

*This paper is intended to differentiate between the concepts of "need" and "demand" for medical services, and to provide a concept of "shortage" in this regard. The authors endeavor to deal with an important problem of health economics and to eliminate confusion in this area.*

## **ON THE DEMAND VERSUS NEED FOR MEDICAL SERVICES AND THE CONCEPT OF "SHORTAGE"**

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### **I. Introduction**

A PERENNIAL problem which is responsible for considerable confusion in health economics literature concerns the use of the terms "demand" and "need" in connection with medical services.<sup>1</sup> In general, the former appears most frequently in the writings of medical economists, while the latter term is most frequently used by health professionals, commissions, and agencies.

A basic difficulty lies in the failure of economists and health professionals to fully communicate when using their own respective terminologies. The concepts to which these terms refer are quite different but are often interpreted through usage as meaning the same thing. The fact that the two terms are often used interchangeably further adds to confusion and lack of understanding concerning the differences in the phenomena to which the concepts "need" and "demand" relate.

Unfortunately, these concepts are seldom differentiated in the reports of various committees and special commissions which have been charged with the difficult tasks of estimating the magnitude of current and future shortages of medical services.<sup>2</sup> The general approach taken by these groups has been to measure present and future gaps between "needs" and "supplies" of medical serv-

ices while not taking into account that the "quantity needed" may differ from the "quantity demanded."<sup>3</sup> Indeed, in most such studies the connection between the quantity of medical services "needed" and the "quantity demanded" is left unspecified.

The purposes of this article are to differentiate between the two concepts, "need" and "demand," and to provide two interpretations of the concept of "shortage" as it applies to medical services. In what follows, the first section briefly discusses the concept of the "need for medical services." This is followed by a section outlining the economist's notion of the "demand for medical services." The next section interrelates the two concepts. This is followed by a section interpreting the concept of shortage, and a final section presents a summary and the conclusions of our analysis.<sup>4</sup>

### **II. Need for Medical Services**

We interpret a given population's *need* for medical services as a normative professional medical judgment concerning the quantity of medical services that its members ought to consume over some specified time period. In order to simplify subsequent discussion, we define a given population's health needs as:

A. *That quantity of medical services which*

*expert medical opinion believes ought to be consumed over a relevant time period in order for its members to remain or become as "healthy" as is permitted by existing medical knowledge.*<sup>5</sup>

An accurate specification of a population's "needs" for medical services requires perfect knowledge of the state of its members' health, the existence of a well-defined standard of what constitutes "good health," and perfect knowledge of what modern medicine can do to improve ill (or below standard) health. It must be acknowledged that existing diagnostic procedures are not capable of providing perfect knowledge of the state of any population's, or even of an individual's health. It also must be acknowledged that a clear-cut consensus as to what constitutes "good health" does not exist among health professionals. Further, it must be acknowledged that perfect knowledge concerning the potential of modern medicine to improve ill health does not exist since in many cases validated clinical findings verifying the curative effects of new drugs and procedures have yet to be accumulated. In spite of these difficulties, everyday health professionals are asked to estimate the needs for medical services of their patients; and frequently, as is well known, panels of medical experts are asked to estimate the needs for medical services on the part of the resident population of an entire state, region, or nation. Thus in spite of the difficulties of doing so, judgments as to the quantity of medical services *needed* are made as a matter of course by medical professionals. Perhaps the most sophisticated effort to quantify need was that undertaken by Drs. Roger Lee and Lewis Jones.<sup>6</sup> In their now classic study, the estimate of need for physicians was based on a consensus of a panel of experts concerning the number of physician hours needed to prevent, diagnose, and treat a list of specific diseases and conditions of illness.

The hours of physician services needed were then converted into an estimate of the number of physicians needed. However, most regrettably, the Lee and Jones effort has never been duplicated on a large scale since the time of their study.

However, a point that must be emphasized is that in many cases the population in question may view its own health needs as something other than what the medical profession views them. That is, the quantity of medical services that the population *wants* to consume may be different from the quantity of medical services the medical profession feels, in its opinion, the population's members *need* and *ought* to consume.

In this connection, our population's wants for medical services may be defined as:

B. *That quantity of medical services which its members feel they ought to consume over a relevant time period based on their own psychic perceptions of their health needs.*

A given population's wants for medical services depend on cultural, religious, educational, and social status as well as on perceived physical or mental distress. As such, they are an important determinant of consumer behavior, i.e., a determinant of what economists call *demand*, a market phenomenon, which is discussed in Section III of this paper. Our major purposes at this point are to emphasize that *wants* as viewed by a given population and *needs*, as defined by the medical profession, are likely to differ and to offer some reasons why this discrepancy exists.<sup>7</sup>

#### ***Consumer versus Medical Concepts of Need***

There are several reasons why the quantity of medical services a given population may want may differ from the quantity of medical services that the medical profession thinks it needs. Cer-

tain members of the population may be reluctant to consume some medical services because of inertia or because of their wish to avoid pain, suffering, or embarrassment which accompanies their delivery. Uncertainty concerning the potential benefits of certain medical services in connection with these other considerations may be sufficient to convince others that they do not want them.

However, probably the most important factor responsible for the gap between wants and needs is consumer ignorance. Most consumers are ignorant of professional standards of what constitutes "good health" and are not fully aware of the extent and limitations of the preventive, therapeutic, and rehabilitative capabilities of modern medicine for improving their health. In general, most consumers do not recognize symptoms of bad health until they are manifest as pain, passage of blood, or other obvious abnormalities. Further, they usually defer seeking out advice concerning the state of their health, or enlightenment concerning the curative potential of modern medicine, until such symptoms are observed. Even upon entry into the health care delivery system, consumer enlightenment on these matters is usually restricted to knowledge concerning the specific illness which prompts them to seek out medical care.

As medical science progresses, more and more symptoms are recognized to be abnormalities associated with "bad health," and new and better means of curing illnesses are developed. As a consequence of imperfect knowledge, consumer wants may lag behind the advances in standards of "good health" and of the curative potential of medicine; and, as a consequence, a gap may develop between health needs and wants.<sup>8</sup>

However, for some consumers in the population, not all of whom are hypochondriacs, current standards of good health and curative potential of medical

technology are likely to be below what they would like. This cohort views its wants for medical services as something greater than the quantity *needed* or in some cases even available. The lower a given population's cultural, educational, and social status, and the more restrictive in terms of the consumption of medical services are its collective religious beliefs, the greater the gap between wants and needs. However, announcements in the news media concerning the development of new drugs and procedures capable of improving health, public service messages concerning the advantages of preventive health measures, and communication between the doctor and patient concerning the latter's health *needs* serve to increase the population's *wants* for medical services, assuming that its members believe what they read and hear. However, the extent to which these increased *wants* are translated into increased consumer participation in the market for medical services depends on certain economic considerations which are discussed in the next section.

### III. The Demand for Medical Services

The demand for medical services, or for that matter the demand for any set of goods or services, arises out of consumers attempting to satisfy their psychologically formulated wants. Wants serve as the basis for the formulation of consumer tastes and preferences for goods and services. Economists traditionally assume wants, and consequently consumer tastes and preferences, as "given" and then proceed to explore the market consequences of any given set of tastes and preferences.

To satisfy wants, consumers enter the market place seeking to exchange money for those goods and services that are desired. However, since most consumers possess limited financial resources, and the goods and services they desire have positive prices, they cannot buy all the

goods and services in the quantities they desire. It is assumed that consumers are rational and allocate available financial resources among alternative goods and services, purchasing that combination of them which yields the maximum satisfaction attainable, given their limited financial resources and the prices of goods and services in the market place.<sup>9</sup>

Therefore, the quantity of medical services demanded by a given population depends on collective consumer wants (tastes and preferences) for all goods and services, prices of medical services, the prices of alternative goods and services, the size of the population, and the financial resources available to its members. Symbolically, this may be expressed as:

$$(1) q_{ms} = f(P_{ms}, P_o, F, N, W)$$

In equation (1),  $q_{ms}$  refers to the quantity of medical services demanded,  $P_{ms}$  represents the price of medical services,  $P_o$  represents the price of alternative goods and services,  $F$  represents financial resources available to consumers,  $N$  represents the size of the population, and  $W$  represents collective consumer wants for all goods and services, including wants for medical services as

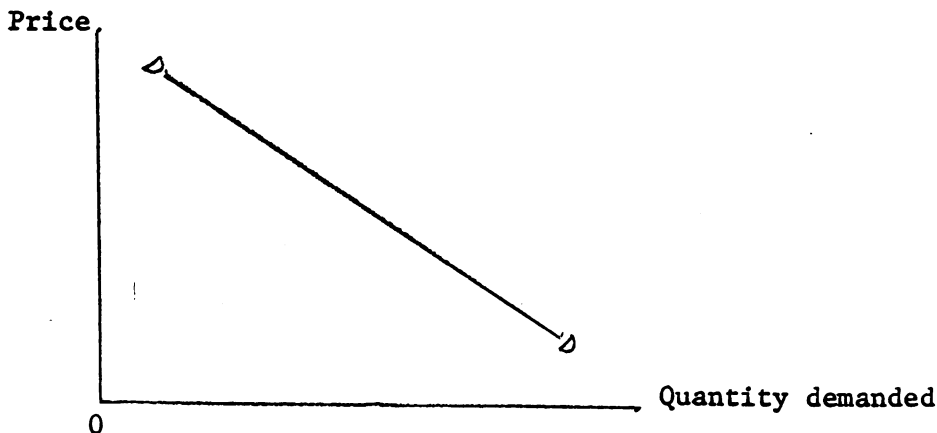
members of the population perceive them.<sup>10</sup>

We may now define the economic concept of a given population's demand for medical services as:

*C. A multivariate functional relationship between the quantities of medical services that its members desire to consume over a relevant time period at given levels of prices of goods and services, financial resources, size and psychological wants of the population as reflected by consumer tastes and preferences for (all) goods and services.*

The specification of the demand function is an intellectual exercise in which the primary goal is to specify these factors that are likely to be important determinants of the quantity of services purchased by consumers. The second task is to hypothesize how the quantity of medical services demanded will be influenced by the changes in the level of any one of these determinants. For example, economists frequently hypothesize, assuming that all other determinants of demand remain at existing levels (*ceteris paribus*), that the quantity of medical services demanded will be greater, the lower the price of medical services. This behavioral hypothesis is illustrated by Figure 1.

Figure 1



Demand Curve for Medical Services

**Table 1—Hypotheses concerning the expected effects of increases in the levels of various determinants of the demand for medical services**

Determinants	Hypothesis	Measure	Calculation	Interpretation
Prices of medical services	—	Price elasticity of demand	$\frac{\% \Delta q_{ms} \text{ demanded}}{\% \Delta P_{ms}}$	if $> 1$ , elastic if $= 1$ , unitary if $< 1$ , inelastic
Financial resources	+	Income elasticity of demand or other appropriate elasticity	$\frac{\% \Delta q_{ms} \text{ demanded}}{\% \Delta \text{ in income}}$	if $> 0$ , normal good if $< 0$ , inferior good if $> 1$ , superior good
Prices of other goods and services	+ and —	Cross-elasticity of demand	$\frac{\% \Delta q_{ms} \text{ demanded}}{\% \Delta \text{ price of other goods or services}}$	if $> 0$ , substitute if $= 0$ , unrelated if $< 0$ , complementary
Wants or tastes and preferences <sup>13</sup>	+	Appropriate elasticities of age, sex, education, religious preference, etc.	As an example, $\frac{\% \Delta q_{ms} \text{ demanded}}{\% \Delta \text{ in population female}}$	No terminology or classification schemes generally accepted
Size of population	+	Elasticity of population	$\frac{\% \Delta q_{ms} \text{ demanded}}{\% \Delta \text{ in population}}$	No terminology or classification schemes generally accepted

The line drawn in Figure 1 is what economists call a "demand curve" and reflects the hypothesis that price and quantity of medical services demanded are inversely related.<sup>11</sup> Demand curves can take on various shapes and degrees of convexity and concavity. The curve in Figure 1 is represented as linear only in the interests of simplicity. It should be emphasized that the aphorism, *ceteris paribus*, that prices and quantities of medical services demanded are inversely related is to be regarded as a behavioral hypothesis to be verified upon empirical investigation.

We may likewise advance hypotheses concerning the effects of the other determinants on the demand for medical services. Table 1 summarizes the probable effects of changes in the levels of various determinants of demand on the quantity of medical services demanded, and also presents various elasticities which economists frequently use to meas-

ure the relative importance of various determinants of demand.<sup>12</sup>

Table 1 for the most part is self-explanatory with the possible exception of the information provided in the right-most column. The information provided there pertains to economic interpretations and to the terminology employed to classify various consumption responses according to the sign or magnitude of certain elasticities.

#### IV. Demand and Need Related

As stated above, a given population's need for medical services from the standpoint of the medical profession relates to that quantity of medical services that expert medical opinion regards as available and necessarily rendered to enable its members to meet contemporary standards of good health. This concept of need is independent of economic considerations, i.e., independent

of prices of medical services; financial resources, including insurance; and so on. A given population's needs for medical services can be depicted in a graph with the price of medical services on the ordinate and the quantity of medical services on the abscissa as shown in Figure 2. Needs are reflected by the line N-N and are independent of the prices of medical services. Since it is also independent of the prices of other goods and services, financial resources and the individual's wants, the line NN remains unchanged even if these factors take on different values.

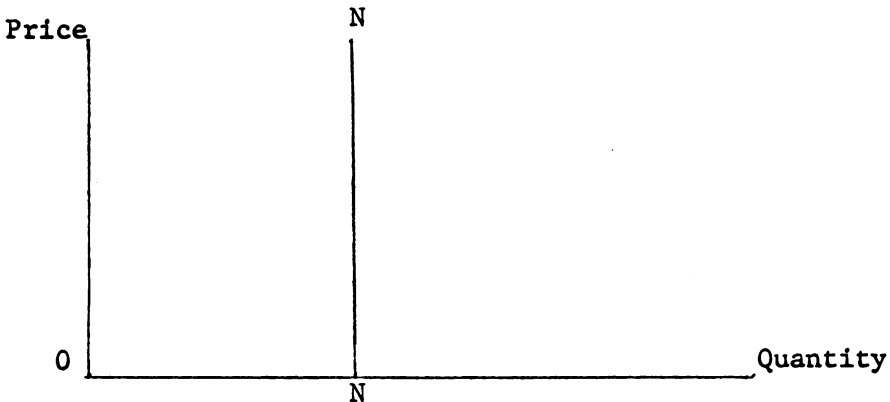
To show a strict connection between demand and need, let us *assume* that a given population of health consumers is perfectly informed concerning contemporary standards of good health, the "health status" of its members, and the curative potential of modern medicine. Further, let us assume this population exhibits no unusual abnormalities. Given assumed knowledge of contemporary standards of good health, the "health status" of each of its members, and of the potential of modern medicine to diagnose and treat illness, our hypothetical population has a very clear con-

cept of the kind and amount of medical services it ought to receive over a given time period, say a year.

In this special case, the total quantity of medical services *wanted* on the part of this hypothetical population is equal to the quantity of medical services *needed* as defined by the medical profession.

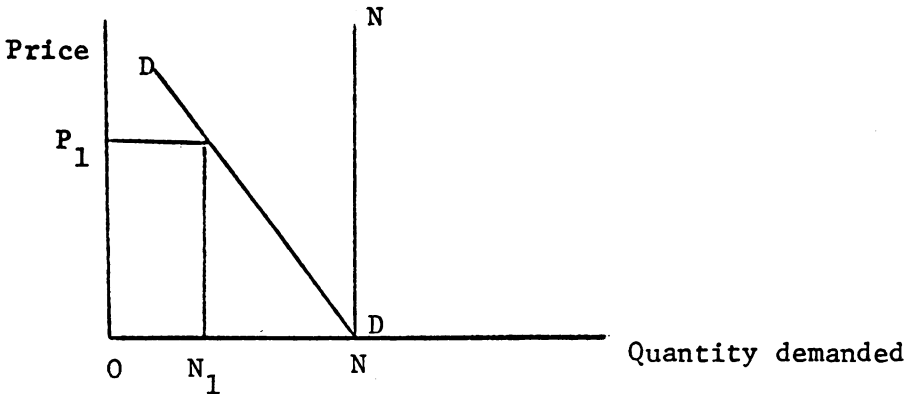
The question that arises under these conditions is, will this population purchase all the medical services it wants? The answer is, *probably not*. The reason is, given limited purchasing power, our hypothetical population *cannot* purchase all desired quantities of the *goods and services that its members want*. Its members are likely to be aware of standards of need for food, clothing, shelter, recreation, as well as those pertaining to medical care. Since the collective financial resources of the population's members do not permit them to buy goods and services in the quantities necessary to satisfy all their wants, they are, in the aggregate, likely to strike some sort of compromise and consume less than wanted quantities of all goods and services, including medical services. However, members of the population would

Figure 2



A Population's Needs for Medical Services

Figure 3



The Relationship Between Demand and Need

be happy to purchase desired quantities of those goods and services wanted if their prices were zero. Further, it may be hypothesized that, collectively, members of the population will buy more of any particular goods or service, the lower its price relative to alternatives. Therefore, at positive prices for medical services, the population is likely to consume medical services in quantities less than its total wants. For example, at an assumed price  $P_1$ , Figure 3 shows that the quantity of medical services demanded is  $ON_1$ , which is less than  $ON$ , the quantity of medical services wanted or needed. However, as prices of medical services approach zero, the quantity of medical services purchased will more nearly approximate the total quantity wanted, where in this special case, the latter is exactly equal to the quantity of medical services needed as viewed by expert medical opinion. This latter situation is clearly illustrated in Figure 3.<sup>14</sup>

***Increased Knowledge, Financial Capacity, and Acute Care Needs***

Thus far we have assumed that our hypothetical population has perfect knowledge as concerns the health status

of its members and the potential of modern medicine for improving it. We also have assumed the members of our population to have limited financial resources and to have no unusual acute medical symptoms. In general, most consumers have imperfect knowledge of their state of health, contemporary standards of health care, and the potential that medicine has for improving it.

Any increase in information that a population of consumers receives concerning its health status, and what modern medicine can do to improve it, will shift its demand curve for medical services rightward (an increase in demand) or leftward (a decrease in demand) depending on how it affects perceptions of need for medical services. News of new procedures or increased knowledge of what are acceptable standards of good health are likely to increase consumer demand for medical services.<sup>15</sup>

Similarly, an increase in financial capacity (increase in income, insurance coverage, and so on) tends to increase consumer demand for medical services.<sup>16</sup>

Up to this point we have not been concerned with unusual acute care needs and demands for medical services. Under the conditions assumed above, con-

sumers may be assumed to act rationally and, rather unemotionally, to allocate dollars among available goods and services including ordinary acute care medical services. The term "rationally," in this context, means that consumers, on the basis of tastes and preferences, allocate dollars among alternative goods and services taking into account limited financial resources and the prices that are associated with all goods and services that are available. However, it must be recognized that human nature is such that people are temporarily insensitive to prices or tend to discount the problem of paying for their purchases when they feel that they need them badly enough.

To an economist's way of thinking, disregard for prices and financial constraints and failure to weigh potential benefits in relation to costs, is to act irrationally. Yet, when people are in pain, are injured, or have other symptoms which disturb them, and when ignorant of the possible causes and consequences of these symptoms, they are prone to seek out medical services without careful consideration of the economic consequences of doing so. Under these conditions medical services are not postponable, people tend to be somewhat irrational in the economist's sense of the term, and the costs and financial implications of purchasing expensive medical services are temporarily forgotten or given low priority in the process of making the decision "to go to the doctor." Thus, when extraordinary acute symptoms are manifest, both consumer demand and needs may increase.

It is difficult to say just how far or in what way demand increases under these conditions. The more ominous the symptoms and the more consumers believe their lives to be endangered, the further the shift in demand. That is to say that if consumers perceive that their illness is a "life or death" matter, entails intolerable pain and suffering, or is

potentially permanently disabling, crippling, disfiguring, and the like, demand is likely to coincide or even surpass actual medical needs. In such cases, consumers are likely to attempt to place life and limbs in the hands of physicians, consume all quantities of medical services that are prescribed, and worry little about prices and limited financial capacity with which to pay for services received.<sup>17</sup>

It should be emphasized that the majority of acute cases do not involve an intolerable level of pain and suffering or are not "life or death" matters; thus the times when consumer demand approaches or surpasses needs are rare.<sup>18</sup>

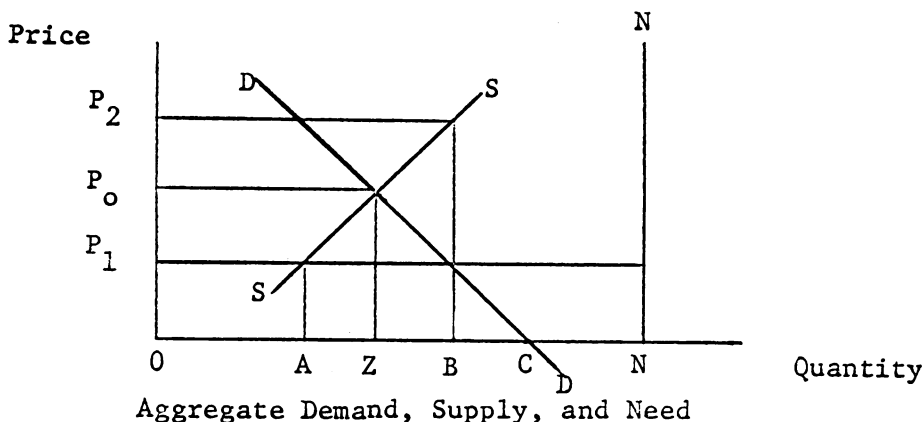
## V. The Concept of "Shortage"

For most individuals, medical services are not free goods. Moreover, it seems safe to assume that the great bulk of health consumers do not possess discretionary financial capacity sufficient to purchase all of the medical services that they want at existing prices. Surely, a very significant volume of America's needs for medical services is not being met; indeed, the situation is often referred to as one of "crisis." This may be interpreted as meaning that, in the aggregate, the quantity of medical services currently being consumed is less than the quantity that ought to be consumed (needed). The analysis of the situation is facilitated by Figure 4.

Figure 4 shows the aggregate demand on the part of consumers of medical services (DD) interacting with the aggregate supply offered by suppliers of medical services (SS) so as to "clear the market" at a mutually satisfactory price and quantity of medical services exchanged equal to  $P_0$  and  $OZ$ , respectively.<sup>19</sup> If the market for medical services were perfect, resources would be allocated optimally according to the collective tastes and preferences of consumers, the quantity and distribution of



Figure 4



financial resources available to them, the prices of other goods and services, the amount and existing organization of resources available to the medical industry, and the prices of these resources. Yet, even in the case of a "perfect market," a "shortage" of medical services may exist in the sense that the consumption of medical services falls short of what it "should be," where the latter is an assertion on the part of the medical profession or some other group in our society.

Figure 4 illustrates this concept of "shortage," namely that the quantity of medical services consumed (OZ) falls short of the quantity of medical services needed (ON). Assuming that the market for medical services is *perfect*, a declaration of the existence of a "shortage" is a value judgment based on non-market criteria. It should be noted that the fact that consumers do not choose to consume the quantity of medical services that they "need" is as much an economic "fact of life" as their choosing not to purchase all of the recreation, housing, education services, and so on, that they "need."

However, the analysis of problems of "shortages" for medical services is made more difficult due to the fact that the

market for medical services is far from being perfect. The medical industry is fraught with imperfections, including restrictions over the education of health professionals, licensing and certification procedures restricting entry into the health professions, and administrative price setting on the part of those managing "not for profit" health facilities, to name a few. It is worth emphasizing that these institutional arrangements were implemented, more or less voluntarily, by health professionals themselves in recognition of the "public trust" necessarily vested in those rendering medical services to a vastly ignorant and uninformed consuming public. Thus health professionals tend to view the "health system" as a quasi-public utility. Basic economic decisions as to "what" will be produced, "how" it will be produced, and "who" will consume the product, traditionally have been made by health professionals. In such cases, technological imperatives tend to prevail over economic ones and concerns for the quality of medical services made available tend to predominate over concerns for the quantities of medical services made available.

The same sort of decision process prevails in both the defense and education

industries. Decisions, for the most part, are made by suppliers (military authorities and educators). However, in the case of health, because of the quasi-public utility character of the medical industry, and the genuine compassion felt by health professionals for consumers who are subjected to random and unpredictable episodes of illness, the decision concerning "who will consume products" traditionally has been that all should be permitted to consume what they need. "Health is a right not a privilege."

The basic inconsistency in all of this is that most consumers cannot afford to buy all the medical services that they need. For many, price has been a barrier to entry into the health services system. Traditionally, the response of the medical industry has been to price medical services below costs when necessary (sliding fee schedules, lower charges to the medically indigent, and so forth) in order that consumers are able to consume the quantity of medical services that they need. In the past, differences between revenues and costs have been made up by private philanthropy (physicians, dentists, and other health professionals providing services "below cost") and by government.

The question that arises is, on balance, what implications do these market imperfections have for the problem of "shortage" of medical services?

The answer is that market clearing prices may not prevail in markets for medical services, and "surplus" or "shortages" in market senses of the term may prevail in addition to shortages of a normative sense as discussed above. For example, if price  $P_2$  were to prevail, Figure 4 illustrates a condition that economists call "excess supply," i.e., at price  $P_2$ , the quantity supplied exceeds the quantity demanded. In the context of this paper, we interpret this condition as "market surplus" or negative shortage due to the establishment of a

higher than equilibrium price in the aggregate market for medical services.<sup>20</sup> However, if price  $P_1$  were to prevail, Figure 4 illustrates a condition economists call "excess demand," i.e., at price  $P_1$ , the quantity demanded exceeds the quantity supplied. For purposes of the present discussion, we interpret the differential between the quantity demanded and the quantity supplied at price  $P_1$  as a "market shortage."

The possibility of "excess supply" for the medical industry as a whole can be safely ruled out. Almost all who have studied the matter agree that currently the United States is facing a "health crisis."<sup>21</sup> Factors cited as evidence of crisis include the difficulty of the comparatively "well-to-do" to obtain the health medical services that they want and that they are willing and able to pay for; sharply rising costs of hospital and of other medical services; and the unavailability of health medical services to the poor, the rural, and those residing in the inner core of our nation's urban centers. Other manifestations of crisis include lengthening waiting lists; the hurried and impersonal care received by patients within limited appointment schedules; rising patient visit loads borne by physicians and increasing recourse to telephone patient visits; and other phenomenon consistent with a deterioration of the quality of medical care rendered by an overcrowded health delivery system operating near or beyond capacity.

Also, the traditional values of health professionals in viewing the industry as a quasi-public utility and themselves as being vested with a "public trust," and the long history of philanthropy and benevolence characterizing the delivery of health care all suggest that existing medical prices are probably below those that would be established if strictly determined by market forces of demand and supply.<sup>22</sup>

Assuming that the price of medical

services in the aggregate is below the market clearing price, Figure 4 illustrates the concepts of market and normative shortage and represents them quantitatively. At an assumed non-equilibrium price  $P_1$ , a "total" shortage of medical services exists equal to ON-OA. This quantity of shortage is what most commissions, panels, and government agencies would purport to estimate, perhaps translating the shortage of medical services into a shortage of some particular type of health professional or facility and thus recommend or propose some policy designated to eliminate the gap between existing supplies and need. In this case, the total shortage of medical services is comprised of two components—a market shortage equal to OB-OA and what here is defined as a normative shortage equal to ON-OB.

There are several reasons why the distinction between the market shortage and normative shortage components of an over-all shortage is important. Of these two types of shortages, a normative shortage poses greater difficulties for public policy. A market shortage may be expected to eventually work itself out through upward price adjustments since it is doubtful that health professionals can for long hold the line on prices while continuing to allocate services by nonprice means. This is even more true of late because of the increasing financial capacity of the public to purchase medical services due to growth in income and the growth of private health insurance. The process of market adjustment will eventually push price up to an equilibrium price of  $P_0$ . At this price, no market shortage exists. However, a normative shortage equal to ON-OZ will exist which will not be alleviated by market forces.

However, a normative shortage, from the point of view of public policy, is more serious, because its alleviation requires market intervention which ulti-

mately alters the basic character of the industry. Intervention in the market for medical services can take the form of altering demand, supply, or both. In fact, intervention on the side of both demand and supply is currently being undertaken through governmental programs that subsidize medical education and the construction of medical facilities (thus altering supply) on the one hand, and programs like Titles XVIII and XIX, which are designed to subsidize the consumption of medical services on the part of certain groups of our population (thus altering demand) on the other. Implementation of policies designed to alleviate a normative shortage which ignore the fact that barriers exist which restrict the access of consumers to medical services may result in a grotesque misallocation of resources. For example, even in the case of policies solely designed to increase the supply of medical services, the demand for medical services cannot be ignored.

This point may be illustrated with reference to Figure 4. Suppose it were decided that the solution to America's health problem would be to supply a quantity of medical services equal to that quantity that informed medical opinion indicates we need. Suppose also that medical services were rendered "free," i.e., at a zero price. In Figure 4, the quantity of medical services that would be made available would be equal to ON. However, given no change in demand, at a zero price, the (maximum) quantity of medical services demanded would equal OC. Thus, a quantity of services equal to ON-OC would not be consumed. This implies that those medical resources created to supply a quantity of medical services equal to ON-OC would remain idle or unemployed, thus implying that resources have been misallocated. The existence of barriers (non-price barriers since, in this case, prices are assumed to be zero) to entry into the market for medical services, limited

accessibility, and so on, would serve to further inhibit the consumption of medical services, thus accentuating the misallocation of resources beyond what would be the case in their absence

Thus, there is more to solving America's health problems than a simple identification of need and the implementation of policies designed to augment existing stocks of medical resources. Similarly, programs designed to augment the financial capacity of consumers to purchase medical services that do not

consider the existing capacity of the health industry to expand the supply of medical services could result in an increase in the price of medical services that served to force many Americans out of the market for medical services.

VI. Summary and Conclusions

The major ideas presented in this paper are conveniently summarized in Table 2, from which one recognizes that in *no cases should demand and need be*

Table 2—Characteristics of need, wants, demand, quantity of medical services demanded, shortages

Concept	Phenomenon to which Concept Relates	How related
<i>Need for medical services</i>	Biological and psychological health states as <i>perceived by expert medical opinion.</i>	<i>Unique quantity</i> comparable to <b>total</b> quantity of medical services wanted and to the quantity demanded, given determinants of demand.
<i>Wants for medical</i>	Biological and psychological health states as <i>individuals perceive them</i> and as related to cultural, educational, and social status.	<i>Unique quantity</i> comparable to total quantity of medical services wanted and to the quantity demanded, given determinants of demand.
<i>Demand for medical</i>	<i>Market behavior</i> as related to consumer wants, prices of medical services, prices of other goods, and financial resources.	As a concept refers to <i>no unique quantity</i> of services, but rather refers to a <i>functional market behavioral relationship</i> between quantities of medical services that will be demanded, given levels of the determinants of demand.
<i>Quantity of medical services demanded</i>	<i>Consumption of medical services</i> given values of determinants of demand.	A <i>unique quantity</i> of medical services comparable to both quantity needed and quantity wanted.
<i>Market shortage of medical services</i>	<i>Excess demand:</i> at existing prices, quantity demanded exceeds quantity supplied.	A <i>unique quantity</i> of medical services comparable to quantity needed, a normative shortage, etc.
<i>Normative shortage of medical services</i>	Extent to which <i>quantity of medical services needed exceeds quantity of medical services demanded at existing prices.</i>	A <i>unique quantity</i> of medical services comparable to quantity needed, a market shortage, etc.
<i>Total shortage of medical services</i>	Extent to which <i>quantity of medical services needed exceeds quantity of medical services supplied at existing prices.</i>	A <i>unique quantity</i> equal to the sum of market and normative shortages at a given price.

*compared* since the former does not refer to a unique quantity of medical services. However, it is correct to compare the *quantity* of medical services that will be demanded, given the determinants of demand, with the *quantity* of medical services needed as determined by expert medical opinion. In general the quantity of medical services *demande*d will be less than the quantity of medical services *wanted*. The quantity of medical services *demande*d will be less than the quantity *wanted* because of limited consumer financial resources and the fact that medical services have positive prices. The quantity of medical services *wanted* is likely to be greater or less than the quantity of medical services *needed*, because consumers tend to be ignorant of their own health status, contemporary standards of what constitutes "good health," and the potential of modern medicine for improving "ill health."

Existing evidence concerning the so-called "crisis" in health is consistent with both the notion of a "market shortage" and the concept of "normative shortage" developed in this paper. A "market shortage" may be expected to eventually work itself out through upward price adjustments. A "normative shortage" can be alleviated only through market intervention from either the demand side, the supply side, or both.

In closing, one observation should be made concerning future medical costs. Recently, market intervention, particularly from the demand side (Medicare and Medicaid), has generally been accompanied by attempts to "rationalize" the health system. Such requirements as the development of better cost accounting techniques, a closer tethering of patient charges to the actual costs of providing services, and better identification of the rates at which resources are actually utilized in delivering medical services may have served to reduce the quasi-public utility character of the

medical industry. As a consequence, the image of "public trust" with which health professionals have tended to view themselves also may have been undermined. As a consequence, services which traditionally were provided free or below cost to individuals who, in the process were being subsidized by health professionals and private philanthropy, are likely to be explicitly costed-out in the marketplace and thus identified as part of our nation's health bill.

An implication of the possible presence of a "market shortage" and the explicit identification of previously hidden or suppressed costs resulting from pursuing policies designed to alleviate a "normative shortage" in health services is that, in the future, prices of medical services are likely to continue to rise more rapidly than might be expected from anticipated increased utilization of health resources.

In spite of the fact that we may "shudder" at the thought of further advances in medical costs from any cause, this added rise in medical prices is not all bad. What is an element of "free" medical service to one individual is not "free" from the point of view of a society that is in the process of collectively underwriting the costs of medical education, the construction of health facilities, and other costs associated with the delivery of medical services. The real cost to society of providing for health is the value of the goods and services that are foregone as the result of producing medical services instead of producing other things such as education, housing, and the like. Knowledge of the costs of meeting the nation's health needs is a necessary first step toward ordering national priorities concerning meeting needs for health as opposed to meeting needs for other things. The notion that "health is a right not a privilege" may be good moral ethics, but it is not sufficient justification for making an all-out economic effort to

provide all the medical services that society needs. The truth is "health is purchasable," meaning that somebody has to pay for it, individually or collectively, at the expense of foregoing the current or future consumption of other things. Everything has its price—however ethically desirable it may be.

FOOTNOTES

1. For purposes of this paper, medical services refer to therapeutic, preventive, and rehabilitative services and care. No attempt is made to specify the units in which medical services, as defined here, might be measured. The discussion also assumes that medical services as so defined are of uniform quality.
2. Examples include the report of the Presidents Commission on the Health Needs of the Nation, *Building America's Health—Vol. II, "America's Health Status, Needs and Resources"* (Washington, D. C.: Gov. Ptg. Office, 1953). Report of the Surgeon General's Consultant Group on Medical Education (Bane Committee Report), *Physicians for a Growing America*, P.H.S. Publ. No. 709 (Washington, D. C.: Gov. Ptg. Office, 1959). Oscar R. Ewing, *The Nation's Health—A Ten Year Program* (Federal Security Agency—1948). For an excellent summary of these and other studies of shortages of medical services, see Rashi Fein, *Physician Services for the 1970's* (Washington, D. C.: Brookings Institution, 1964).
3. Many of these studies have been the subjects of criticism, comment, and elaboration on the part of economists. See for example: W. Lee Hansen, "Shortages and Investment in Health Manpower," *The Economics of Health and Medical Care* (Ann Arbor, Mich.: University of Michigan Press, 1964), pp. 79-91; and Elton Rayack, "The Supply of Physician's Services," *Indust. & Labor Relations Rev.*, Vol. 7, No. 2 (Jan., 1964), pp. 221-237. Other works which relate to this point are: Rashi Fein, *The Doctor Shortage: An Economic Analysis* (Washington, D. C.: Brookings Institution, 1967), pp. 6-22; Dale L. Hiestand, "Research Into Manpower for Health Services," reprinted from the *Milbank Mem. Fund Quart.* (Oct., 1966), Vol. XLIV, No. 4, Part 2. Published by the Milbank Memorial Fund, 40 Wall Street, New York, N. Y. 10005, esp. pp. 152-160; and Irene Butter, "Health Manpower Research: A Survey," *Inquiry* (Dec., 1967), pp. 5-42.
4. Other studies which carefully distinguish between "need" and "demand" include, Kenneth E. Boulding, "The Concept of Need for Health Services and Comments on the Health Services Research Papers Conferences," *Milbank Mem. Fund Quart.*, Vol. XLIC (Oct., 1966), pp. 202-233; Grover Wirick and Robin Varlow, "The Economic and Social Determinants of the Demand for Health Services," in S. J. Axelrod (prefaced), *The Economics of Medical Care* (Ann Arbor: University of Michigan, 1964), pp. 95-125; Paul J. Feldstein and John W. Carr, "The Effect of Income on Medical Care Spending," *Proc. Social Statistics Section* (American Statistical Association, 1964), pp. 93-105; and Gerald D. Rosenthal, *The Demand for General Hospital Facilities* (Chicago: American Hospital Association, 1964). An excellent summary of theoretical and empirical literature bearing on the demand for medical services appears in Herbert E. Klarman, *The Economics of Health* (New York: Columbia University Press, 1965), Chapter II. Also see, Paul J. Feldstein, "Research on the Demand for Health Services," *Milbank Mem. Fund Quart.*, Vol. XLIV, No. 3 (July, 1966, Part 2), pp. 128-162.
5. It should be noted that medical experts when appraising an individual's need for medical services are likely to be somewhat influenced by the patient's cultural, economic, and social situation, as well as by the availability of medical services in the area. In the interests of simplifying the discussion, we assume that members of our hypothetical population are "typically situated" in these respects and thus abstract from these considerations in the text.
6. Roger I. Lee and Lewis W. Jones. *The Fundamentals of Good Medical Care* (Chicago: University of Chicago Press, 1933).
7. It should be noted that in the text wants and needs are to be interpreted as quantities, since quality of medical services is assumed to be uniform. However, differences between lay and professional opinion concerning quality of medical services are as likely to exist as differences in opinion concerning wanted and needed quantities.
8. While some consumers are doubtless led to overestimate the curative potential of modern medicine due to the sensationalism with which certain medical discoveries are

heralded by the press, it is possible that the news media, television, and other communication devices are inadequate to keep consumers in a state of perfect knowledge concerning the full implications of advances in medical science.

9. In the case of medical services, financial resources include savings, insurance, and other sources of third-party reimbursement, as well as income. Certain theoretical difficulties are presented by the mixing of stocks and flows (e.g., wealth and income) in the budget constraint which, as yet, are unresolved. The discussion in the text is intended to be expository only.
10. One aspect of consumers' tastes and preferences for medical services tends to complicate analysis. A consumer's perception of the potential benefits of medical services changes drastically whenever he is injured, observes physical abnormalities which he interprets as indicative of extreme ill health, or is otherwise "informed" that the condition of his health is considerably below standard. These incidents cause the consumers to place a higher value on those medical services which cure the illnesses related to these symptoms. Thus, wants for extraordinary acute medical services are more immediate and rank higher in consumer ranking of preferences than wants for ordinary and nonacute medical services. The consequences of the sudden perception of the need for extraordinary acute medical services are discussed in greater detail later in the text. For an example of one attempt to take account of this in an empirical demand study by the use of a "severity of illness" variable, see Gerald Rosenthal, "Price Elasticity of Demand for Short-Term General Hospital Services" (presented at the Second Conference on the Economics of Health, Baltimore, Dec., 1968).
11. At one time economists were so convinced on the basis of the sheer logic of this proposition, buttressed with overwhelming supporting empirical evidence, that they elevated this relationship to the status of a "law," i.e., they regarded it irrefutable.

As an example of a classic statement of the "law of demand," we quote Alfred Marshall, *Principles of Economics* (MacMillan, London, 1890), p. 84.

"The greater the amount to be sold, the smaller must be the price at which it is offered in order that it may find purchasers; or in other words, the amount

demanded increases with a fall in price, and diminishes with a rise in price."

However, more recent theoretical developments provide a rationale for exceptions to the law of demand as well as point out that certain special cases of consumer behavior involving price speculation and "prestige" goods may well reflect a direct relationship between prices and quantities demanded.

For example, if consumer expectations are such that an increase in prices in the current period is interpreted as evidence that prices will rise again in the future, consumers may well increase their consumption of a commodity in response to an increase in current prices.

"Prestige goods" refer to commodities, the "conspicuous consumption" of which enhances one's social standing. For example, mink coats and diamonds are purchased and consumed (worn) in large part because they are symbols of wealth. If these commodities were cheaper (lower priced), the quantities of them consumed might actually diminish. A case could be made that medical services, at least to many consumers, are a "prestige goods." It may well enhance one's social status to go to an "expensive" doctor, dentist, or hospital for medical services.

Also, there is the problem that physicians and dentists frequently find that their list of patients increases as they raise their fees, and consequently the demand for their services increases as the "price" of them rises. This is explained by the fact that consumers of medical services are almost completely incompetent to evaluate quality of service. In such cases price is likely to be interpreted as an index of quality of medical services.

For a good discussion of exceptions to the law of demand, see J. R. Hicks, *Value and Capital* (Oxford, London: Oxford University Press, 1946), Chapter II, "The Law of Demand," pp. 26-42.

12. In general, an elasticity is a pure number (independent of units of measurement) that expresses the % change in quantity demanded to the % change in the level of a demand determinant, assuming all other determinants remain invariant. For example, the impact of a change in the price of medical services would be measured by calculating

$$\frac{\% \Delta \text{ quantity of medical services demanded}}{\% \Delta \text{ in the price of medical services}}$$

where the symbol  $\Delta$  is used to denote

"change." Therefore, given the demand relation

$$(1) q_{ms} = f(P_{ms}, P_o, F, N, W),$$

if the price elasticity of demand,  $E_{p_{ms}}$ , is measured in the neighborhood of a single point on the demand curve, we may write,

$$(2) E_{p_{ms}} = \frac{P_{ms}}{q_{ms}} \cdot \frac{\delta q_{ms}}{\delta P_{ms}}$$

where the second factor represents the partial derivative of quantity demanded with respect to price.

13. Very often in empirical demand studies age, sex, education and other "explanatory" variables are introduced as surrogates for consumer tastes and preferences. For example, see Grover Wirlick and Robin Barlow, "The Economic and Social Determinants of the Demand for Health Services" in S. J. Axelrod (prefaced), *The Economics of Health and Medical Care*, op. cit., pp. 95-125.
14. It should be noted in passing that the prices such as the arbitrary price  $P_1$  depicted in Figure 3 should be interpreted more broadly than just the "fee for services rendered." It is often said that people are reluctant to seek out all the medical service they *need* due to inertia, abhorrence of pain and embarrassment, etc. The real *price* per unit of services received should reflect the cost of pain, inconvenience, travel costs, waiting time as it genuinely reflects a cost in terms of foregone income and therefore will exceed the out-of-pocket cost of the fee for service. Anything that reduces the pain, suffering, and embarrassment that accompanies the delivery of medical services, or which reduces inconvenience, waiting time, and travel costs, reduces patients' real *costs* or *prices* of medical services, rendering them more attractive to other goods and services.  
It also should be noted that economists distinguish between a "change in quantity demanded" and a "change in demand." The former refers to a movement along a given demand curve in response to a change in price. The latter refers to a shift in the entire curve in response to a change in a determinant of the demand relation that does not explicitly appear in diagram.
15. Thus, for example, promotional activities designed to persuade people to reduce exposure to high-risk factors such as smoking, saturated fats, lack of exercise, etc., may be viewed as information devices designed to increase awareness of

health needs and of steps (therapy) that can be taken to improve "health." As such, they serve to increase the demand for medical services, and in the case of stopping smoking, people are being exhorted to treat themselves! The service people render to themselves is that of stopping smoking and the real cost of the service is the pain and suffering which accompanies "breaking the habit," less the reduction in expenditures on tobacco. Preventive health services which are self-administered may be viewed as substitutions of the services of less expensive medical manpower (patients) for future services of more expensive health professionals (physicians).

16. Several recent empirical demand studies have demonstrated the significance of income, insurance, and other financial variables as determinants of demand. For example, see Ronald Anderson and Lee Benham, "Family Income and Medical Care Consumption," and Morris Silver, "An Economic Analysis of Variations in Medical Expenses and Work Loss Rates," unpublished papers presented at the Second Conference on Economics of Health (Baltimore: Dec., 1968).
17. Recognition of these considerations have certain implications for the appropriate arguments of the demand equation expressed in Section III above. The following equation now seems appropriate:

$$q_{ms} = q(P_{ms}, P_o, F, N, W_o, W_A),$$

where  $W_A$  represents extraordinary acute care wants; and  $q_{ms}$  represents the quantity of medical services demanded,  $P_{ms}$  represents the price of medical services,  $P_o$  represents the prices of other goods,  $F$  represents financial resources,  $N$  represents the size of the population, and  $W_o$  represents all remaining wants including nonacute care wants for medical services as above. Thus  $W_A$  represents a "shift parameter" causing the demand curve to approach acute care medical needs according to the degree to which consumers feel that they are suffering or the extent to which they perceive that their lives are endangered, and so on.

- It also may be noted that the new demand curve is likely to be much less elastic than the original curve reflecting a reduced sensitivity to price in such cases.
18. Chronic illnesses, which may involve acute symptoms of intense pain and suffering, may prompt consumers to seek constant medical consultation and treatment and to grasp at every medical ad-



vance, no matter how tenuous, in attempts to improve their condition. In such cases, demand is likely to be coincident or may even surpass actual medical needs.

19. In Figure 4, the aggregate supply curve is drawn with a positive slope incorporating the hypothesis that suppliers are willing to make a greater quantity of services available only if prices per unit of service offered are higher. This is the usual supply hypothesis which may be justified on the reasonable assumption that greater quantities of services can be produced in the aggregate only by incurring higher per unit costs.
20. Rigorous definitions of market shortages are found in David M. Blank and George Stigler, *The Demand and Supply of Scientific Personnel* (New York: National Bureau of Economic Research, Inc., 1957), W. Lee Hansen, *op. cit.*, and Kenneth Arrow and William Capron, "Dynamic Shortages and Price Rises: The Engineer-Scientist Case," *Quart. J. Economics*, LXXIII (May, 1959).
21. The discussion which immediately follows concerning factors pointing to a health crisis appears in the Report of the *National Advisory Commission on Health Manpower* (Washington, D. C.: Gov. Ptg. Office, 1967).
22. Some readers may question the assumption that existing medical prices are below market clearing ones, noting that in the last 15 years or so medical prices have risen sharply. For example, from 1950 to 1967, the consumer price index of medical care rose by 86 per cent, from 73.4 to 136.7, and the consumer price index for all items rose by only 38 per cent, from 83.8 to 116.3 (Dorothy P. Rice and Barbara S. Cooper, "National Health Expenditures, 1950-67," *Social Security Bull.* (Jan., 1969, pp. 12-13). Upward price adjustments are entirely consistent with a condition "excess demand"; indeed, this is precisely the market mechanism that alleviates a condition of this sort. However, as will be brought out later in the text, upward price adjustments also may be expected to result from market intervention from the demand side in an effort to alleviate a "normative shortage." Thus, while price rises are not conclusive evidence of the unique existence of either a market or normative shortage, they do suggest that either a "market shortage" exists or that the demand for medical services is greater or is increasing more rapidly than supply at existing prices.

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## From Physiology to Poetry and Politics

The purpose of the Visiting Scholar program at Downstate Medical Center in Brooklyn is to give those engaged in the exacting and necessarily narrow discipline of science a chance to range more freely in fields of thought. Arnold Toynbee and Archibald MacLeish are among those who have visited the center in the last three years and, last month, the poet W. H. Auden spent two days stimulating medical students and doctors at Downstate.

One after luncheon conversation began with a base in physiology and widened by a series of illogical progressions to touch on the nature of Italian men, the necessity for mathematics, the character of cultures, poetry, education, political history, and hippie dress. At one point Mr. Auden was heard to say: "The question is, what causes the increase in metabolic rate? My hunch is it's overcrowding." "Is there such a thing as therapeutic poetry?" someone asked. "No, I don't think so at all," answered Auden. "It is not of therapeutic value. The aim of writing is to enable people a little better to enjoy life or a little better to endure it." (*New York Times*, December 12, 1970; 229 West 43rd St., New York, N. Y. 10036.)