CHAPTER 1

TERMS OF TRADE: THE FLOW OF FUNDS THROUGH THE HEALTH CARE SYSTEM

QUESTIONS

1. Who is made better off, the surgeon or the patient?
2. Who pays when you skip a workout to watch television?
3. Why does health care cost so much?
4. Is health scarce?
5. Who pays for it?
6. Does everyone get the same amount of care?
7. Is there trading in health futures?
8. Why is health care bought and sold differently from other goods and services?

Who gets a heart transplant? Why does surgery cost so much? Will insurance pay for AIDS treatment? How many children get immunized? Is Senator Smith's health plan worth voting for? These questions are dealt with every day in hospitals, in doctor's offices, and in people's homes. They are the subject of health economics, along with the more mundane decisions that cumulatively have an even greater impact on your personal health: how much exercise to get, the value of reducing cholesterol in your diet, whether to study until 3 a.m. or get a good night's sleep, and so on.

Conveying information and using it to make decisions is the stock in trade of both doctors and economists. By the end of this book, we will have discussed hospitals, nurses, ambulances, drugs, sex, extortion, kickbacks, government, family ties, love, international trade, sports injuries, and the next generation—the makings of several box office hits. The discussion will take the perspective of an economist, seeing things in terms of opportunity cost, budget constraints, monopoly, marginal productivity, and other analytical concepts. Some people claim that this takes all the fun out of drugs, sex, and business intrigue. Not so. Economic principles provide the motivations that shape this story, giving it character development and structure rather than just one scene after

another as in some forgettable action movie. As a sophisticated student of human society, you seek full disclosure of the ambitions that lie behind the actions, the deviousness of self-interest cloaked in proclamations of public benefit, the pragmatism of those who use strategy and tactics to make the best of a bad situation, the tragedy of noble aspirations that fail because of human limits, the labyrinthine connections of one of the world's largest businesses, and the growing awareness that behind it all we will find money at the root of much that is evil, and even more that is good, in the search for health. This wealth of behind-the-scenes drama is what makes the economic perspective on health so compelling.

Looking carefully at how people make deals with physicians, with hospitals, and with each other to improve their health is the fundamental approach to health economics taken here. Simplified assumptions and abstractions are used to clarify the forces that lead to economic change. Tracing the flow of funds through the health care system will make it possible to apply the principles of price theory to situations involving life and death, nonprofit organizations, professional licensure, addiction, and other issues. The powerful generalizations and concepts of microeconomics, macroeconomics, and industrial organization will allow us to see how medical transactions are like, and yet unlike, most of the rest of the economy. As a practical matter, it will be helpful if you already have a basic grasp of economics theory and applications. Reviewing a textbook, such as Paul Samuelson's *Economics*, Paul Heyne's *The Economic Way of Thinking*, or Campbell McConnell and Stanley Brue's *Microeconomics*, may prove useful. A student guide, instructor's manual, introduction to elasticity, cost and production functions, lecture slides, and current Internet resources are available at www.wiley.com/college/getzen, and you are urged to check out this site for current links, updates, and other material.

When someone says "economics" or "economic behavior," the sorts of things that probably come to mind—interest rates, unemployment, stock markets—seem far removed from the hospital emergency room. If I asked about your most recent contribution to the health sector of the economy, you might not even think of the little line on your paycheck stub labeled "HI" or "FICA:M" or "Medicare." Yes, that's 1.45 percent of your gross income that is taken out for Medicare, which you might not have realized you were paying. No, it's not your health insurance, because you don't become eligible for Medicare until you reach age 65 or become permanently disabled. Health care doesn't always conform well to the standard models economists use to analyze buying and selling wheat, or renting property, or the price of gold. However, money drives the health care system just as it does many other activities in a modern industrial society. Furthermore, economic development is by far the greatest cause of improvements in health, and the General Agreement on Tariffs and Trade has probably saved more lives than penicillin.

1.1 WHAT IS ECONOMICS?

The essence of economics is trade, or "making a buck." Its focal point is the market, the point where buyers and sellers exchange dollars for goods and services. Without buyers and sellers there would be no economy—no rich surgeons, no insurance companies, no hospital billing departments (or textbook royalties for health economists). To say that there would be no rich surgeons is not a statement of envy but one of fact. Without an advanced economy, a person could not spend 15 years studying and practicing eye surgery, and hence could not provide a highly specialized form of labor that is so valuable; therefore, patients could not reap the benefits of so much knowledge and training.

For a surgeon to be a seller, the patient must be a buyer. They both must agree on a price so that an exchange can occur. The surgeon would probably prefer that the price be

higher and the patient would probably prefer that it be lower, but both must be satisfied in order for a trade to take place. As economists, we can observe that since a transaction took place, there must have been mutual agreement that made both the buyer and the seller better off. If the surgeon would rather have watched television than perform another operation, she would have turned down the case. If the patient would rather have saved the money, or gone to a different surgeon, he could have done so. The insight that both parties must be benefiting if they freely agreed to make a trade is central to an economic vision of the world, and is known as the Fundamental Theorem of Exchange.

Terms of Trade

The "terms of trade" specify what the buyer is to give to the seller, and what the seller is to give to the buyer in return. When you buy a common item in a store, such as aspirin, a simple price of $1.29 per bottle of 50 may tell you everything you need to know about the transaction. For services, and for medical care in particular, the transaction is apt to be much more complex. For example, consider the transaction for an operation to implant an artificial intra-ocular lens (IOL) in a patient's eye to replace the natural lens that has become clouded by cataracts. The patient is to pay a $200 deposit up front and $800 more within 30 days after the surgery is completed and all sutures are removed. Reduced to its most simple element, the terms of trade in this exchange can be expressed as a monetary price of $1,000 for the IOL implant. Yet much more than the $1,000 is being agreed to in this transaction. The physician agrees to provide not just any artificial lens, but to choose the correct one, continuously monitor the quality of the operation, and control adverse reactions to post-operative medications. The patient agrees to make payment in two parts, with a time limit, and may assume the operation will be redone without further charges if the first attempt is not satisfactory. Many of the agreed-upon conditions (that the physician is licensed, will use only qualified assistants, will not try to boost the bill needlessly to increase her fees, and will keep the patient informed of any possible adverse consequences, and that the patient will wear bandages as long as necessary and not go skydiving) will never be specified explicitly unless some disagreement and subsequent legal action force the doctor and patient into court.

In the simplified neoclassical model of perfectly competitive behavior with which most textbooks begin, price is the only term that matters in a transaction and both the buyer and seller are "price takers." That is, there are so many buyers that whether one person buys or not has little influence on the price in the market; therefore, buyers must "take" the price as given. Similarly, there are so many firms selling the same product that no single firm can affect prices; hence, all firms must take the price as given. This uncomplicated model of perfectly competitive behavior is not too distant from reality when you buy a

FUNDAMENTAL THEOREM OF EXCHANGE

The foundation of market economics is that trade makes both parties better off. People make a deal because they expect it will provide more satisfaction than not making the deal. The surgeon and the patient expect to gain from trade—the surgeon by receiving money and gratitude, and the patient by being healed. It may turn out that the patient dies, and the surgeon gets sued for malpractice, but both made the transaction with the expectation that they would become better off. Trade does not take advantage of people so that one party is made better off at the expense of the other (that is stealing). Trade takes advantage of differences in skills, endowments and tastes so that people can make exchanges that are mutually advantageous.

bottle of aspirin. The model works reasonably well for most of the purchases made by consumers, and thus can be used to frame the analysis of the economy as a whole. Yet buying a bottle of aspirin is not representative of most medical decisions, and an elementary model does not capture many of the essentials when life and death decisions are being made in the operating room. While the same principles used to analyze monetary prices can be applied to other stipulations in the terms of trade, a more detailed and explicit consideration of how transactions are made, and what is being exchanged and by whom and on whose behalf, is required. Although the analysis is made more difficult, it becomes more exciting. Economic organizations adapt creatively to the special demands of health care. Studying such adaptations reveals the potential of economics as a discipline in a way that the analysis of more standard markets cannot.

Value

Why does health care cost so much? Because health is so precious that its value exceeds that of the things we possess. What benefit do I get from spending my money on books or art or cars or clothes if I am dead? Sick and in pain, confronted with the possibility of death, people would be willing to spend almost any amount of money to get their health back. Health care costs so much because people are willing to pay so much for it. The many years a surgeon spends in training, the billions of dollars government spends on public health, and the comprehensive health insurance plans provided by employers are consequences of the value we as a society place on health care. They are effects, rather than causes. We are willing to spend so much on physician training, public health, and health insurance because what they produce is valuable to us. If we stopped caring about (or paying for) health, no new magnetic resonance imaging (MRI) scanners would be built, surgeons would stop spending years in training, and our taxes would go toward highways or national parks instead of AIDS and cancer research. Cows can get just as many diseases as humans do and we could put all those resources to work saving cows, but we don't. Cows, I am sure, would set priorities rather differently, but they are not paying the bills.

1.2 THE FLOW OF FUNDS

Goods and services are provided in a market economy only if the people who want them are willing to pay for them and if suppliers are willing to accept those payments in return. Exchange is based on voluntary agreement, so that trade between a buyer and seller occurs only when both parties believe that they will be made better off by trading (Fundamental Theorem of Exchange). In the simplest form of trade, consumers buy from businesses, exchanging money for goods and services in a two-party transaction.

Consumers make up the demand side of this simple service market, while firms make up the supply side. In legal terms, firms are contractual entities that can own, buy, and sell property and pay taxes just as real people do. To get the labor, land, and other inputs needed for production, the firm (the seller) in Figure 1.1 must also be a buyer, as shown in Figure 1.2. These secondary two-party transactions are characteristic of derived demand, purchases made as an intermediate step in production, rather than for final consumption. Firms are owned by individuals (or other firms) that provide the capital, labor, and organizational effort necessary to get them started and keep them running. Thus, every dollar that a consumer gives to a firm, whether used for wages, profits, or purchase of input from another firm, ultimately ends up in the hands of someone who wants to spend it. When workers or owners spend money, they become consumers, and therefore complete the circular flow of funds through the economy, as shown in Figure 1.3.

FIGURE 1.1 Two-Party Transaction

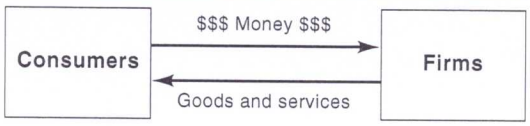


FIGURE 1.2 Derived Demand between Firms

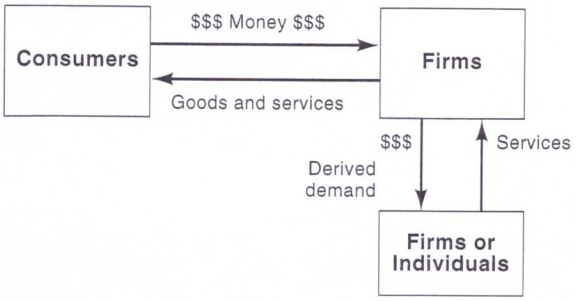
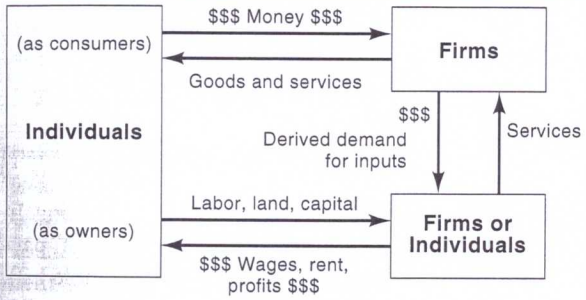


FIGURE 1.3 Circular Flow of Funds



Health Care Spending in the United States

Medical care in the United States is a trillion-dollar business, with an estimated average of $5,427 spent per person in 2002.[1] The 285 million citizens of the United States received services from more than 4,000 hospitals, 30,000 nursing homes, 750,000 physicians, 2.2 million registered nurses, and 8 million other health care workers. The major sources and uses of health care funding in 2002 are indicated in Table 1.1. Individuals paid $227 billion, or 15 percent of total funding; private (mostly employer-based) health insurance paid 35 percent; and government, the largest payer, paid 45 percent (17 percent Medicare, 16 percent Medicaid, 12 percent other government programs). The remaining 5 percent of total health care funding came from a variety of other private sources (philanthropy, industrial clinics, interest and rental income of providers). The largest use of funds was the $476 billion spent on hospital care, 31 percent of the total.

Figure 1.4 presents this information, highlighting a simple yet important fact: the "sources" and "uses" bars are of equal height because the total amount spent on health care must be identical to the total amount collected by providers. Every dollar spent by a patient, insurance company, or government is recorded as a cost, but is also recorded as income to a physician, hospital, agency, administrator, or other health employee. The flow

TABLE 1.1 U.S. Healthcare Spending, 2002

Uses of Funds	Percentage of Total	Amount Per Person*	Sources of Funds	Percentage of Total	Amount Per Person*
Hospital	36%	$1,509	Medicare	19%	$ 813
Physician	20%	852	paycheck deductions		528
Dental	4%	175	Medicaid	14%	593
Drugs & supplies	8%	353	VA & DOD	3%	119
Nursing home	8%	340	Workers comp.	2%	93
Home health	3%	123	Other government	7%	297
Eye & equipment	1%	55	*Total government*	*45%*	*1,914*
Other	9%	375			
Admin. & ins.	5%	215			
Public health	3%	113	Employer ins.	34%	1,416
Research	2%	62	Self paid	17%	734
Construction	1%	54	Charity, etc.	4%	162

*Based on a projected U.S. population of 285 million.

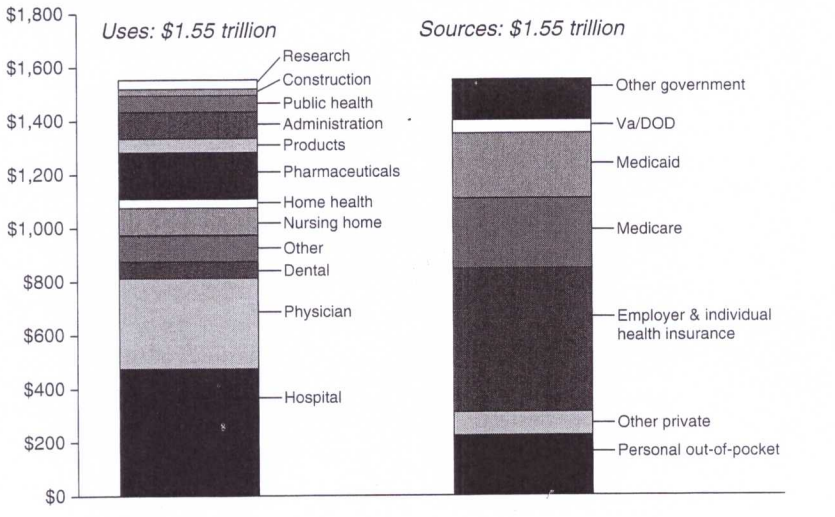
Source: U.S. Office of the Actuary, National Health Projections, http://cms.gov/statistics/nhe/.

of money is circular. Money itself is only a way of keeping track of all the obligations within the economy. Every dollar spent by one person is, of necessity, a dollar of income for someone else. Tracing the flow of funds through this complex system provides some sense of the forces that shape the economy.

Sources of Funds

Health care spending has grown enormously. In 2002, it was 15 percent of the Gross Domestic Product (GDP) and accounted for 1 of every 12 employees in the labor force. That growth has been facilitated by the shift from individual payments to third-party financing. In 1929, 81 percent of medical expenditures came directly from individual "out-of-pocket" payments and only 19 percent from government and other third-party organizations (Table 1.2).

FIGURE 1.4 U.S. Sources and Uses of Health Care Funds, 2002



Source: Office of the Actuary, www.cms.gov.

TABLE 1.2 Sources of Payment, 1929, 1965, 2002

	1929	1965	2002
Total health spending (millions)	$ 3,656	$ 41,012	$1,545,900
Adjusted for inflation (2002 $$)	32,400	192,300	1,545,900
Per capita (adjusted)	305	962	5,427
As a % of GDP	3.5%	5.7%	14.7%
% Paid by			
Self (out-of-pocket)	81%	44%	15%
Third parties	19%	56%	85%
Government	13%	25%	45%
Private insurance	< 1%	25%	35%
Philanthropy, other	6%	6%	5%

By 2002, this ratio had been reversed, with individuals paying only 15 percent directly and the remaining 85 percent of funds flowing through third-party transactions involving government, nonprofit organizations, and insurance.

All of the elements that characterized health care in 2002 were present in some form one hundred years ago, but their relative importance to the flow of funds has changed so much that the transactions look entirely different today.[2] Physicians, who in 1900 were tradespeople sometimes making do with partial payment in eggs or flour, have become highly paid and technologically sophisticated professionals who rarely talk to their patients about paying the bills. Hospitals, once minor supports for a few disabled and disadvantaged, are now technological palaces of intensive treatment and the largest users of U.S. health care funds. Whereas in 1900 hospitals were financed by a few donors and some patient fees, they are now financed almost entirely by third parties: either by government insurance such as Medicare and Medicaid or by private insurance provided through employment or purchased directly by consumers (Figures 1.5 and 1.6). For every $100 spent in the hospital, less than 2 percent comes from charitable donations. Even the 3 percent paid for by patients out-of-pocket does not really flow through a two-party transaction, because much of that 3 percent consists of co-payments, deductibles, and other fees related to third-party insurance payments.

There are many reasons health care spending has grown rapidly. An increasingly wealthy population is willing to spend more on all goods and services. Extra spending on health care has a greater appeal after basic necessities such as food and housing are taken care of. Technological advances make modern medicine more desirable. An aging population favors health care over other goods. Insurance now covers more of the cost. Shifting

FIGURE 1.5 Health Care Flow of Funds, circa 1900

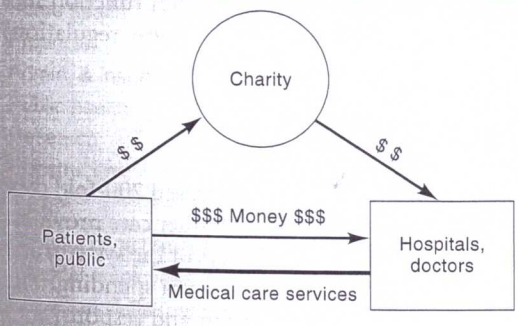
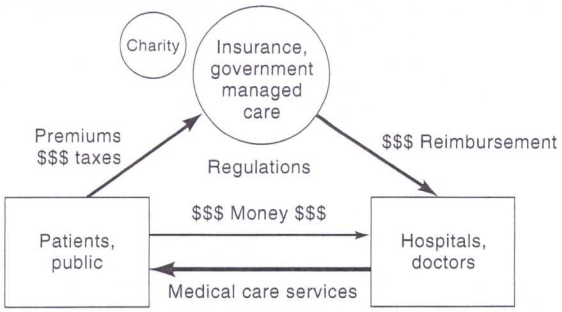


FIGURE 1.6 Health Care Flow of Funds, circa 2002



the financial burden from individuals to third parties through insurance not only changed the way funds flowed, but made more funds available, so that the health care system could grow rapidly and absorb an ever-larger share of total economic output.

Such "cost-shifting" has made the payment system complex and opaque—almost no one knows who is paying for what.[3] Billed charges bear little resemblance to what is paid, or what the provider receives, and provider revenues are usually identified not as "income," but as "reimbursement." Third-party payments are made with:

- Taxes paid to government agencies (Chapters 14 and 15)
- Employer and employee payments to commercial insurance companies (Chapters 4 and 5); for-profit and nonprofit managed care firms, including health maintenance organizations (HMOs), preferred provider organizations (PPOs), and other organizations (Chapter 10)
- Philanthropic contributions to charities (Chapters 4 and 14)

Each of these major categories of third-party payments exists in endless variations. The details differ widely, but from a flow-of-funds perspective, they all have a similar purpose: pooling funds from many people to pay the bills of the few patients who need care.

Who gets care and what kind of care are decisions made according to the rules of the group and the opinions of the professionals who run the health care system. In each case, indirect third-party payment weakens the monetary linkage between buyer and seller that characterizes the direct two-party transactions typical in most other sectors of the economy. For most medical transactions, there is no exchange of money between the recipient of services and the provider. The patients (or their families) pay insurance premiums and taxes, and the doctors and hospitals are paid by the government and insurance companies. In the absence of a direct link between the amount paid and the resources used in treatment, "prices" become more ambiguous and less important to the transaction than ongoing relationships of trust and professional behavior. One of the purposes of this textbook is to explain how economic forces continue to operate when prices do not function in a normal way and how other organizing principles (professionalism, licensure, regulation) serve as replacements.

Health Care Providers: The Uses of Funds

Payments by patients, government, and insurance companies have increased 200-fold over the past sixty years; thus, payments received by doctors, hospitals, and other care providers have increased by the same amount. In general, both the public, as users of the system, and providers, as suppliers of care, have been happy with this large increase in spending. The public has gotten a health care system that is technologically advanced and responsive to

their needs. Providers have gained glory in the fight against disease and substantial gains in income, making them eager to continue the struggle.

Part of the increase in health care spending from almost $4 billion in 1929 to $1,546 billion in 2002 is just an accounting fiction due to inflation, because $1 in 1929 is roughly the same as $9 in 2002. Also, some of the increase reflects a rise in the number of people who must be cared for. Yet even after adjusting for changes in population and inflation, real per capita spending has increased more than ten-fold since 1929. Some of this real increase in spending is due to a real increase in wages. As per capita incomes rise, workers expect more real goods and services per hour of work. Therefore, expenditures on labor-intensive services tend to rise more rapidly than expenditures on goods and capital-intensive commodities. Furthermore, the wages of health care workers have risen more rapidly than for other types of labor.[4] This probably reflects both the increased education of health professionals today and the increased demand for their services. Increases in the quantity of services provided account for some of the growth in total expenditures, but the medical services most commonly counted, number of days spent in the hospital and number of visits to physicians, have actually declined since 1965 (see Table 1.3).[5] However, nursing home days and number of prescriptions per person have increased substantially.

After taking all these factors into account—inflation, higher health care wages, and use of services—there still has been a tremendous increase in expenditures over the last thirty years, more than 250 percent. How can spending increase so much more rapidly than the increase in the number of services, or in the wages of those who provide them? By increasing the **intensity and quality of services.** More tests are done for a patient in a modern intensive care unit during a single day than were done for a patient over the course of a month in his or her wooden bed in 1929. Many of those tests (MRIs, blood glucose, heart monitoring) were not available back then. The physician who drove to the patient's house and worked alone out of a black bag has been replaced by a team of therapists, technicians, and support staff assisting a group of physicians, many of whom are specialists

TABLE 1.3 Changes in the Use of Health Care Funds over Seventy Years

	1929	1965	2002
Spending per person (in 2002 dollars)	$305	$962	$5,427
Percentage			
Hospital	18%	34%	31%
Physician	36	21	22
Dental	12	7	4
Drugs	18	9	10
Other	1	6	6
Nursing home	na	4	7
Home health	na	na	3
Products	3	3	4
Admin. & insurance costs	3	5	7
Public health	3	2	4
Research	1	4	2
Construction	5	5	1
Total	100%	100%	100%
Hospital days (per 100 persons)	9.4	10.3	5.6
Hospital employees (per patient)	< 0.5	2.5	7.4
Physician visits (per person)	2.6	4.3	3.8

using an array of medical equipment. Another factor that explains some of the growth in spending is that, as some common, acute (short-term) diseases have become curable or preventable, medical care is increasingly applied in cases of chronic diseases that were once considered hopeless. The shift from simple caring to technologically sophisticated curing is reflected by shifts in the categories of expenditure; more is going to institutional care in hospitals and nursing homes, while the share devoted to personal services by doctors has declined. The fraction of the health care dollar spent for manufactured goods such as drugs has also fallen, while the cost of labor-intensive services has risen.

1.3 QUALITY

Medicine often involves life-and-death decisions. In these situations, quality is crucial and quantity is irrelevant. It doesn't help if a mediocre surgeon offers to give you a second operation at half price. A patient usually consumes one and only one "unit" of care—an operation in this case—for each illness. The only trade-off made is in the quality, not the quantity, of the procedure. Having budget decisions made over quality rather than quantity tends to complicate economic analysis. While it is reasonable to assume for most other goods that price per unit remains constant as the quantity increases or decreases, any change in quality must change the price. Quality cannot simply be added up or multiplied to arrive at a total spending limit the way quantity can.

The quality of medical care has increased over the last thirty years. But has it increased as much as, or more than, the cost? While measures such as the consumer price index (CPI) attempt to deal with these issues, there is no consensus on how accurate they are, or even on what these measures should be. Can quality be measured by number of lives saved, number of lives saved per dollar spent, number of tests or services provided, level of physician knowledge (should this count if the patient dies), or patient satisfaction? Historically, most emphasis on quality was at the level of the individual: a procedure, a patient, or a physician. Was the surgery done properly? Did the patient heal well and was he satisfied with the care he received? Was the doctor adequately trained for the procedure with a certified supporting staff? Recently, a more comprehensive statistical perspective has come to the fore. What percentage of patients suffer infections as a result of surgery? What percentage of patients requires a second operation? How do these rates compare with surgeons and hospitals in other states or countries? The development of information technology has provided a major impetus for the development of such **population health** measures, which shift the focus from individual errors and competence to assessment of system performance.

Even though quality of care can mean the difference between life and death, it is important to remember that medical care cannot permanently save a life since we will all die eventually. What medical care can do is prolong a life and make it more productive. (See discussion of quality adjusted life years [QALYs] in Chapter 3.) The extension of life is not, however, unambiguously good. Increasingly, we are asked to make decisions about end-of-life care, release from suffering, and quality of life not in terms of morbidity and mortality, but in terms of relationships, social connections, and spiritual concerns.

1.4 PUBLIC OR PRIVATE CHOICES

For some goods there is only one unit, which we consume collectively. The atmosphere is an example. Quantity is not economically meaningful for the atmosphere. Having "more" by breathing deeply, turning on a fan, or opening a window does not add value if the

problem is pollution. Quality is the only relevant dimension. Air quality, the legal system, national defense, cancer research, transportation, and other goods that are similarly universal in consumption are known as "public goods." Being universal does not exempt them from scarcity. Scarcity of air quality (i.e., pollution) can be addressed through various improvements, each of which has a cost. Public funds, although much greater than those of any individual, are still subject to budget constraints. The price of better air must be paid by giving up some other public goods, or by all of us giving up some of our private goods by paying higher taxes.

Smoking has been banned on airplanes, trains, buses, and in office buildings of many firms, universities, and hospitals. Air quality has been improved without paying for pollution control equipment or raising taxes. Does this mean that these improvements in air quality came without a price tag or that no trade-offs had to be made? Of course not. Listen to the smokers gripe or to the complaints of non-smoking libertarians who worry that the next distasteful behavior to be banned will be drinking, or sex, or gun ownership. While it does not appear that anything has been bought or sold, a transaction has in fact taken place. The opportunity cost of a smoke-free workplace was a discernible, but small, loss of personal liberty. This is the "price" of the gain in air quality. People have made it clear that this is a price they are willing to pay—and just as clear that some measures advocated by health advisors are too costly to be implemented. Even though such collective relationships are inherently complex, involving millions of people, the fundamentals of opportunity cost, budget constraints, and trade-offs still apply. Price theory can be used to analyze what will happen.

"Private" and "public" are polar concepts. Few goods are so purely private that they are entirely unregulated regarding safety, ingredients, and disposal, and few goods are so public that there are no differences among individuals regarding use or quality.[6] The economic organization of medical care clusters more services toward the public end than is immediately apparent. Even though each of us goes individually to the hospital emergency room, in a small city we must all go to the same emergency room and, therefore, get pretty much the same quality of care. The mayor may get better service than a homeless person who is brought in off the street, but the mayor will be operated on by the same surgeon, will be cared for by the same nursing staff, and might end up in the same room as the homeless person. In a large city with many hospitals, there is somewhat more variation, but patients are rarely able to choose their surgeon, nursing staff, or room. Contrast that with the purchase of a coat, a birthday cake, or even a wheelchair, in which there are many more choices and much more individual control over quality.

Payment systems also tend to make medical care a public good. All employees in a firm often have the same insurance plan. Therefore, the mail clerk and the executive vice president are equally valued customers of the hospital. In Chapters 4 and 5 we will examine how the pooling of funds into insurance for payment of medical expenses can distort choices and obscure the nature of the budget constraint.

1.5 RESEARCH

Technology has been the driving force in the health care system—saving babies, lengthening lives, creating hospitals, linking medical records worldwide, and raising the American public's willingness to spend more than $1 trillion a year. One can easily imagine that spending would be doubled again without complaint if the research laboratories could come up with a vaccine for AIDS, a cure for cancer, and a reversal of Alzheimer's disease. Medical discoveries often have been fortuitous outgrowths of other activities (Pasteur's

discovery of bacteria grew out of an investigation into the causes of spoiled wine and beer) or the refinement of insights from patient care. Historically, what little direct funding there was for research came mostly from philanthropists. Today, taxpayers are the largest source of pure research funding through support of the National Institutes of Health and similar programs. However, a much larger portion of research funding is hidden in the cost of patient care, as the work of physicians to develop and refine new technologies is covered through reimbursement. The most prestigious hospitals and clinics are deemed superior because cutting-edge research and innovative therapies are first applied there. Being on the cutting edge is expensive, and charges for patient care at the top academic medical centers are as much as three times higher than those at local community hospitals (see Chapters 8 and 9). This source of indirect funding may be under pressure as the growth of managed care increases price competition in the hospital services market (see Chapters 10 and 12).

Most of the cost of developing new types of surgery and diagnostic tools does not show up as research in the national health accounts because it is covered as part of patient care reimbursement. Similarly, most of the research and development (R&D) at pharmaceutical companies is buried as an overhead cost in the production of drugs. Even more hidden is the cost of administrative innovation. Developing new forms of contracting, such as HMOs, or new methods of delivering care, such as home health companies and life care communities, is very costly, largely because it is a trial-and-error process requiring many expensive failures before a better system can be found. Yet such organizational development is not usually even recognized as being research and its cost is almost never tallied alongside the cost of laboratories and biomedical scientists.

The cost of continually innovating and changing medical treatments and delivery systems is staggeringly high, yet the forgone opportunity cost of not innovating is much greater. What athlete injured today would wish to forgo arthroscopic knee surgery and accept a hot mustard plaster? Senior citizens may say they want to turn back the clock to the good old days, but any politician who threatens to take away Medicare, or even to cut benefits slightly, gets defeated at the polls. The American public demands a modern, constantly updated health care system. Research into new therapies and new forms of organization is the force that has made it worth spending $1,546 billion today versus $4 billion dollars one hundred years ago. Yet the flow of funds into research is hard to trace, the connection between spending and benefits is difficult to make, and the dynamics of technological and organizational change are among the most challenging of economic questions.

1.6 TIME

Time is more limited than money. You have just 24 hours each day. To use your money as a consumer you must have time. Given time, you can get money. Or, you can spend your time meditating, hunting for berries in the woods, or writing poems in the sand. At least you are alive. If you have money, but no time left, the money is worthless. Death is the ultimate budget constraint. Once the sum total of all your hours is gone, there are no second chances, no credit advances—and no more decisions to make. While all economists acknowledge that scarcity is fundamentally defined by the consumer's lifetime, this awareness is more acute among health economists because the business of medical care centers on life-and-death decisions.

It is difficult to improve your health once it has deteriorated. Spending money on medicine once you are seriously ill is a little like spending money on your car after the engine has begun to burn oil; regular maintenance is a lot cheaper. How healthy you are

when you get old depends not so much on the medical care you get then, but on what you have done to and for your body over the years. Taking some of your time each week to exercise and giving up some tasty junk food (donuts, french fries, ice cream sundaes) can help you live longer and feel better in the future. Some people would call such behavior health consciousness, or following a healthy lifestyle. As economists, we call it savings and investment. What I am doing is reducing consumption now (less ice cream) so that I can consume more (have greater enjoyment) in future years. I invest in my body by exercising, just as a firm invests in a manufacturing plant by doing maintenance and construction. Most readers of this textbook are studying now for a future reward: knowledge, grades, a degree, career advancement. You are investing, giving up time (money) now to obtain more value in the future.

Medical school is a form of investment, usually a very good one (see Chapter 7). Similarly, the research done by pharmaceutical companies is an investment: forgo current profits to discover a new drug that will begin to sell fifteen years from now. In a society, the money used for medical schools and research, the loss of life due to trials of experimental drugs, and the difficult learning curve of surgeons in training (somebody has to be the first patient) are investments in the future of medical care. Current losses are real, and staggeringly large, but the rewards are greater. Imagine how many of your parents, or your classmates, would be dead if we decided as a society to stop the losses and practiced the best nineteenth century medicine for the next one hundred years.

1.7 THE STRUCTURE OF THE ECONOMY: CONTRACTS

A contract is an agreement to trade. In a two-party transaction, as depicted in Figure 1.1, the contract is often so simple that it is never written down and is specified in only a few words (e.g., "Will you take $5 for that lamp?"). Buying a new car is more complicated. There is almost always a sales agreement, the terms of which must be agreed to by a manager, and the real seller is not the salesperson but a corporation. Taxes must be paid. The buyer has a warranty against defects and malfunction, and in some states has a legal right to return the car without penalty within the next three days. Buying a house entails an even more intricate set of contracts, with obligations involving many firms and the government. The shape and responsiveness of an economy—its information structure or "neural network"—is determined by the contracts that link parties. It is made up of all the contractual entities: people, partnerships, corporations, government agencies, courts, constitutional conventions, legislatures, and even the police and military forces (since contracts engender disputes and force is the ultimate means of dispute resolution).

Medical care is part of, and contractually connected to, the larger economy as a whole.[7] Physicians earn money so they can buy cars and houses and CDs. The cost of care to patients is in forgoing cars and houses and CDs. While all parts of the economy exchange money and share certain features, many parts have special features and specialized contractual forms (movie studios, the National Football League, stockbrokers). Medicine is more special than most other types of economic activity because of extreme information requirements and risks entailed in treating disease. No one needs a prescription to rent a DVD. You don't have to have insurance or sign a consent form to have your car's fuel pump worked on, and almost anyone can cut your hair without a license. The degree of trust in a surgeon, and the reliance on professionals to enforce standards and maintain quality within the operating room, is quite special. The use of more extensive contractual structures (professional licensure, hospital staff bylaws, regulatory review) to meet such special needs is a standard and helpful response of a modern economy.

1.8 ECONOMIC PRINCIPLES AS CONCEPTUAL TOOLS

Questioning whether the effects of another course of chemotherapy are worth the possibility of surviving until your daughter graduates is highly personal, yet the principles involved are common to most economic problems: balancing costs and values within a set of constraints imposed by the situation. Structurally, it can be analyzed like other decisions: whether to apply to medical school, how many risks to take while skydiving, the choice between buying health insurance and taking a vacation. A list of seven principles useful as "conceptual tools" for analyzing decisions is provided here. Most of these will be evident to you based on your own experience or previous study. If not, you might wish to review some of the suggested introductory economics resources.

Trade

People engage in trade, exchanging things, time, favors, money, and information, because it makes them better off. Both sides must benefit, or they would not agree to trade. This is the Fundamental Theorem of Exchange and perhaps the most basic principle of economic reasoning.

Choice: Are Benefits Greater Than Costs?

Every decision involves a trade-off, giving something up in order to get something else, choosing the one that means more to you. This is obvious when you engage in trade with someone else. It is true whenever you make a choice, even though you "trade" only with yourself (e.g., giving up a workout at the gym in order to study, passing up a new CD in order to buy dinner at a restaurant, giving up some of your savings in order to take a trip to Cancun). Economists assume that people tend to make choices that make them better off in a way they value (not necessarily financially). This is known as the "benefit-cost principle."

Opportunity Cost

The best measure of what something costs is what you have to give up to get it. The trip to Cancun might cost you $750 in savings; an extra weekend date might cost you an A as your grade falls to a B+ because you gave up study time. Conversely, you might say that the decision to be a grind and get an A cost you a date. It is the decision you make, not the price tag or money, that really determines the cost of something. The primary cost of attending this class is the time it takes (the fun you could have had and/or the money you could have earned), not the amount spent on tuition and books.

Scarcity (Budget Constraints)

Why does a decision always involve giving something up? Because reality imposes limits, or constraints, on what you can do. The most basic limit is time. You have only 24 hours per day and once your days are gone (due to death) you have no more life to use in production or consumption. Your income and your bank balance, the place you live, the things and friends you have, and even your credit rating all put limits on what you can do to make yourself better off. Economists call them "budget constraints." This term applies not only to money, but also to time, things, relationships, and any other kind of constraint.

Maximization/Marginalism

Productive effort and exchange (trade) are ways people make themselves better off. What principle determines when to stop? When the benefits from the next step are outweighed by the costs. Each decision increment (read one more page, eat one more slice of pizza, play one more game) adds a little value (marginal benefit). Each step also takes a little more time or money (marginal cost). The real issue is not whether something (grades, food, playing time) is good, but whether you would be better off with more or less of it.

As more and more is done a point at which the benefits of each additional step become smaller and smaller (diminishing marginal returns) is usually reached, and the costs of an additional unit become greater. Maximum net benefits are obtained by pushing to the point at which rising marginal costs equal falling marginal benefits.

Money Flows in a Circle

When someone buys something, the money spent must be received by someone else. The seller wants those dollars for what he or she, in turn, can buy. The dollar is almighty because it flows—because it can be changed into anything else—not because there is any inherent value in a wrinkled piece of paper.

Contracts and Organization

The seller must have faith that the money obtained in trade will have value. The buyer must have faith that the goods received are what they are supposed to be. Both buyer and seller must be able to trust each other. The more complex the transaction, the more a buyer and seller have to trust each other and to rely on external guarantees. Buying on credit or for future delivery (mail order, new custom home, knee surgery) creates potential problems and requires an extended contractual framework. Uncertainties in value (a used car "as is," a share of stock in a start-up company, an experimental drug to treat your rash, trip insurance for your Cancun vacation) also force greater reliance on trust and contract specifications. Having to include a third party that handles the money (purchasing agent, insurance company) makes transactions even more complex and vulnerable to fraud. Two of the parties may collude to take advantage of the third party. Often, tracing the flow of funds helps reveal the underlying economic forces at work, even if the contracts are confusing or people lie.

Organizations evolve to build trust and increase the efficiency of exchange. Laws, rules, political parties, mandatory labels, certified measures, corporate financial statements, clubs, professions, and nonprofit organizations are in a sense market responses to market failure, as difficulties in making simple price transactions are resolved by more comprehensive contracts. Government is the most comprehensive of such social structures. Exchange and economic potential remain limited until a solid base of personal trust, laws, contractual organization (markets, firms, credit, regulations), and social structure evolves. The growth and output of an economy have more to do with the efficiency of organization than the endowment of natural resources, numbers of people, financial aid, or any other factor.

1.9 HEALTH PRINCIPLES

Medicine is not all, or even mostly, about money. Science, caring, professionalism, and even religious concerns regarding birth and death can be more important than dollars.

Economics gives one important and clear perspective, but it is a limited view—analogous to the kind of limited view that an X-ray provides of a person, or that radiology provides for all of medicine. Just as radiology has been expanded to include sonograms, computed tomography (CT), positron-emission tomography (PET), MRI scans, and other forms of diagnostic imaging, economics has expanded to examine social relationships, politics, and the financing of technological advances. Yet, no matter how powerful economics is for analyzing decisions, it still remains just one piece of a larger picture. Most of medicine and health lies outside the scope of this textbook, but a few simplified health principles within the expanding realm of economics are noted here.

Health Is Priceless

In a crisis, people will pay almost anything for medical care. The opportunity cost is too great to bargain over "how much" when your daughter's life is at stake. People do not want to make difficult decisions trading off dollars for health. This is why virtually every modern economy offers medical care on demand and extensive programs of health insurance. Much of the struggle in health economics is to face up to the inevitable trade-offs by stepping out of crisis mode and looking at the larger picture regarding costs and benefits.

And Yet, Money Still Determines Health

Everywhere we look, the rich are healthier than the poor. In unsophisticated rural villages and modern cosmopolitan cities, with health insurance or without, the rich tend to do better in terms of both mortality (death rates) and morbidity (illness rates). A particular rich person may be in worse health than a poor person, but in general, money has a strong positive impact on physical condition. Other demographic factors (age, sex, race) are often even more important.

Health Risks Are More Public Than Private

Just as your income depends more on the level of development of the economy into which you were born than on your individual skills and effort, so does the state of your health. Compared with starting your life in Switzerland, being born in a rural village in the Sudan severely curtails both your earning power and your life expectancy.

Individual Choices: Lifestyle Is More Than Medicine

To the extent that individual choices influence health, lifestyle matters more than medical purchases. It is not that medicine isn't important, but that most people will almost always pay for the important types of care. The remaining marginal choices, Branch Creek Hospital versus University Hospital, generic *naproxen sodium* versus *ALEVE*, doctor at the local health department clinic versus specialist in private practice, will not have a major impact on death rates, although they may have a lot to do with personal satisfaction and the quality of the experience. Flying first class on a major carrier is more comfortable than flying cut rate in economy class, but safety (the likelihood of dying in a crash) is about the same. Similarly in medicine, the available choices in a generally high-quality and highly regulated system mean that "better" care usually does not have a measurable impact on mortality.

Measurable Differences in Quality Over Time, or Regions, Are Greater Than Most Differences in Choices Faced by Patients

Heart surgery in 2002 was so much better than the kind practiced in 1962 that no one would choose the latter. Rich patients may fly from Guatemala to the United States for superior medical care, but few U.S. tourists would decide to have knee replacement surgery done in Guatemala while on vacation to save a few dollars. Individual market choices for quality are important and persistent for goods such as clothing and housing, but medical care is more like the market for computers and video equipment, in which most people pay for what is newest.

1.10 HEALTH AND THE ECONOMY

Spending money on medical care is only one of many ways that the economy affects people's health. Economic prosperity enables people to have a better diet, to avoid hazardous jobs, and to clean up the environment, as well as to purchase more medical care.[8] A major benefit of higher incomes is education, which changes values and production possibilities in ways that are favorable to health. Chapters 16 and 17 provide more detailed examination of the complex relationships between economic growth, income distribution, medical care, and health, but some basic facts provide a useful background for study of the health care system. Table 1.4 presents the results of a study of 320,000 middle-aged men enrolled in a trial of cardiac risk reduction.[9] Income for this study is based not on individual wages, but on the community in which the person lived (average per capita income of the ZIP code of residence). Reading down the columns, it becomes evident that men in poorer communities face a much higher risk of death each year, a finding that holds even as the groups are adjusted for age, unemployment, use of medical care, and other factors. Indeed, those living in areas with average incomes below $10,000 per year were twice as likely to die as those in areas with average incomes above $30,000 per year. Blacks were more likely to die than whites, largely because of living in lower income areas. Yet even after controlling for differences in income, black mortality is still significantly greater each year. Similar differences in morbidity and mortality rates by socioeconomic and ethnic grouping are observed among women, the elderly, and children.

Although insurance and government assistance has done much to equalize access to medical care, large disparities in actual health and life expectancy endure. Inequalities in health are found throughout the world. Countries such as Sweden and the United

TABLE 1.4 Annual Mortality Rate Among Middle-Aged Men

Income Category	Mortality Rate	
	White	Black
< $ 9,999	0.918%	1.234%
$10,000 – $14,999	0.840%	1.123%
$15,000 – $19,999	0.706%	0.899%
$20,000 – $24,999	0.660%	0.867%
$25,000 – $29,999	0.591%	0.603%
$30,000 +	0.542%	****

Source: G. D. Smith et al, *American J. Public Health* 86: 486–504, 1996.

Kingdom, which have universal national health systems, also show substantial differences in mortality between groups, as do poorer countries such as Bangladesh and Ghana, where a national health infrastructure is almost nonexistent. Health economists are still working to understand the persistence of excess mortality among disadvantaged groups despite tremendous increases and redistribution in health care spending.

The effects of medical care on the economy are as profound as the effect of economics on health. Not only has medicine led to better health, greater longevity, and increased productivity, it has become one of the largest businesses in the world. Investments are made in hospital bonds and biotech stocks to make people better off monetarily, not just in terms of health. To those who directly or indirectly earn their living from medicine (physicians, nurses, hospital administrators, equipment vendors, and even health economists), the business aspects—the contracts that are used to allocate health services—are the most salient. The invisible hand plays a role in creating a demand for health economics that is just as powerful, and more direct, than the desire to improve the standard of living and care for the sick.

SUGGESTIONS FOR FURTHER READING

Health United States, 2002. U.S. Department of Health and Human Services (annual publication), (www.cdc.gov/nchs/hus.htm).

National Health Expenditures 1980-2001 and National Health Expenditure Projections 2001-2011, U.S.D.H.H.S., Centers for Medicare and Medicaid, National Health Accounts, (www.cms.gov/statistics/nhe).

Kaiser Family Foundation Health Policy Studies (www.kff.org).

Victor Fuchs, "Economics, Values and Health Care Reform," *American Economic Review* 86, no.1 (1996):1–24.

Paul Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1982).

SUMMARY

1. For people to get what they want from the system, exchanges between patients and providers must be made. **Trade** is the means, not the goal. **Health economics** is the study of how those transactions are made and of the bottom line results.
2. The **terms of trade** are the specifics of a transaction. Only in a very simple exchange are all of the terms of trade captured in the money price. The **Fundamental Theorem of Exchange** states that for a trade to take place, both the buyer and the seller must believe that it makes them better off.
3. **Value** is not inherent in a good, but in the trading relationship. **Health care costs so much because people are willing to pay for it.** As a wealthy country, the United States was willing to spend more than 1.5 trillion dollars in 2002, $5,427 per person, supporting a dynamic and technologically sophisticated health care system.
4. Health care costs have consistently **risen 3 to 5 percent more rapidly than incomes** and now account for **15 percent of GDP. Government** is the largest provider of health care funds (45 percent), and hospitals are the largest users (36 percent). **Physicians** account for about 0.5 percent of the U.S. labor force, about the same percentage as in 1880. However, the number of nurses and other health workers per physician has risen from 0.2 to sixteen.
5. Two major complexities in the economics of health are that most choices are made regarding **quality,** rather than price or quantity, and that there is **uncertainty** regarding the effects of medical care upon health.

6. **Costs are unevenly distributed.** Seventy percent of total health care dollars are spent on the 10 percent of people who become most ill during a year. Due to the uncertain and uneven distribution of medical costs, most health care payments flow through **third-party insurance** intermediaries, which pool and transfer funds. This system replaces the direct exchange of money for services between two parties (consumers and providers), which is common to most markets.
7. Some choices can be made only by society as a whole. Such things as airline safety, cancer research, and malpractice laws are **public goods.** Pooled financing through insurance can make medical care into a form of public good even though services are provided and consumed in private transactions between doctors and patients.
8. **Research** into new drugs and therapeutic techniques is very expensive, but the forgone opportunity cost of not innovating would be much greater.
9. Improvement in **health and longevity** has come mostly from **economic growth, social factors,** and inexpensive **public health** activities rather than the application of expensive medical technology. Insurance and government programs have greatly reduced disparities in the use of medical care between income groups, but **socioeconomic differentials in health status have persisted.** Residents of poor neighborhoods are twice as likely to die as are people of the same age and sex who live in wealthy neighborhoods.

PROBLEMS

1. {*economic principles*} What is the opportunity cost of going to a doctor to be examined for skin cancer?
2. {*economic principles*} What is the primary budget constraint facing an 84-year-old billionaire?
3. {*planning resources per capita*} Using the data in this chapter, calculate the number of physicians, nurses, hospitals, and nursing homes there would be in an average small town with 10,000 people (total U.S. population was approximately 285 million in 2002).
4. {*local estimates*} Using the telephone book for your city, try to determine whether the number of physicians, nurses, hospitals, and nursing homes is greater than or less than the number you calculated for Problem 3. Why is it more difficult to estimate the number of physicians than the number of hospitals? Why is it so difficult to estimate the number of nurses?
5. {*distribution of health expenditures*} Ranking everyone by the amount spent on medical care, 30 percent of the total (all expenditures for all people) is accounted for by the top 1 percent of patients. Take the overall average per capita personal health expenditure and determine how much on average is spent on each of these high-cost patients. The top half of the population accounts for 90 percent of total spending. What is the average amount spent on the remaining people in the bottom half of the distribution? Is the median (i.e., amount spent on the person who is at the middle of distribution, with half of all people spending more, and half of all people spending less) higher or lower than the mean?
6. {*philanthropy, $ versus %*} Has the dollar amount of charitable giving for health increased or decreased since 1900? Has the percentage of health expenditures paid for by charity increased or decreased?

7. {*manpower*} Which has increased more rapidly since 1900, the number of physicians or the number of ancillary health workers? As medicine becomes more technologically advanced, which will grow faster, the number of more-skilled workers or the number of less-skilled workers?
8. {*utilization*} Did people go to the doctor more often or less often in 2002 than in 1965? In 1929? Did they spend more or fewer days in the hospital? Why?
9. {*causality*} Have health expenditures increased because the number of people employed has increased, or has health employment increased because total health expenditures have increased?
10. {*causality*} Would eliminating research reduce or increase the cost of U.S. health care?
11. {*normative and positive judgments*} Are public choices better or worse than private choices?
12. {*Fieldwork*} Contact three people and find out how much they spent on health care last year. Try to estimate how much they spent out of their own pockets and how much was spent by their employers, insurance companies, or the government. Did the people with more serious health problems always end up spending more of their own money on health care? Did they personally end up paying a larger or smaller percentage of their total health bills out of pocket?

ENDNOTES

1. National Health Care Expenditures Projections 2001-2011. U.S.D.H.H.S., Centers for Medicare and Medicaid, National Health Accounts (www.cms.gov/statistics/nhe), accessed November 22, 2002. The CMS Office of the Actuary is the source for all expenditure estimates in this and subsequent chapters, unless noted otherwise.
2. Committee on the Costs of Medical Care, *Medical Care for the American People* (Chicago: University of Chicago Press, 1932); Odin W. Anderson, *Health Services as a Growth Enterprise in the United States since 1875* (Ann Arbor, Mich.: Health Administration Press, 1990).
3. The distribution of costs across individuals can be measured only for personal health care costs that are billed to individuals, not for overhead items such as public health, construction, and insurance administration. Such overhead items make up about 14 percent of national health expenditures. Hence, the "personal health expenditures" account for only 86 percent of national health expenditures in Table 1.1 and elsewhere. In truth, even when charges are billed to an individual, many costs have overhead components and are difficult to unambiguously assign to a single person, although they are clearly concentrated on the most ill and not evenly distributed. Many economists would argue that costs are more concentrated than statistics indicate (Figure 4.1 and Table 4.2) since hospitals and physicians typically overcharge the least complex patients to subsidize the most difficult and complex cases (see the discussion of "cost shifting" in Section 8.4).
4. Bureau of Labor Statistics, U.S. Department of Labor, *Employment and Earnings* (www.bls.gov). Bureau of Labor Statistics, U.S. Department of Labor, *Employment Cost Indexes and Levels, 1975–90,* Bulletin 2372, 1990.
5. U.S. Department of Health and Human Services, *Health United States 1975,* and *Health United States 2002* (www.cdc.gov/nchs/hus.htm).
6. Joseph E. Stiglitz, *The Economics of the Public Sector* (New York: W.W. Norton, 1986).
7. Paul Starr, *The Social Transformation of American Medicine* (New York: Basic Books, 1982).
8. Thomas McKeown, *The Modern Rise of Population* (London: Edwin Arnold, 1976); Massimo Livi-Bacci, *A Concise History of World Population,* trans. Carl Ipsen (Cambridge, Mass.: Blackwell, 1992). James P. Smith, "Healthy Bodies and Thick Wallets: the Dual Relationship Between Health and Economic Status," *Journal of Economic Perspectives* 13, no.2 (Spring 1999): 145–166.
9. G. D. Smith, J. D. Neaton, D. Wentworth, R. Stamler, and J. Stamler, "Socioeconomic Differentials in Mortality Risk Among Men Screened for the Multiple Risk Factor Intervention Trial," *American Journal of Public Health* 86 (1986): 486–504.