U.S. population used the Internet as of 2001, and about 40 percent of Internet users (20 percent of the entire adult population in the United States) used the Internet for health care purposes (Baker et al., 2003). The Internet provides an open, widely accepted standard for transferring information. In general, health care information technologies, not unlike information technologies in other sectors, have used proprietary technology, much of which has been unable to communicate with other technologies. The result is great difficulty in sharing information across organizations—a function that is vitally important in health care as patients move among organizations. In contrast, health care information technologies based on the Internet standard can more easily communicate with one another.

Health care is a global concern; health care delivery is a local business. The Internet has real limitations: there are concerns about inaccurate information, and potential difficulties with the confidentiality of personal information. Nevertheless, the Internet promises to offer a means to disseminate information about health and health care, enhance communication, and facilitate a wide range of interactions between patients and the health care delivery system. These kinds of changes could produce important improvements in health care and, ultimately, the health of the population. The Internet gives health care organizations the potential to communicate at low cost, because the Internet infrastructure is already built and is publicly available. Physicians and health care organizations can communicate with other physicians in different settings; they can also communicate with patients where the patients live and work. This ability enhances home health care, HMO–patient communication, physician–patient communication, and internal communications within increasingly large and decentralized health care organizations (see Chapter 13). Additional Internet applications currently in use to some extent include consumer and clinician access to the medical literature, creation of communities of patients and clinicians with shared interests, consumer access to information on health plans, participating providers, eligibility for procedures, and covered drugs in a

formulary, and videoconferencing among public health officials during an emergency (IOM, 2001). In addition, telemedicine (see Chapter 24) has become much more practical with Internet technologies.

Comprehensive Longitudinal Clinical Databases

Theoretically, patient medical records include detailed information about every interaction an individual has with the health care delivery system. In practice, paper-based information is difficult to retrieve, and too often it is lost. Over time, and for individuals with complex problems, medical records can become thick documents of loose notes from multiple sources, test results, and images (see Chapter 2). For decades, most of the reports included in medical records were handwritten. Subsequently, many organizations added transcription departments or relied on outsourced services to type medical records.

Paper-based medical records do not support continuity of care across physicians and across health care institutions. Health care organizations do not share medical records. Thus, an individual may have multiple, but incomplete, medical records in different doctors' offices, clinics, and hospitals, representing different portions of the patient's medical history. Even if medical records are shared in a multispecialty-group practice setting, paper records may be missing when they are needed. Finding relevant information in even the best-organized medical records is a difficult and time-consuming task. Using medical record information for learning about patterns of care across multiple patients can be a Herculean task.

Comprehensive, longitudinal, clinical databases—in effect, a paperless, complete medical record—have been viewed by many people as the holy grail in health care information technology (see Chapters 1 and 12). Integrated delivery of care requires comprehensive longitudinal records for each patient so that each provider who contacts patients as well as the patients themselves can have a complete picture of the patients' medical history, access that helps to avoid duplicate tests and unfavorable drug interactions. In addition, the information can serve as a basis for research on the relationships among diagnoses, treatments, and outcomes. Comprehensive patient records would also enable outcomes measurement, technology assessment, physician profiling, measurement of practice variation, identification of best practices, continuous quality improvement, utilization management, continuity of care, measurement of compliance with guidelines, and risk adjustment.

Projects to develop comprehensive, computer-based medical records were common in the 1980s; they still persist. (Refer to Chapter 12 for a detailed discussion of computer-based patient records.) They raised concern among consumer advocates about the confidentiality of information, prompting adoption and implementation of comprehensive privacy legislation through the Health Insurance Portability and Accountability Act in 1996. Privacy concerns created yet another opportunity for health care information technology development: systems to address data security concerns (see Chapters 5 and 10).

Longitudinal databases are also being used to achieve slightly less ambitious aims. Some information technology companies focus on tracking courses of treatment for particular conditions or in single settings, such as hospitals. Clinical information systems focus on six major functions: computerized physician order entry and alerts, clinical documentation,

decision support, results reporting, messaging, and data analysis. Automated drug order-entry systems, when used in hospitals, eliminate handwriting errors and call attention to potentially harmful drug interactions. These have the potential to reduce serious medication errors in hospitals by 50 percent (Leapfrog Group). Clinical documentation systems facilitate comprehensive and consistent physician notetaking with common orders, forms, and structured templates, which may be electronically searched. Decision-support systems can alert physicians to potential errors and facilitate adherence to evidence-based practices. Results reporting systems make laboratory and imaging findings available to clinicians by linking them to orders and providing alerts when results, particularly abnormal results, become available. Electronic messaging within a clinical information system not only facilitates communication between patients, physicians, and care teams, but also self-documents contacts, which become part of the patient record. Finally, by linking clinical records to a central data repository, clinical information systems provide opportunities far beyond those presented by paper records for data analysis and information about the relative efficacy and efficiency of all approaches to care. These technologies represent a great improvement in health care management and information and offer the potential to make care more affordable, higher quality, and more satisfying for patients.

In addition, better analytic methods have rendered information based on readily available hospital inpatient administrative data more useful. For example, the Agency for Healthcare Research and Quality's quality and safety indicators enable hospitals to flag potential opportunities for prevention and improvement. (<http://www.qualityindicators.ahrq.gov/>).

There are a variety of reasons why hospitals and physicians have been slow to adopt electronic medical records, although some form of this technology has been available for years (Bates, 2003). Key reasons for not adopting include:

1. Providers do not want to get locked in to proprietary systems; the vendors may not survive so that the large investment becomes a waste after a period of years. This problem would be mitigated by widespread adoption of standards (see below) or the emergence of one or more credible vendors whose longevity is not in doubt. There are large vendors now but some providers are still skeptical.
2. Data exchange is not yet standardized; many providers are waiting for imminent standardization, including agreement on Extensible Markup Language (XML) standards and medical terminology (see Chapter 7). Integration of systems thus remains extremely complex and costly.
3. Data entry in these systems is often costly. Current user interfaces may be slow and cumbersome, so they fail to save providers' time.
4. Total costs of maintaining the systems may still be high. Although the cost of hardware, quality-adjusted, has plummeted, the maintenance costs are another matter.
5. The hospital/physician may feel that they bear all the costs but do not capture all the benefits from use of the technology, i.e., incentives are misaligned.
6. Providers often cite limitations in the features offered in these systems. Everyone expects features to improve in the future, so they may rationally choose to wait longer to invest.

Increasing numbers of organizations are adopting electronic medical records despite these impediments, and adoption will likely increase as barriers are addressed.

Information exchange across health care settings is more difficult. The likely evolution of a comprehensive computer-based medical record will include several phases: The first phase will be the capability to exchange electronically enrollment and eligibility information through the development of universal identifiers for enrollees and providers. The second phase will be the capability to exchange pharmacy, laboratory, and encounter records through standardization and expanded coding. This intermediate stage will represent a tremendous step forward, facilitating quality improvement and performance measurement. The third phase of evolution will be the comprehensive computer-based medical record systems originally envisioned.

23.5.4 The Challenge of Implementation

The era of open-ended spending left many health care organizations with a legacy of substantial but antiquated infrastructure. Data management systems are also typically plagued by incomplete data and a lack of quality control. Both the management systems and the information technologies associated with FFS reimbursement were ingrained through years of development and use. In general, technology that predates the 1990s was proprietary to particular institutions and therefore incompatible with technology in other institutions. This situation makes difficult not only the transfer of information across institutions but also the modernization of existing technology. The transition to new integrated systems and new technologies therefore is extremely challenging and costly. Converting or replacing existing systems requires substantial investment (see Chapter 13). Health care organizations, which face ongoing cost pressures, require champions to demonstrate a business case for information technology. Active purchaser demand, through organizations such as the Leapfrog Group, the National Committee for Quality Assurance, and pay for performance initiatives.

Health care institutions today must constantly balance the trade-off between the cost of upgrading information capabilities and collecting and disseminating information and the value that the additional information can provide. While organizations continue to debate the size and timing of information technology investments, changing circumstances including movement toward standardization, the influx of trainees and young physicians who demand technological capabilities for their clinical care, pressure from purchasers, and patient expectations, are adding to the pressure to adopt these capabilities. Evolution of these systems will support future quality and patient safety improvement, performance measurement, improved efficiency, and restoration of consumer confidence.

Suggested Readings

Ellwood P.M. (1988). Shattuck lecture—Outcomes management: A technology of patient experience. *New England Journal of Medicine*, 318(23):1549–1556.

The author describes the destabilizing and democratizing effects in terms of choices and decisions of HMOs on patients, payers, and health care organizations. He coins the term “health maintenance organization” and makes the case for outcomes measurement.

Enthoven A.C. (1993). The history and principles of managed competition. *Health Affairs*, 12(Suppl):24–48.

The author articulates the principles of managed competition, a plan for comprehensive health reform that combines microeconomics with careful observation and analysis of what works. Managed competition relies on a sponsor to structure and adjust the market for competing health plans, to establish equitable rules, to create price-elastic demand, and to avoid uncompensated risk selection.

Fuchs V.R. (1983). *Who Shall Live?* (2nd ed.). New York: Basic Books.

The author presents an excellent introduction to the structure of the health care delivery system. The roles of the main players and the relationship between medical care and health are discussed.

Fuchs V.R. (1993). *The Future of Health Policy*. Cambridge, MA: Harvard University Press.

The author provides the reader with the necessary concepts, facts, and analyses to clarify complicated issues of health policy. The book addresses cost containment, managed competition, technology assessment, poverty and health, children's health, and national health insurance.

Institute of Medicine Committee on Quality of Health Care in America (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C.: National Academy Press.

Available online at <http://www.nap.edu/openbook/0309072808/html>.

This book responds to evidence of quality problems in America's health care system by providing a strategy to achieve substantial improvement in the quality of health care over the next decade.

Weller C.D. (1984). "Free choice" as a restraint of trade in American health care delivery and insurance. *Iowa Law Review*, 69(5):1351–1378, 1382–1392.

This article explains in simple yet powerful terms many of the issues raised by the fundamental restructuring of the health care industry from the era of open spending to the era of accountability by providing a historical account of the transition from "guild free choice," which prevented doctors from organizing into groups and offering discounts, to "market free choice," which permits competition.

Questions for Discussion

1. Define the following terms, each of which is relevant to current health care financing:
 - a. Usual, customary, and reasonable fees
 - b. Health maintenance organization
 - c. Diagnosis-related group
 - d. Preferred-provider insurance
2. Compare HMOs, PPOs, POS plans, and high deductible plans. What are the strengths and potential limitations of each with respect to cost and quality of care?
3. How will the differences in incentives for providers under each of the following payment systems affect providers' assessments of new medical technologies, such as patient-monitoring systems?
 - a. An HMO
 - b. An individual physician participating in a PPO arrangement
 - c. A hospital with a large number of patients treated under Medicare's prospective payment system
 - d. A standard fee-for-service arrangement
4. Compare information system needs in a hospital that treats mostly private-pay patients with those in one that accepts capitated payments.

5. You are the new administrator of the Center for Medicare and Medicaid Services, the agency responsible for Medicare and for the federal component of Medicaid. You are about to authorize a new program for health care financing for the elderly. The program offers elderly beneficiaries a choice of all health plans on the market.
 - a. With what information do you think it is important to provide beneficiaries so that they can choose among plans?
 - b. What data would you want to collect to evaluate the performance of plans?
 - c. What mechanisms would you implement to collect these data?
6. Describe at least three ways in which health care organizations can use the Internet to improve patient care.