HEALTH CARE AND THE UNITED STATES ECONOMIC SYSTEM

An Essay in Abnormal Physiology

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Health care affects and is affected by the economic system in so many ways as to preclude any attempt at complete enumeration or description. The objective of this paper is more modest. I shall assume that the reader is reasonably familiar with health care, its institutions, technology and personnel, but is less familiar with an "economic system" that is used by economists to describe and analyze economic behavior. Therefore, major emphasis will be given to indicating the place of health care in this system and showing how related economic concepts can contribute to an understanding of problems of health care in the United States. I shall also attempt to indicate some of the limitations of economics in dealing with such a complex area of human activity and concern.

INTRODUCTION

Definitions

Health care can be defined as those activities that are undertaken with the objective of restoring, preserving or enhancing the physical and mental well-being of people. These activities may be aimed at the relief of pain, the removal of disabilities, the restoration of functions, the prevention of illness and accidents or the postponement of death. Some health care is produced within the "household;" e.g., the triage, first-aid and

nursing services rendered to children by parents. Some is bought and sold in the "market"; e.g., physicians' services, hospital services. Most health care is applied to identifiable individuals but some may be aimed at a population; e.g., fluoridation of a water supply.

The *economic system* consists of the network of institutions, laws and rules created by society to answer the universal economic questions: (a) What goods and services shall be produced? (b) How shall they be produced? and (c) For whom shall they be produced?[1] Every society needs an economic system because *resources* (natural, human and manmade) are scarce relative to human wants. The resources have alternative uses and there is a multiplicity of competing wants. Thus, decisions must be made regarding the use of these resources in production and the distribution of the resulting output among the members of society.

Two Fallacies

Before turning to several important issues concerning health care in relation to the economic system it will be useful to dispose of two fallacies that have frequently obstructed clear thinking in this area.

1. Resources are no longer scarce. Some people seem to be so inspired, terrified or confused by automation and other technologic advances as to proclaim the end of scarcity. A decade ago it was not unusual to find writers prophesying that in ten years no one would have to work because machines would turn out all the goods and services needed. The falsity of such predictions becomes more apparent each year. That inefficiency and waste exist in the economy cannot be denied. That some resources are underutilized is clear every time the unemployment figures are announced. That the resources devoted to war could be used to satisfy other wants is self-evident. But the fundamental fact remains that even if all these imperfections were eliminated total output would still fall far short

of the amount people would like to have. Resources would still be scarce in the sense that choices would have to be made. An economic system would still be needed. Not only is this true now, but it will continue to be true in the foreseeable future. Some advances in technology make it possible to carry out current activities with fewer resources (e.g., automated laboratories), but others open up new demands (e.g., for renal dialysis or organ transplants) that put further strains on resources. Moreover, time, the ultimate scarce resource, becomes more valuable the more productive we become.[2,3]

2. Health is the most important goal. Some of those in the health field recognize that we cannot satisfy all wants, but they seem to believe that health is more important than all other goals and therefore questions of scarcity and allocation are not applicable in this area. It requires only a casual study of human behavior to reveal the fallacy of this position. Every day in manifold ways people make choices that affect health and it is clear that they frequently place a higher value on satisfying other wants; e.g., smoking, overeating, careless driving, failure to take medicine.

Criteria for an Economic System in Relation to Health Care

What is it that we want the economic system to do with respect to health care? Given the scarcity of resources and the existence of competing goals we want a system that will result in:

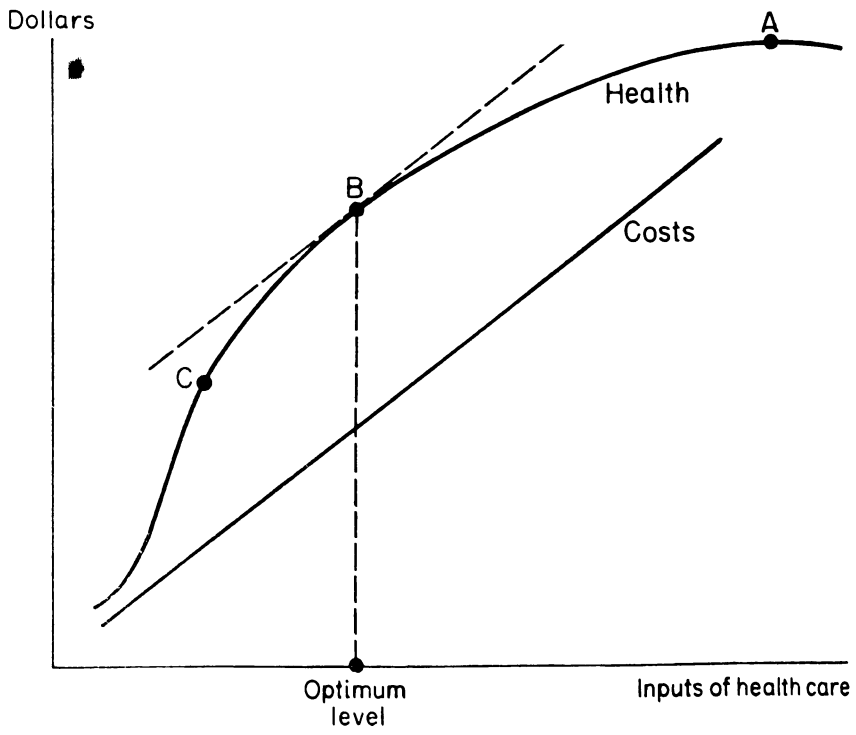
1. An optimum amount of resources devoted to health care;
2. These resources being combined in an optimal way;
3. An optimal distribution of health care;
4. An optimal allocation of resources between current provision of health care and investment for future health care through research, education and so forth.

The general rule for reaching such optima is "equality at the margin." For instance, the first criterion would be met if the

last dollar's worth of resources devoted to health care increased human satisfaction by exactly the same amount as the last dollar's worth devoted to other goals.

The contrast between this view of a social optimum and the notion of "optimal care" as used in the health field can be appreciated with the aid of Figure 1. The relation between health and health care inputs can usually be described by a curve that may rise at an increasing rate at first, but then rises at a decreasing rate and eventually levels off or declines.[4] "Optimal care" in medicine would usually be defined as the point where no further increment in health is possible; i.e., point A.[5] The social optimum, however, requires that inputs of resources not exceed the point where the value of an additional increment to health is exactly equal to the cost of the

FIGURE I. DETERMINATION OF OPTIMUM LEVEL OF HEALTH CARE UTILIZATION



inputs required to obtain that increment (point B). It should be noted that point C, where the *ratio* of benefits to costs is at a maximum, is not the optimal point because additional inputs still add more to benefits than to costs. One of the problems with current health care policy is that it frequently fluctuates between trying to drive utilization to A, and then, in frenzied attempts to contain costs, cuts back some programs to point C or below.

Types of Economic Systems

Economists have identified three "pure types" of economic systems—traditional, centrally directed and market price. Every actual economy is a blend of types, but their relative importance can and does vary greatly. Most primitive and feudal societies rely heavily upon a traditional system; the process of decision-making is embedded in the total culture—its customs, traditions and religious rituals. In some ancient empires (Egypt, Babylonia) central direction played a major role. The basic decisions were made by one man or a small group of men who controlled the power apparatus of the society and were in a position to enforce their decisions concerning the allocation of resources and the distribution of output. This system has also been dominant in the Soviet Union since 1928 and in many other countries since World War II. The United States, Canada and most countries of Western Europe have relied heavily on a market system for the past century or two. Thus a discussion of health care and the United States economy requires a close look at the working of a market system. An additional reason for concentrating on this third type is for its normative value. Under certain specified conditions the results produced by the theoretical market system set a standard against which the performance of any real economy can be evaluated.[6]

The Elementary Model

The elementary model of a market system consists of a collection of decision-making units called *households* and another

collection called *firms*. The households own all the productive resources in the society. They make these resources available to firms who transform them into goods and services, which are then distributed back to the households. The flow of resources and of goods and services is facilitated by a counterflow of money (see Figure 2).[7] This is called a market system because the exchanges of resources and of goods and services for money take place in markets where *prices* and *quantities* are determined. These prices are the signals or controls that trigger changes in behavior as required by changes in technology or preferences. The market system is sometimes referred to as the "price" system.

In the markets for resources the households are the *suppliers* and the firms provide the *demand*. In the markets for goods and services the firms are the suppliers and the households are the source of demand. In each market the interaction between demand and supply determines the quantities and prices of the various resources and goods and services (see Figure 3).

The income of each household depends upon the quantity and quality of resources available to it (including time) and their prices; the amount of income determines its share of the total flow of goods and services. The household is assumed to spend its income (and time) in such a way as to maximize *utility* (i.e., satisfaction). It does this by following the principle of "equality at the margin;" i.e., it adjusts its purchases so that marginal utility (the satisfaction added by the last unit purchased) of each commodity is proportional to its price.

It is assumed that firms attempt to maximize *profits* (the difference between what they must pay the households for the use of resources and what they get from them for the goods and services they produce). To maximize profits they too must follow the equality at the margin rule, adjusting their use of different types of resources so that the marginal products (the addition to output obtained from one additional unit of input) are proportional to price.

If the markets are perfectly competitive and if certain other

FIGURE 2. ELEMENTARY MODEL OF A MARKET SYSTEM

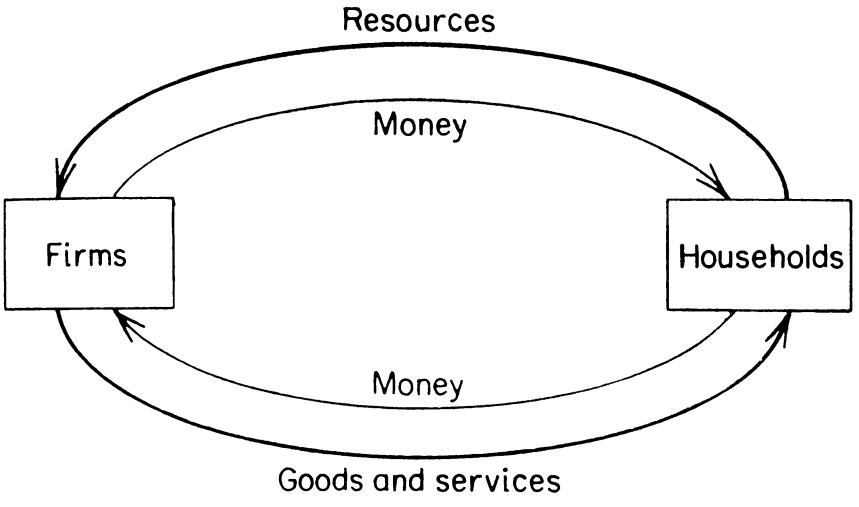
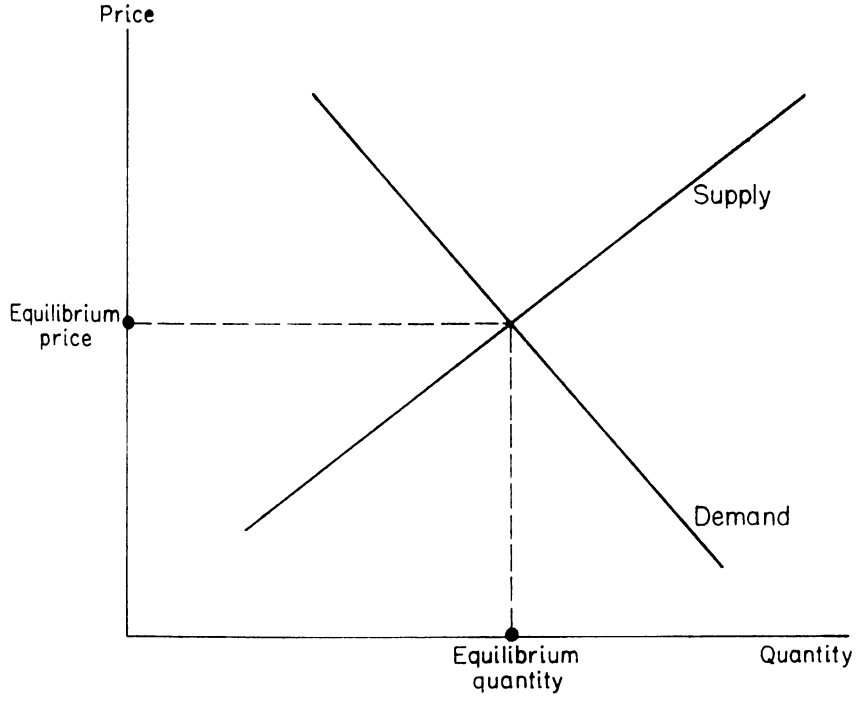


FIGURE 3. A TYPICAL MARKET



conditions are met, it can be shown that a market system produces an optimum allocation of resources, given the distribution of resources among households and given their "tastes" or preferences. The United States economy departs in many respects from the abstract perfectly competitive market system; this is particularly noticeable in the health care sector. The main body of this paper is devoted to a discussion of these departures and the problems they pose for health care policy.

IMPERFECTLY COMPETITIVE MARKETS

The essence of a competitive market is (1) that there are many well-informed buyers and sellers no one of whom is large enough to influence price; (2) that the buyers and sellers act independently (i.e., no collusion); and (3) that there is free entry for other buyers and sellers not currently in the market. Most health care markets depart substantially from competitive conditions, sometimes inevitably, and sometimes as the result of deliberate public or private policy. A discussion of some of the principal problems follows.

Fewness of Sellers

In most towns and even moderate size cities the market is too small to support enough hospitals or enough practitioners in each speciality to fulfill the requirements of a workably competitive market. For instance, most students of hospital costs believe there are significant economies of scale in general hospitals up to a size of 200 or 300 beds, and some believe that economies are to be realized in even larger hospitals. Assuming a ratio of four beds per 1,000 population, a city of 60,000 could support just one 240 bed hospital. Thus, it would be extremely uneconomical to require numerous competitive hospitals except in large, densely populated markets. These constraints are even more significant when specialty care is considered. It is doubtful that even a population of one million would justify enough independent maternity, open heart surgery and transplant services

and the like to approximate competitive conditions.[8]

In such a condition of "natural monopoly" the traditional United States response has been to introduce public utility regulation (e.g., electricity, telephone, transportation). The results, however, have not always been satisfactory, partly because the regulators often tend to serve the regulated rather than the public and partly because it is inherently difficult to set standards of performance without competitive yardsticks. Many other countries rely on government ownership and control, but the United States experience with government hospitals has not, on balance, been favorable. Another possible solution is the development of what J. K. Galbraith has termed "countervailing power" and what the economics textbooks describe as bilateral monopoly. If, for instance, in a one-hospital town all the consumers were organized into a single body for purposes of bargaining with the hospital, at least some of the disadvantages of monopoly would be lessened.

The typical "solution" in the hospital field has been to emphasize the "nonprofit" character of the hospitals and to assume that therefore the hospital will not abuse its monopoly power. Two criticisms of this "solution" are (a) the absence of a profit incentive may lead to waste, inefficiency and unnecessary duplication, and (2) the hospitals may be run for the benefit of the physicians.[9]

Cooperation (Collusion) Among Sellers

Even when numerous sellers of the same health service are in the same market there may be significant advantages to society if they do not maintain a completely arms-length competitive posture vis-à-vis one another. The free exchange of information, cooperative efforts to meet crisis situations and reciprocal backup arrangements may help to reduce costs and increase patient satisfaction. Unfortunately, the intimacy and trust developed through such activities may spill over in less desirable directions such as price fixing, exclusion of would-be rivals and other restrictions on competition. For 200 years econ-

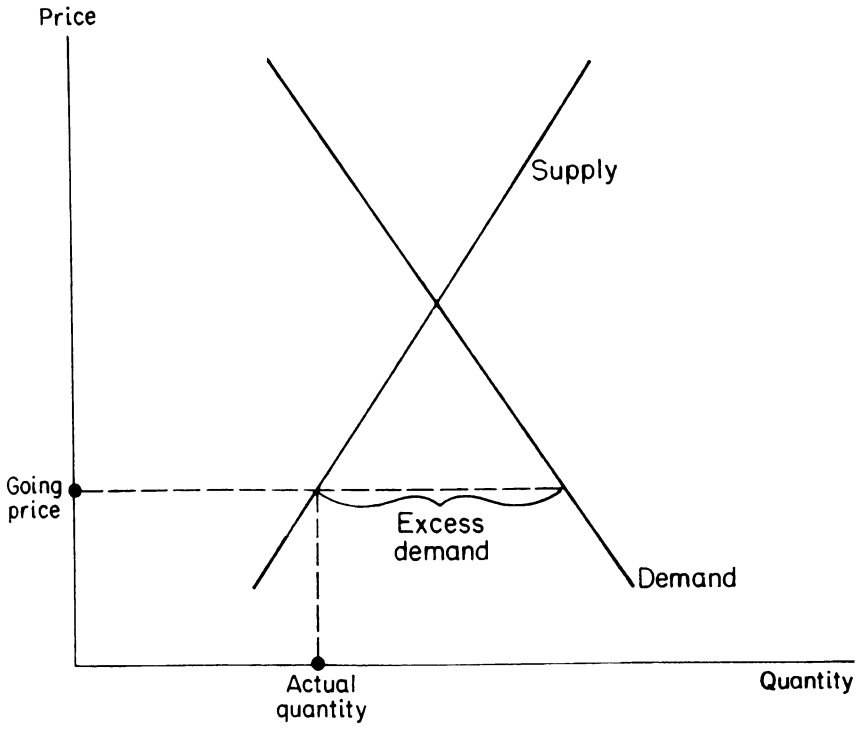
omists have been impressed with the wisdom of Adam Smith's observation that "people of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." Pathologists have been found guilty of price-fixing, and price discrimination by physicians is not uncommon. The latter practice, which physicians view benevolently as a way of reducing inequality of access to medical care, is viewed by some economists as evidence of the use of monopoly power to maximize profits.[10]

Restrictions on Entry

Probably the most obvious and most deliberate interference with competition in the market for physicians' services is the barrier to entry imposed by compulsory licensure. The case for licensure presumably rests on the proposition that the consumer is a poor judge of the quality of medical care and therefore needs guidance concerning the qualifications of those proposing to sell such care. Assuming this to be true the need for guidance could be met by voluntary *certification,* rather than compulsory licensure. Indeed, the need could probably be better met through certification because there could be several grades or categories and periodic recertification would be more practicable (and less threatening) than periodic relicensure. Under a certification system patients would be free to choose the level of expertise that they wanted, including uncertified practitioners.

The principal objections that could be raised against such a system are that some patients might receive bad treatment at the hands of uncertified practitioners. and that it might result in an expansion of unnecessary care. The obvious advantages of such a system are greater availability of care and lower prices. For certain health care needs, practitioners with lesser qualifications than present physicians have would clearly be adequate. The existing system results in some persons receiving no care,

FIGURE 4. EXCESS DEMAND

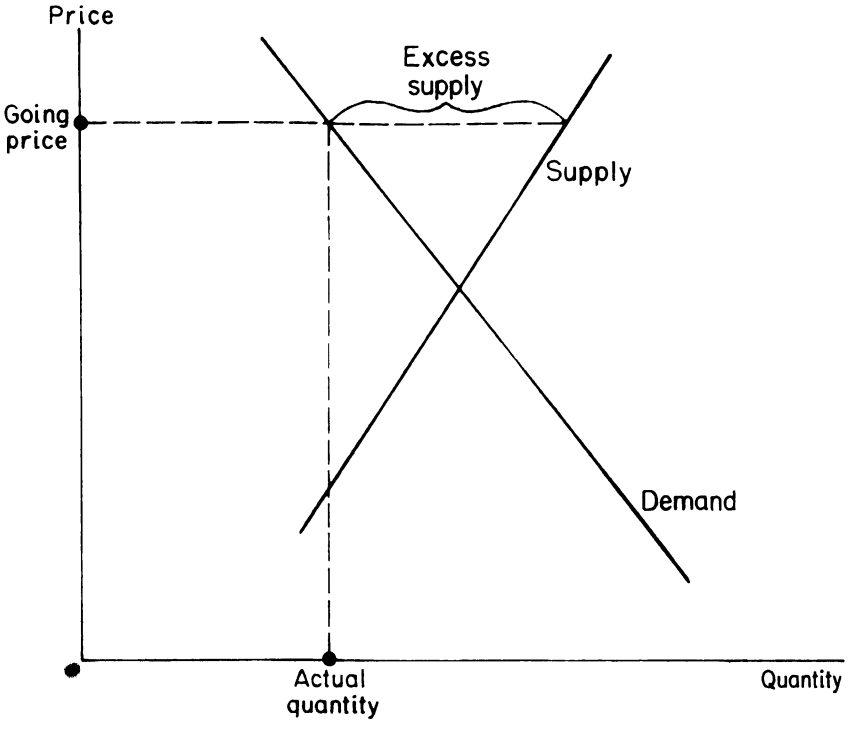


or being treated by persons without any medical training (e.g., family members, neighbors, friends).

Another example of entry restrictions is the system of limiting hospital privileges to certain physicians. This has been justified in terms of the desire to insure quality of care (in the institution) and as a way of obtaining free services from the physicians. However, it can also be viewed in an economic context as a way of limiting competition.

In general, the codes of professional ethics that physicians have evolved undoubtedly serve many useful social purposes. But it is well to recall Kenneth Arrow's observation that "codes of professional ethics, which arise out of the principal-agent relation and afford protection to the principals, can serve also as a cloak for monopoly by the agents."[11]

FIGURE 5. EXCESS SUPPLY



Disequilibrium

One disturbing characteristic of some health care markets is the failure of price to reach an equilibrium level (the level where the quantity demanded and the quantity supplied are equal). For instance, the market for house calls seems to be characterized by excess demand (see Figure 4). The "going price," about $20 per visit, is not high enough to bring supply and demand into balance. The quantity (number of house calls) that patients are willing and able to pay for at that price is much greater than the quantity physicians are willing to supply. Some observers, notably Martin Feldstein,[12] believe that the market for physicians' services in general is characterized by excess demand.

The market for general surgery, however, can best be described as an example of excess supply (see Figure 5).[13] At the

going price for most general surgical procedures, $300 for a herniorrhaphy, the quantity that surgeons are willing and able to do is much greater than the quantity demanded. A condition of excess supply is also probably present for many types of specialty surgery (ophthalmology, gynecology).

The persistence of a disequilibrium price is a clear indication that the market departs substantially from the competitive norm. In the case of excess demand, physicians are apparently reluctant to let the price of house calls rise to their equilibrium level; they introduce a form of rationing instead. This may yield certain psychic satisfactions in lieu of the higher income that is clearly possible. In the excess supply example, the price fails to fall either because the individual surgeon does not think it would be to his advantage to cut price or because surgeons have collectively reached this decision. A contributing factor is the option that most surgeons have of using their nonsurgical time for general practice or other income-producing activities.

The alleged shortage of nurses indicates another potentially troublesome health care market. If what is meant by "shortage" is that it would be nice to have more nurses, no analytical problem arises and the point is trivial. In that sense there is a shortage of every type of good or service. If, however, the allegation refers to a shortage in the sense shown in Figure 4 (i.e., an excess demand for nurses), the failure of nurses' salaries to rise to their equilibrium level must be explained. Some investigators[14,15] claim that it is monopsonistic behavior on the part of hospitals that keeps nurses' salaries from rising to the point where supply and demand would be equal.

Costs of Information

The elementary competitive model assumes that all information relevant to decision-making is known by the households and firms—prices, production possibilities, utility to be derived from different commodities. In the real world, of course, such information may be difficult or even impossible to obtain. High information costs are characteristic of many health care mar-

kets; frequently the only way a person can know whether he needs to see a physician is to see a physician. The incorporation of information costs into economic analysis is relatively recent,[16] and the theory is far from complete. Many health care markets function poorly because of imperfect information but there is considerable disagreement as to how to make them function better. One point might have general validity. Where the costs of information are increased as a result of public or private policy, reversal of that policy would probably be desirable. For instance, restrictions on the right of physicians to advertise and on the right of pharmacies to advertise prices of prescription drugs ought to be reexamined in the light of the consumer's need to know more about physicians and drugs to make intelligent choices. A study of variations in restrictions on advertising by optometrists and opticians found that prices were substantially lower in states that permitted advertising.[17]

EXTERNALITIES

An externality exists when the actions taken by an individual household or firm will impose costs or confer benefits on other households or firms, and where no feasible way exists of arranging direct compensation for these costs or benefits. The presence of externalities indicates that the individual household or firm, in attempting to maximize its own utility or profit, will not make socially optimal decisions.[18] A classic example of an externality is the costs of air pollution imposed on others by the smoke emanating from a factory. Another classic example is the benefit to society that results when an individual decides to be vaccinated or treated for a communicable disease.

One way to deal with externalities is for the state to prohibit or require certain actions. Another is to attempt to modify the prices facing individual firms or households (through taxes or subsidies) so that the price properly reflects the social costs or benefits. In principle, use of the price mechanism will permit a much closer approximation to a social optimum, but practical difficulties may preclude the price approach in some situations.

Externalities are very important to health care in the broadest sense of the term. Consider, for instance, the effects of automobiles on health. The decisions of individual households involving the purchase and use of an automobile, the speed and manner of driving, the amount of maintenance and repair and even the choice of gasoline have potentially important implications for the health of others, but these implications are not reflected in the prices facing the household. Similar problems arise in connection with many other consumption or production activities that create environmental health hazards.

In seeking to reduce such hazards a few central points should be kept in mind. First, costs (resources used or wants unsatisfied) are usually associated with the reduction of hazards, and these costs frequently increase at an accelerating rate, the greater the reduction desired. It follows, therefore, that the social goal should rarely be the complete elimination of the hazard, but rather its reduction to the point where the value of a further reduction is less than the cost of achieving it. A major problem for health care policy is to identify these externalities, estimate their effects and impose appropriate taxes or subsidies so that individual households and firms, in seeking to maximize their own utility or profits, will make socially appropriate decisions.

Medical research is a good example of an activity with large external benefits, and, therefore, in the absence of specific public policy, too little will be undertaken. One solution is to permit the discoverer of new knowledge to appropriate the benefits (e.g., through patent protection), but with regard to much health research this solution will frequently not be feasible or acceptable. The alternative is for the government to subsidize research. It has done this to a considerable degree; the question is how much health research is socially desirable? The answer, in principle, is the same as for any other decision regarding the use of scarce resources—the optimum level of research is reached when the incremental value of the prospective benefits is equal to the incremental cost. The more basic the research the more

likely it is to give rise to external benefits, but the more difficult it is to estimate their value or incidence.

In contrast to environmental programs and medical research, medical care today frequently does not involve significant external benefits. For instance, the benefits of most surgery accrue primarily to the patient and his family. This is equally true for treatment of most major diseases such as heart disease and cancer.[19] The best known examples of externalities arising from medical care involve the prevention of and treatment for communicable diseases. Another potentially important source of externalities is the treatment of mental illness, but lack of knowledge concerning causes or cures makes it difficult to reach firm policy conclusions in this area.

One important application of the externality idea is with respect to the problem of inequality of access to care. A frequent criticism of the market system is that it results in an unequal and "unfair" distribution of income.[20] Households that are poorly endowed with resources will earn relatively little and will command only a small share of the nation's output.

Many people would like to see a reduction of inequality, either in general or with respect to a particular commodity (medical care). To the extent that they are prepared to back their demand for less inequality through voluntary redistribution (philanthropy), no modification of the elementary model is required. We simply note that some households derive utility from giving money to others or from knowing that other households are receiving medical care. They are, therefore, willing to devote a part of their income (or part of their time) for that purpose. The purchase of a good or service for someone else is no different analytically from the purchase of a good or service for one's own household.

The externality problem arises because a philanthropic act by one household confers benefits on all other households that derive utility from observing a decrease in inequality. If each potential philanthropist considers only the psychic benefits *he* derives from reducing inequality, the total volume of philan-

thropy will be less than warranted by the collective desires of the group.[21]

One solution is compulsory redistribution. Society, working through government, may decide that the distribution of income resulting from the market system is inequitable or otherwise unsatisfactory and may seek to change it through taxation. This requires only a slight modification of the elementary model. The simplest way to do this is to take money away from some households and give it to others. Each household is then free to allocate its income as it pleases.

For any given amount of redistribution the utility of households is presumably maximized by a general tax on the income of some households and grants of income to others rather than by taxing particular forms of spending or by subsidizing particular types of consumption. Mathematical proofs of this proposition are available and its plausibility is obvious. If a household is offered a choice of either $100 or $100 worth of health care, it will prefer the former because it can use the additional income to buy more health care (if that is what it wants), but usually utility will be maximized by increasing consumption of many other commodities as well. Similarly, if a household is offered a choice between giving up $100 and giving up $100 worth of health care, its utility will be diminished less by the general tax on income.

Despite the obvious logic of the foregoing many nonpoor seem more inclined toward a reduction in inequality in the consumption of particular commodities (medical care is a conspicuous example) than toward a general redistribution of income.[22] Two reasons may explain this behavior. First, the nonpoor may believe that significant externalities are associated with medical care (in addition to the psychic benefits of observing a reduction in inequality) that are not associated with other commodities. The earlier discussion indicated some grounds for skepticism concerning this belief.[23] A second reason may be that the nonpoor think they know better what will maximize the utility of the poor than do the poor themselves.

A special aspect of the problem arises when the emphasis is put on reducing inequality of access to medical care *per se* rather than raising the consumption of medical care by the poor. This goal may require rationing the amount available to the nonpoor as well as subsidizing the poor. One economist has argued that the British approach to health care through a national health service can best be understood in these terms.[24]

Compulsory Insurance

At the extreme, the demand for reductions in inequality takes the form of an assertion that "health care is a right;" that if someone needs health care society has an obligation to provide it. To the extent that society honors that obligation, the incentive for households to provide for their own health care (as through voluntary insurance) is diminished. Those without insurance and especially those individuals who prior to their illness could have afforded the normal premium, become, in effect, "freeloaders" on the rest of society.

If this behavior is widespread, the only solutions are to make insurance compulsory or to modify the ethical imperative. Thus far the United States has opted for a little of each. Insurance is virtually compulsory for many through their employment contract; on the other hand, free care is made less attractive by means tests, long waiting lines, unpleasant surroundings and similar inconveniences.

Another argument advanced in favor of compulsory insurance is that it overcomes the problem of adverse selection. If insurance is completely voluntary it may be impractical to adjust each household's premium to its expected utilization. To the extent that uniform premiums are charged, however, households with lower than average expected utilization have an incentive to drop out and this process can continue until the plan collapses.

It seems likely that the United States will move further in the direction of compulsory insurance, but this development is likely to create new problems even as it solves others. It in-

creases the incentive to reduce health care in the home and throws more of the burden on collectively provided care. If the money price of market-provided care goes to zero, people will tend to use more than the amount they would like to use if they were free to shift resources to satisfy other wants.

SOME LIMITATIONS OF THE MODEL

The "Taste" for Health

It is becoming increasingly evident that many health problems are related to individual behavior. In the absence of dramatic breakthroughs in medical science the greatest potential for improving health is through changes in what people do and do not do to and for themselves. Household decisions concerning diet, exercise, smoking, drinking, work and recreation are of critical importance.

It is useful to distinguish between two different classes of decisions. The first consists of those that affect health, but without the decision maker's awareness of these effects. In such instances, public policies are needed to increase information. The question of how much of this activity can be justified can be answered (in principle) along the familiar lines of weighing incremental costs and benefits.

A more difficult problem is posed by those decisions that are made with full information available, and that, according to economists, reflect the household's "tastes." Tastes is a catchall term given by economists to the underlying preference patterns that determine demand at any given structure of income and prices. The overeater, the heavy smoker, the steady drinker are all presumably maximizing their utility, given their tastes. They may be knowingly shortening their lives. Should it be an object of public policy to try to change their tastes—to try to increase people's tastes for health? Economics can provide very little guidance in this area because economists have no way, even in principle, of saying what has happened to utility once tastes have changed. Economists are not, of course, alone in this

dilemma. None of the other social sciences has a well-developed theory of preference formation or the capacity to make judgments about the relative merits of different social goals.

The issues involved are extremely complex. Tastes are not acquired at birth or formed in a vacuum. It seems that economists should make an effort to determine how the working of the economic system itself influences tastes. They should study the impact of advertising and other sales efforts on demand, and try to determine whether taxation or subsidies of such efforts and counter efforts are justified. Tastes are also undoubtedly influenced by the information and entertainment media, by the schools, by religious institutions and by other organizations that are either tax supported, subsidized through tax exemptions or regulated by government to some degree.

Another way of thinking about this problem has been proposed by Gary Becker and Robert Michael.[25] In their approach, all households have the same basic wants or "tastes." They try to satisfy these basic wants by producing "commodities" with the aid of purchased goods and services plus inputs of their own time. Households differ greatly in their ability to produce different "commodities" and these differences explain much of the observed differences in purchases of goods and services in the market.

This approach has been developed and applied to health by Michael Grossman.[26] In his model it is the household, not the physician or the hospital, that produces health. Health care and other goods and services (food, shelter) are used in the production of health and some goods (e.g., cigarettes) may have negative effects.

If one pursues this approach, it could be a legitimate aim of public policy to help households become more efficient producers of health.[27] The chief ways of doing this would be through health education and by providing more information about the health care that is purchased in the market. It is of some interest to note that the United States government cur-

rently assumes more responsibility for informing consumers about the quality of steaks they buy than about the quality of hospitals or physicians they use.

Behavior Within Households and Firms

A significant shortcoming of the elementary model in analyzing health care is its treatment of the firm and the household as the basic elements of analysis. In recent years some economists have directed their attention to decision-making within the firm[28-30] and within the household.[2,31]

Attention to decision-making and allocation within the firm is particularly important if we are to try to understand one of the major institutions in health care, the nonprofit, voluntary hospital. It is relatively easy to identify several significant interest groups within the hospital—the board of directors, the management, the full-time medical staff, the attending staff—but it is more difficult to weigh their impact to formulate a predictive theory of hospital behavior. When the goals of the various interest groups are similar, the simple theory of the profit-maximizing firm may be adequate, but when they conflict, (e.g., the selection of cases for admission) such a theory is obviously incomplete.

Decision-making and allocation within the household also pose problems that have special relevance to health care. The quantity and quality of health care provided to children by parents differ greatly among households, even among households with equal incomes. The ability of parents to "produce" health for themselves and for their children seems to vary considerably. Society feels an obligation to protect the health rights of minors, but has found this difficult to do. The health care provided elderly parents by their children also varies greatly. The decline of family ties tends to shift some production of health care from households to firms, and part of the observed rising cost of health care in recent decades is undoubtedly attributable to such a shift; e.g., the growth of nursing homes.

IMPLICATIONS FOR TECHNOLOGIC CHANGE

This paper has discussed health care in relation to the economic system. The conference, however, is primarily concerned with technologic change, so it is appropriate to conclude with an attempt to relate the preceding discussion to technology.

Certainly the most important point to be made is that the basic economic principles concerning resource allocation and utility maximization apply in a world of technologic change as well as in a static one. Neither blanket endorsement nor condemnation of technology is rational; every change in technology involves costs and benefits and wise social policy depends upon an accurate assessment of their relative magnitudes.

There is a widespread belief that the health care sector harbors many wonderful technologic changes that have not been diffused widely and rapidly enough. An opposing view has been advanced by Richard Nelson of Yale, one of the nation's leading students of the economics of technologic change. He has written, "In both defense and health there has been a lot of R and D, and technical change has been extremely rapid; but it also has been extremely expensive and poorly screened . . . In health one has the strong impression that one of the reasons for rising health costs has been the proclivity of doctors and hospitals to adopt almost any plausible new thing—drugs, surgical methods, equipment—that increases capability in any dimension (and some for which even that isn't clear) without regard to cost."[32]

Nelson's view has considerable validity. The tendency toward rapid and indiscriminate adoption of innovations in the medical care field can be attributed in part to efforts of suppliers of the innovation, especially drug companies. Possibly the most important reason is the technologic imperative that influences medical choices.[33] This is instilled in physicians by their training, and reinforced by present systems of financing health care. It produces the attitude that if something can be done it should be done. Most medical decision-makers, be they physicians or hospital administrators, are not trained to weigh marginal bene-

fits against marginal costs. Moreover, present methods of third party payment and provider reimbursement do not give them any inducement to acquire that ability. To be sure, patient pressure and the ethical imperative to do everything possible for the patient make this a complex problem. But a more rational approach could result in saving more lives and providing greater overall patient satisfaction.

Another popular misconception is that any change in health care technology that reduces labor requirements must be desirable. No such a priori assumption is warranted. A change in technology that is capital saving and labor intensive may be more valuable than the reverse, and a change that permits the substitution of two relatively unskilled workers for one highly skilled one may be more valuable than either.

The nature of technologic change can have profound effects on resource requirements, and some attention should be paid to this matter in granting funds for research and development. In choosing between two projects, for instance, it is not sufficient to consider only the importance of the problem and the probability of success. The granting agency should also consider what resources will be required to implement the solution if the project is successful.[34] Some technologic advances, such as the antibiotic drugs, greatly reduced the demand for physicians' services. Others, such as organ transplants, greatly increased demand.[35]

Traditional societies resist or inhibit technologic change. Society probably errs in the opposite direction. We seem to be fascinated by technology and often look to it to solve problems when less expensive solutions lie elsewhere. This may be particularly true of health care. It is to be hoped that this conference, with its emphasis on technology, will not serve to divert attention from other fundamental questions concerning the organization and financing of health care and personal responsibility for health.

Consider the problem of hospital costs. Hundreds of millions are being spent to make hospitals more efficient through new

technology, but the return is likely to be small compared to the savings possible now with existing technology through reductions in utilization. Most informed observers believe that on any given day approximately 20 per cent of the patients in the average general hospital do not need to be there. Research probably will prove this to be a conservative estimate because it still assumes customary medical interventions, conventional lengths of stay and so forth.

What, for instance, is the appropriate length of stay after hernia surgery? A British team, in a carefully controlled study, showed that patients discharged one day after surgery did as well as those discharged after six days. Another British team compared surgical repair of varicose veins with injection compression sclerotherapy. The former method involves expensive hospitalization; the latter is done on an outpatient basis at minimum cost. Outcomes seem to be similar, (except that surgical patients lost four times as many days from work) and patients seem to prefer the injection/compression technique.[36]

No reasonable person would want to inhibit the development of new technologies or their application to health problems. But everyone concerned with American health care should realize that the most pressing problems are not centered around technology and their solutions will probably be found in other directions. As this paper has suggested, we need to make health care markets work better; we need to quantify and control the externalities that affect health; and we need to recognize the importance of individual behavior and personal responsibility for health. Substantial alterations in organization, financing and education are required to achieve these objectives.

These are the realities. Tomorrow's technology may help to bring about these changes, but let us not underestimate what is possible today if we have the will to do it. Let us not oversell technology. Let us not divert attention and misdirect energies that could be devoted to the complex task of creating a more equitable, more effective and more efficient health care system.

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[4] Health might be measured by life expectancy, absence of disabilities, speed of recovery after surgery and so forth. Health care inputs might refer to the size of a health care program, or the total amount of care given to a particular patient or a particular aspect of care such as number of tests or number of days in the hospital.

[5] This assumes that some input—e.g., the state of technology—is fixed at any given point in time.

[6] This point is well recognized in the theoretical literature on socialist planning (cf., Lange, O., On the Economic Theory of Socialism, in Lippincott, B. E. (Editor), ON THE ECONOMIC THEORY OF SOCIALISM, Minneapolis, University of Minnesota Press, 1956) and in the attempts of the Soviet government and other East European governments to make greater use of the market mechanism.

[7] The flow of resources (and the reciprocal flow of goods and services) in the United States is currently at a rate of approximately one trillion dollars per annum. About seven per cent of these resources flow to "firms" producing health care. Fifteen years ago only about 4.5 per cent of such smaller resource flow went in that direction. The resource flow, measured in dollars, depends upon the quantities of various resources and their prices. Over long periods of time prices of equivalent resources usually change at about the same rate in all sectors of the economy. Thus the increased share in dollar terms reflects a substantial increase in the share of real resources as well. This large shift of resources over a relatively short period of time is the most important element in the present "health care crisis."

[8] The fact that these services proliferate contrary to what economies of scale would indicate is the result of other problems such as the absence of appropriate incentives and constraints for physicians and hospital administrators.

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[18] The firm or household will presumably equate *its* marginal cost and *its* marginal benefit. The social optimum requires taking into account the costs or benefits imposed on others.

[19] When medical care keeps an employed head of family alive and well, a type of external benefit is created because society does not have to provide for his or her dependents. Much medical care, however, goes to the young or the aged or to keeping people alive but not well enough to work so it is doubtful if on balance a positive externality exists in this sense.

[20] What would constitute a "fair" distribution of income has never been satisfactorily answered by economists or anyone else. One feature of the market system that makes it attractive to some is that a household's share of goods and services will be roughly proportional to its contribution to total output as evaluated by all households collectively.

[21] Note the analogy with the individual household's decision regarding vaccination.

[22] Pauly, M. V., MEDICAL CARE AT PUBLIC EXPENSE: A STUDY IN APPLIED WELFARE ECONOMICS, New York, Praeger Publishers, Inc., 1971.

[23] However, where medical care for the poor is tied to using them for teaching and research purposes, significant externalities are probably present.

[24] Lindsay, C. M., Medical Care and the Economics of Sharing, *Economica,* 36, November, 1969.

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[26] Grossman, M., THE DEMAND FOR HEALTH: A THEORETICAL AND EMPIRICAL INVESTIGATION, New York, National Bureau of Economic Research, in press.

[27] But there would be no a priori case for favoring health over other commodities. The choice should depend upon relative costs and benefits.

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