UNIT 9  DETERMINANTS OF HEALTH SERVICES

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9.0 OBJECTIVES

After going through this unit, you will be able to:

● discuss the impact of healthcare services on consumer welfare;
● examine the two-way relationship between income and health;
● explain how poverty is not the sole determinant of malnutrition;
● outline the concept of ‘social gradient of health’;
● illustrate how wages and expected income can affect the supply of healthcare services;
● evaluate how the effects of organisational change and technical efficiency impacts the supply of healthcare services;
● state the implications of up-gradation of medical technology on healthcare costs;
● describe the methods and impact of pharmaceutical pricing on healthcare services; and
● analyse the impact of government policy on the demand for and supply of healthcare services.

9.1 INTRODUCTION

Initially, like any other market, income was thought as the prime determinant of demand for healthcare services. The fact that wealthy and rich countries possess far better
health status, and also demand higher levels of healthcare services, was the main reason for this belief. However, it has since become evident that certain non-income factors are equally crucial in shaping the demand for healthcare services in a country. Two broad type of such determinants classified in literature are: Structural and Proximal determinants. The former are distal characteristics that generate social and economic stratification such as economic, political, social and education systems. Proximal determinants are the circumstances of daily life like the quality of the family environment and peer relationships, availability of food, housing, recreation, access to education, etc. Proximal determinants are thus generated by the social stratification resulting from structural determinants as also the cultural, religious and community factors. In other words, while the structural determinants capture the nature of macro development issues, the proximal determinants concern themselves with the micro issues across and within the household framework. Likewise, the supply of healthcare services is controlled by factor inputs (e.g. wages, price, etc.) and organizational structure of pharmaceutical industry which is a major component of the healthcare sector. In this, we shall particularly see how the pharmaceutical industry suffers from strong non-price pseudo-competitive factors resulting in very high drug prices across countries. Against this background, the present unit deals with the structural and proximal factors that control the demand for and supply of healthcare services. Both of them, taken together and addressed duly, results in better health status of a community.

9.2 DETERMINANTS OF DEMAND FOR HEALTHCARE SERVICES

Healthcare is generally defined to encompass those goods and services whose primary purpose is to improve, or prevent deterioration in, health. Availability of healthcare services is one of the many determinants of the health status of a community. From the perspective of economic theory, healthcare services are an essential input into the production of health. As a result, unlike most of the other consumer goods, which are consumed for their direct utility generating properties, healthcare services are used to produce health, which again has high utility. Had healthcare goods and services followed the same economic principles as other goods, aiming for the optimization of utility of the consumers by striving to establish perfectly competitive markets would have led to a Pareto optimal situation. However, the fact that consistent state intervention in the healthcare market is found necessary, both in developed and developing countries, provides evidence to the fact that leaving everything to the invisible hands of market cannot solve the problems faced by the healthcare market.

Let us consider the concept with the help of a simple consumer framework in which the consumer’s utility is construed to depend on general goods and services (X) and healthcare services (HC). The health status (HS) is then determined by a joint result of both the exclusive as well as the combination of the two factors Z and HC. That is:

\[ U = f[X, HC, HS (Z, HC)] \] .................................. (9.1)

The effect of healthcare on welfare is, therefore, determined by:

\[ \frac{\partial U}{\partial HC} \] ........................................ (9.2)

which is the direct effect of healthcare on the utility of the consumer in which

\[ (\frac{\partial U}{\partial HS}) (\frac{\partial HS}{\partial HC}) \] ........................................ (9.3)

is the contribution of health status to welfare combined with the contribution of healthcare to health status. The first effect \( \frac{\partial U}{\partial HC} \) in expression (2) is the normal direct effect of
healthcare on the person’s welfare, which is common to any other consumer good X. The indirect effect of HC comes via HS in expression (3) which involves two factors: one, the marginal contribution of improvements in HS to utility \( \frac{\partial U}{\partial HS} \) [a subjective concept not identifiable easily] and, two, the marginal productivity of HC in producing HS \( \frac{\partial HS}{\partial HC} \) [a technical relationship guided by scientific research]. Both these marginal effects should have positive values for the expression of (3) to be positive. The total effect, which is a summation of expressions (2) and (3), would partially offset each other to finally reach a value which is normally positive. However, if a healthcare service is found to be ineffective in improving health (i.e. \( \frac{\partial HS}{\partial HC} < 0 \)), it may not necessarily improve the utility of the consumer.

Since the net effect on welfare depends on the production relationship between HS and HC, a simple demand analysis as in case of any other consumer good is inadequate. This brings in the concept of ‘need’ in the health sector as a necessary condition for a good healthcare service to exist in the sense of effectively influencing the desired objective of improving the health status of the society. The ‘need’ concept is important as unnecessary administration of costly medical procedures (due to inefficiencies in the system like the medical profession’s vested interest) could not only reduce welfare but also economically drain a patient’s resources who might otherwise be better off than undergoing the unnecessary procedure. In other words, the medical care is a good ‘good’ when a person is really in need of the treatment and a ‘bad’ good when the treatment is administered for ulterior motives. Hence, the technical relationship can serve as a basis of the concept of ‘need’ as opposed to ‘demand’ which also depends on preferences backed by price conditions. Demand for healthcare is thus derived from the ‘need’ for health itself (Grossman 1972). This concept of the ‘derived demand’ in assessing the need for healthcare services involves the interaction between both the supply side and the demand side concepts and cannot be judged in isolation.

The relationship between medical care and health \( \frac{\partial HS}{\partial HC} \) is, however, far from exact. This is in the sense that there is not only a considerable lack of medical knowledge concerning the efficacy of certain types of medical interventions but there is also extreme uncertainty about how far a particular care can effect the health status. As a result, healthcare providers disagree about the treatment of some types of medical problems where the demand for medical services becoming fuzzy. For instance, there is debate on when surgery is necessary for elderly males with prostate cancer. Thus, it is extremely difficult to accurately delineate the relationship between the price and the quantity demanded for medical care. The relationship between price and quantity demanded can therefore be better represented by not a well-defined line but a gray band like the one depicted in Figure 9.1. Two implications are associated with the fuzzy demand

![Figure 9.1: Fuzzy Demand Curve for Medical Care (Grey Band)](image-url)
curve. One, for a given price, we may observe variations in the quantity or types of medical services rendered. Two, for a given quantity or type of medical service, we are likely to witness price differences. This is illustrated by the substantial variation in physician fees for similar procedures in the same geographical area.

Apart from questioning the basic premises of utility maximisation in healthcare, some economists even question the three very basic assumptions of an optimisation exercise. These are: (i) whose utility are we maximising – Consumers’ (i.e. patients’) or his family members?; (ii) violation of the assumption of sovereignty of the consumer in choosing the level and quality of healthcare service since most of the time it is the physicians who choose this on his behalf; and (iii) if we assume the consequences alone, and hence only the end-results (paying no importance to the process as we do in normal utility optimisation), we actually cannot capture the change in the health status or the stock due to healthcare.

With regard to the market structure of most of the healthcare goods, monopolistic competition describes the market pretty well. Healthcare providers sell differentiated products, while patients idiosyncratically choose one provider based on real or perceived differences in their abilities to cater to their match. Most healthcare providers compete with each other in the market, whose services though may be good are not perfect substitute to each other. Further, the service providers take their competitor’s strategy as given and choose to respond with product differentiation. Because of this, coupled with the consumer’s asymmetric information, a downward sloping demand curve emerges. In most of the cases, this demand curve becomes quite steep mainly due to:

- healthcare, to many, is a necessity and hence its purchase is not responsive to prices that they need to pay. This is particularly true in the presence of strong supplier-induced demand.
- many non-price factors play considerable impact. Apart from their socio-economic conditions, personal preference and trust assume critical importance.
- for high-end patients availing of employer paid or insured check-ups, consumers do not bear the full burden of price differentials and hence their demand for healthcare does not relate to price changes.

Given the above, the equilibrium price remains at a point greater than the marginal cost of production primarily due to the intrinsic differentiation of products and services with significant amount of price inelasticity.

Check Your Progress 1 [answer the questions in about 100 words in the space given]

1) Distinguish between the structural and proximal determinants of healthcare services.

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2) Are healthcare services different from other goods and services? In light of your answer, what would you say about the need for government intervention in the healthcare market?

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3) Using the standard consumer utility framework, state the two expressions whose marginal contributions should both be positive in order that the ‘net indirect effect’ of healthcare on the health status is positive.

4) Why is ‘need’ a necessary condition for a good healthcare service to improve the health status of a society?

5) Give arguments to bring out why the demand for healthcare services cannot be viewed in isolation of its supply side?

6) What is meant by ‘fuzzy demand’? In the context of healthcare services, what are the two implications that follow from the presence of this type of demand?

7) State three reasons why in the case of healthcare services/market, the demand curve is quite steep?
8) Why does the equilibrium price in the healthcare market normally remain at a point above the marginal cost of production?

9.2.1 Income and Health

Income normally enters the demand for healthcare through the constraint in the optimisation exercise of utility function in equation (9.1). It is believed that increase in income, ceteris paribus, would automatically enhance the purchasing power and hence would increase the demand for healthcare. However, a more complex relationship emerges in this respect when one considers the effect of $\partial HS/\partial HC$. Once consumption of healthcare improves the health status, the productivity and hence income of the consumer is expected to increase, thus relaxing the assumption of linear budget constraint based on fixed income. Therefore, to start with, two things can be identified:

a) The impact of income on the demand for healthcare cannot bypass the issue of health status.

b) The relationship between the demand for healthcare and income would not be based on the assumption of fixed income but would be inter-twined with other cofactors.

Although the correlation between health status and income (across individuals and countries over time) is undeniable, economists and public health professionals have looked at the issue differently. Generally, economists focus on health as a source of human capital and hence economic output, while the public health exponents argue that the causal link between income and health is grounded in the redistribution of healthcare resources. Therefore, although the economists propose state intervention in healthcare and good health as a means of providing an avenue out of poverty, the public health group question such spending arguing for the fostering of economic growth to improve the lives and health of the global poor.

That the link between health and income is not unidirectional becomes clear once we incorporate the effect of income on health through $\partial HS/\partial HC$. The first obvious route from health to income is a direct link by productivity improvement. Higher levels of nutrition and the resulting better health, increases the productivity of workers in general. Further, lower incidence of morbidity also similarly impacts the worker’s time spent on the job positively (vis-a-vis length of time devoted to job and absenteeism). Healthier children can attend school more regularly and learn more efficiently performing better in studies. Good health of a person within the family can free others from entering the labour market prematurely (via child labour) and continue skill development and education. This is well exemplified from the fact that the orphan children from HIV/AIDS epidemic in Africa and Latin America are forced to dropout from school very early. Also, due to the presence of strong externality in healthcare, improvement in one person’s health can lead to improvement in health of others through better awareness (e.g. use of bed-nets in malaria-prone areas), sharing public health infrastructure (e.g. improved drinking water facilities and sanitation) and behavioural change (e.g. using condoms to prevent sexually transmitted diseases). Grossman’s celebrated model (1972) by considering the long run life cycle approach, succinctly points out that...
improvements in health add to the stock of human capital and hence can incentivise individuals to invest in health and education. Essentially, this brings into focus the term in equation (9.2) i.e. $\frac{\partial U}{\partial HC}$.

Cross-country correlation between population health (measured by life expectancy) and income per-capita, Pritchett and Summers (1996) found strong evidence of the fact that the relationship between income and health status is not just associative, but also causal and structural (Figure 9.2). Though technical advances and its diffusion in medical care have shifted this relationship, correlation between income and health has continued to remain robust. Other studies have also showed that better health is correlated with larger subsequent changes in income, suggesting that health not only

![Figure 9.2: Association Between Income and Health (1990)](image)

*Source: Pritchett & Summers 1996*

affects the level, but also the growth rate (Gallup and Sachs, 2001). At the macro level, cross-country data analysis on per-capita health expenditure has shown strong correlation with per-capita GDP with the elasticity found to be higher than one (i.e. suggesting healthcare to be a merit good). Thus, the structural effect of GDP on health status is undeniable.

However, there are also studies which have revealed low elasticity of income for utilisation of healthcare across households. This might be due to the strong presence of insurance market in developed countries due to which households pay only a minor fraction of the healthcare costs as direct out-of-pocket expenditure. In developing countries, healthcare utilisation like institutional delivery or immunisation is strongly cornered by the wealthy households, even though these services are offered free of cost by the state. This is mainly because of associated transaction costs (which are far from zero), suggesting a strong income effect. For instance, the report of National Family Health Survey (NFHS)-3: 2005-06 reveals that only 12.7 percent women coming from households with poorest wealth index have delivered their children in any institution, while the corresponding figure for the well-to-do group is as high as 83.7 percent. Similar figures for vaccination coverage posit that while 24.4 percent of children from the poorest group of households received all dosages of vaccination recommended by WHO, 71 percent children from the well-to-do group received all such dosages. On the other extreme, some studies have also come out with the finding that the hypothesis of ‘income protecting health’ is not supported by their analysis. These studies posit that recessions in developed countries have improved the adult health arguably because individuals engage in better preventive lifestyles during downturn by lowering drinking and smoking, doing more exercises and taking the meals regularly. This is, however, a condition that cannot work in a typical developing country set-up where lack of income is strongly cofounded with lack of health insurance, education, awareness, social rank and productivity.
9.2.2 Poverty and Malnutrition

The magnitude of malnutrition is generally assessed by comparing the food energy intake of persons with the proposed norms. Thus, at the onset, the poor who lack enough availability and affordability of good food, are believed to be prone to malnourishment. The nutritional status is measured by anthropometric indices viz. height for age (HAZ) representing stunting or chronic deficiency, weight for age (WAZ) representing wasting or acute malnourishment and weight for height representing underweight as a combination of HAZ & WAZ. Children whose anthropometric measure is less than ‘minus 3 standard deviation (-3 SD)’ from the median’ are labelled as severely malnourished (stunted/ wasted/underweight) and between ‘minus 2 and 3 standard deviation from median’ as moderately malnourished. Children, on this basis, are divided into three distinct categories viz. (i) properly nourished (Z-score above -2 SD); (ii) not properly nourished but not functionally impaired (Z-score between -2 SD and -3 SD); and (iii) malnourished (Z-score less than -3 SD). Any of this condition can occur not only due to lack of enough food, but also from over-consumption or imbalanced consumption of food. Essentially, therefore, it represents an imbalance between food intake and its assimilation within the body. Again, under-nutrition can be of two types: Protein Energy Malnutrition (PEM) and Micro Nutrients Deficiency (MND). While PEM is associated with lack of energy in food consumption, MND represents lack of vitamins and minerals which could cause diseases like anaemia, goitre, rickets, etc. It is, however, argued that ‘food energy intake’ is a poor measure of nutritional status as it does not depend only on nutrient intake but also on non-nutrient food attributes like drinking water facilities, sanitation habits and hygiene behaviour. For instance, in Kerala, low per capita food consumption coexists with low level of malnutrition while in Rajasthan, high per capita food consumption has not reduced the high prevalence of malnutrition. Thus, the relationship between poverty and malnutrition is not a linear one but rather involves complex understanding of the standard of living and awareness.

Empirical evidence, however, also show some cofounding relationship between poverty and malnourishment across Indian states, though factors other than poverty also play a significant role. Prevalence of malnutrition among non-poor household too is not only significant but is also revealing an increasing trend. Apart from the household level characteristics and mother’s education status, type of food intake too is important. The NFHS-3 has, in fact, revealed that 8.2 percent of children in the top quintile class suffer from severe stunting and 25.3 percent from moderate stunting. The situation is far worse in case of urban rich group. Recent trends on consumption pattern among urban middle and rich income classes reveal that they are moving away from food grains and are consuming oily and fatty foods besides leading a sedentary life style. These habits have made the problem of controlling malnourishment way beyond the issue of poverty.

An yet another vicious cycle of malnutrition operates through the chain mother-child-mother. Children born to malnourished mothers or who are themselves malnourished during childhood can suffer cognitive losses that are associated with lower productivity in adulthood. WHO has, therefore, recognised the importance of initial 1000 days (i.e. from a woman’s pregnancy to the second birthday of the child) to be extremely crucial for a child right after the mother conceives. The right nutrition during this 1,000 day window can have a profound impact on a child’s ability to grow, learn, and rise out of poverty as well as shape a society’s long-term health, stability and prosperity. Children malnourished before birth have higher risk of dying in infancy and are more likely to face lifelong cognitive and physical deficits and chronic health problems. Again, after birth, under-nutrition in early days can be life-threatening. It can weaken a child’s
immune system and make the child more susceptible to death from common illnesses such as pneumonia, diarrhoea and malaria. Mothers with high anaemia, tender age and lack of empowerment, especially in the patriarchal societies of developing countries, tend to deliver infants more prone to malnourishment in the long run. It is, therefore, extremely crucial to break this chain in order to reduce the incidence of child malnutrition, with or without poverty.

9.2.3 Socio-economic Determinants of Health

Economic growth is undoubtedly important, particularly for poor countries, as it provides the wherewithal to invest in social sector development. But growth by itself, without appropriate social policies to ensure fairness in the way its benefits are distributed, brings little change to health equity. In fact, mal-distribution of healthcare services (i.e. not delivering care to those who most need it), has always been recognised as the main reason behind poor health and disease. Much of the burden of illness leading to appalling premature loss of life, both in developing as well as developed countries, are identified to both the distal and proximate conditions in which people are born, grow, live, work, and age. In all societies, both rich and poor, those with greater privilege tend to enjoy better health. Such privilege can emanate from better economic status, better education, better overall awareness, etc. While the difference in economic status would affect the incidence and prevalence of common communicable diseases, huge difference in the incidence of chronic illness, mental depression and healthcare utilisation also suggest a far deeper cause of inequality, reaching the ‘causes of causes’. Social scientists generally agree that a broader underlying dimension of social stratification (or social ordering) is the prime factor behind this. Thus, policies to reduce health inequity would have to involve a number of non-health areas of concern. For those involved in designing policies to address these gradients, therefore, a deeper understanding of the diversity and mechanisms of various factors is crucially needed. Conceptual framework of this theory of ‘social gradient of health’ draws on the capability approach of development (propounded by Amartya Sen), where development is taken to mean ‘freedom to lead the life’. These issues have been discussed in detail in the WHO report on Social Determinants of Health (2008).

The social ladder in which an individual stands, therefore, becomes extremely crucial in determining his health status. Health differs across individuals not only due to the income earning capacity and employment but also due to one’s position in social hierarchy. Lack of proper employment not only affects one’s capacity to buy healthcare, but it also creates psychological stress due to feelings of insecurity. Studies have found that in a rich economic setting like Whitehall in Great Britain, occupational hierarchy determines the mortality figures of people in a major way. The social ladder theory also goes across generations. It assumes that employed mothers can spend on their child’s healthcare services readily. It also assumes that participation in labour market offers the mother a sense of empowerment within the household and hence she can decide favourably for her child’s healthcare. However, employment also reduces the time spent on childcare. In developing countries, where much of the women employment is associated with informal sector (without any provision for maternity and childcare), mothers often cannot take their children to healthcare centres even for routine immunisation. Recent studies have found out that child immunisation status is negatively associated with mother’s employment (Shivakami, 1997; Jatarana, 2003). This kind of forced employment in poor households, therefore, rarely offer the women any benefit in terms of empowerment. Thus, not merely the employment, but the nature of employment is a crucial determinant of the health status and healthcare utilisation. A study on highly educated lady IT professionals in Kolkata identifies that women suffer
from untreated morbidity as they hardly get time to see a doctor when they are unwell. The general ‘bargain model’ within the dyad of husband and wife also challenges the general myth that an employed woman enjoys better empowerment and hence enjoys decision making power within a household.

**Ethnicity** is another factor having a very strong health gradient. It is often argued that this social determinants works through the economic conditions. Ethnic people often stay in remote places and in poverty. However, economic conditions cannot always account for all the difference in health status. The child-care practices, social beliefs, cultural norms, language barrier, difficulties in patient-provider communication, residential segregation and legacy of history often differ across ethnic and religious groups, thus resulting in health inequity. In the United States, black adults are more likely to die earlier than white adults (due to cardiovascular diseases, cancer, diabetes, etc.) and also face higher homicide hazards and incidence of drug addiction. Egregious examples of ethnic gradient on health come from comparisons of life expectancy at birth of indigenous people in developed countries like Canada, New Zealand, and Australia with that of the total population (Table 9.1) where in each case, the gap between the indigenous group and the total population is substantial. Australia, a developed country by any standard, finds her indigenous tribal men (living in Northern Territory and Saint Torres Islands) have life expectancy 17 years less than the average men.

In developing countries like India, ethnicity plays a crucial role in determining the healthcare status of the people. NFHS-3 (2005-06) finds that more than 20 percent women from Scheduled Tribe do not use any maternal care services (ante-natal checkups, consumption of iron tablets, anti-tetanus immunisation and institutional delivery), while the corresponding share for the general caste is 6.03 percent. Likewise, the infant mortality rate (IMR) and the child mortality rate (CMR) of ST children are far higher compared to the general caste population in India. As per Census 2011 figures, IMR for Scheduled Tribe population was 62.1 per 1000 live births in 2005-06, while for general castes the figure was 48.9 percent. The corresponding figures for CMR were 95.7 and 59.2 percents respectively.

**Table 9.1: Life Expectancy of Indigenous People in Developed Countries (Years)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Indigenous</th>
<th>All men</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia (1996-2001)</td>
<td>59.4</td>
<td>76.6</td>
<td>17.2</td>
</tr>
<tr>
<td>Canada (2000)</td>
<td>68.9</td>
<td>76.3</td>
<td>7.4</td>
</tr>
<tr>
<td>New Zealand (2000-2002)</td>
<td>69.0</td>
<td>76.3</td>
<td>7.3</td>
</tr>
</tbody>
</table>

**Source:** Marmot 2006

Another crucial source of inequality is education. The focus on education has two rationale. One, education is expected to improve productivity and hence the earning capacity of an adult, thereby improving his health status. Two, it offers intrinsic benefits normally associated with better awareness level like healthcare practices for preventive healthcare. Such intrinsic benefit also flows inter-generationally. Better educated parents, especially mothers, have healthier children who grow up to become healthy adults. Better educated parents prefer to give their children better healthcare facilities, including immunisation coverage, safe drinking water, improved sanitation and proper nutrition.

On obesity, particularly in women, there is an inverse association with socioeconomic status. The relationship of obesity with education as a measure of socioeconomic position is depicted in Figure 9.3 where countries are classified on the horizontal axis by the degree of economic development. Above a GNP per-capita of above $2995 (i.e. upper middle-income economies), the higher the education the lower the obesity rate.
while the corresponding trend is opposite in low income countries. Similar differences are observed for risk factors like smoking, addiction and mental health. Differences in health behaviour thus can be attributed to the autonomy and social engagements.

Recent studies also indicate some inept impacts of education on healthcare benefits. Two reasons are suggested for this. One, there may be a possibility of reverse causality from good health to good education. Evidence suggests that healthy students regularly attend schools and perform better. Two, the quality of education imparted is of crucial importance particularly in developing countries like India, where the main thrust of education policy is on improvement in gross enrolment with the result that people receiving education are able to sign but have poor comprehensive and analytical skills. Apparently, education imparted fails to offer any significant intrinsic benefits by healthcare in these countries.

### 9.2.4 Healthcare Finance

Healthcare is essentially financed by three pre-dominant modes viz. public finance, third party payment through private insurance and out of pocket expenditure (OOPE). With healthcare reform spreading its wings across countries along with tight fisted fiscal policies, countries have adopted policies to restrict the first option only for the poorest and the most vulnerable sections of the population. Commercialisation of healthcare market has resulted in more dependence on private insurance market in developed countries, while sky-rocketing the OOPE in developing and poorer countries. A ready indicator to capture the process of commercialisation has been the share of a country’s healthcare expenditure financed directly by private individuals (i.e. OOPE and private insurance). Among rich countries only the United States and Singapore have private healthcare spending share above 50 percent, while in an overwhelming majority of poor countries the private healthcare share is greater than 70 percent. Additionally, the poorer a country, the more likely the population is to face the most regressive form of health finance. Also, ‘socialized medicine’ (i.e. healthcare financed through tax-based public expenditure and social insurance), appears a luxury good in economic terms since more of public financed healthcare is cornered by the people in the higher income segment relative to those in the lower income segments.

Given this pattern of healthcare finance, a few observations linking the type of finance and the health status across the countries is in order. First, countries with better health
outcomes are associated with lower commercialisation of health expenditure. As per WHO data in 2000, Healthy Life Expectancy (HALE) was significantly higher and child mortality lower in countries with lower ratios of private to total health expenditure. Second, countries spending more of private funding do not report to have better health status. Third, countries that spend more of their GDP on healthcare through public expenditure have significantly better health outcomes. More recent evidence indicates that higher spending via universal health coverage (UHC) impacts health outcomes positively, with larger benefits for poorer countries. Figure 9.4 plots the per capita public spending on health against IMR for 182 countries for 2011. It indicates that there is an inverse relationship between the two. An analysis of the relationship between health status and public spending across Indian states reveals that: (i) per-capita public health expenditure positively influences health status; (ii) poverty declines with better health; and (iii) growth and health have a positive two-way relationship.

In the healthcare market, information asymmetry primarily occurs due to the fact that consumers have information on marginal effect of health on his utility ($\partial U / \partial HS$) which the provider does not have. Again, the provider has information on effectiveness of healthcare service on health status ($\partial HS / \partial HC$) which the patient does not have. This typically leads to a market failure as due to lack of information on $\partial HS / \partial HC$, patients demand unnecessary and irrational healthcare options. Since, Arrow’s uncertainty principles make $\partial HS / \partial HC$ variable and unpredictable, both of these factors induce the patients to be risk averse and they take private insurance by choice. The decision to buy no insurance rather than full coverage is more likely to be optimal with greater cost of insurance. However, with greater probability of individual’s illness, even a risk-neutral individual will buy health insurance. The latter is also the case when some health services are indivisible and necessary for survival (like renal dialysis and organ transplants). Economic theory predicts that with an insurance policy, individuals become a bit more reckless and reduce the use of preventive healthcare practices (called Moral Hazard). The scope for this gives rise to asymmetric information between the insurance provider and patient thereby making the relationship between ‘moral hazard’ and

Figure 9.4: Relationship Between Per Capita Health Spending and IMR (2011)

Source: Gupta & Mondal 2014

the patients to be risk averse and they take private insurance by choice. The decision to buy no insurance rather than full coverage is more likely to be optimal with greater cost of insurance. However, with greater probability of individual’s illness, even a risk-neutral individual will buy health insurance. The latter is also the case when some health services are indivisible and necessary for survival (like renal dialysis and organ transplants). Economic theory predicts that with an insurance policy, individuals become a bit more reckless and reduce the use of preventive healthcare practices (called Moral Hazard). The scope for this gives rise to asymmetric information between the insurance provider and patient thereby making the relationship between ‘moral hazard’ and
‘asymmetry of information’ two-sided. As a consequence, the demand for curative healthcare services eventually increase due to the presence of the third party insurance to pay for the costs.

For voluntary health insurance (as is the case in most developing countries), the consumer will choose to use a level of medical care and its associated levels of spending conditional to the hazards of facing a grave illness in order that the marginal health and welfare benefits of healthcare equals the marginal cost of that care in the market. That level of spending is exactly the amount the consumer would want to pay as premium for insurance. To put it differently, let us assume that

- the illness with uniform severity might strike the patient with a probability ‘p’;
- without insurance, the person is ready to spend $S^*$ on the cost of treatment for a disease; and
- he would compare the marginal benefits from additional spending for a package of care $X^*$.

Given this, in absence of any moral hazard, the person will buy insurance for a premium (irrespective of whether the illness strikes him or not) if the cost of his actuarial premium is equal to the expected value of claims for covering the expenses. This will take place irrespective of the degree of risk aversion for all patients. The value of that additional cost would be $P = p S^*$.

But the situation would differ when the patient does not know what is the exact severity of the illness. At some severity level ‘$L$’, the person is ready to spend $S^*$, and at a higher severity level $L'$ he is ready to pay $S'$. However, with the insurance coverage in the absence of any additional OOPE, the person may prefer $S'$ even in the state of $L$, because additional spending provides positive marginal benefits. Thus, the consumer will claim to be on higher severity level $L'$ (where the expected value of cost of healthcare with insurance is higher than in the case of without insurance) which amounts to moral hazard. Thus, moral hazard leads to consumption of healthcare that is less worth than its benefit. With severity $L$, the person consumes $S - S^*$ additional care, which will not offer him benefits less than that value. The premium will rise from $P' = p(L) S^* + p(L') S'$ to $P'' = \{p(L) + p(L')\} S'$ and hence additional consumption of healthcare would lead to additional premium not worth it.

**Check Your Progress 2** [answer the questions in about 100 words in the space given]

1) Identify the correlates between income and health to bring out that it is a two-way relationship.

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2) Do you agree that the difference in view points between economists and public health exponents on public healthcare expenditure is similar to the debate on ‘growth’ versus ‘development’?

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3) What is the empirical evidence that has established the relationship between income and health as a merit good?

4) What is the empirical evidence that is available to contest the hypothesis of ‘income protecting health’?

5) Do you agree with the view that ‘food energy intake’ is a good measure to reveal the relationship between ‘poverty and malnutrition’? Illustrate your answer.

6) Do you agree that in the prevailing employment conditions in developing countries, characterised by large informal sector employment, employment of women makes a good deal of difference as a determinant of health status and healthcare?

7) What is an empirical indicator generally used to measure the commercialisation of healthcare in countries? What is meant by ‘socialised medicine’ and why is it regarded as a luxury good?

8) What major findings flow from the studies on Indian states in respect of public spending on healthcare?
9) How is the relationship between ‘moral hazard’ and ‘asymmetry of information’ two-sided? What is an unhealthy consequence of this feature?

10) Illustrate how additional consumption of healthcare due to moral hazard leads to additional premium cost incurred unworthy of it.

9.3 DETERMINANTS OF SUPPLY OF HEALTHCARE SERVICES

The supply of health workforce, engaged in delivering different types of healthcare services, is supposed to have direct impact on the health status of the population. Health workforce individually and taken together collectively can be seen as a profit-maximising economic actor. We can see this from the perspectives of price, wage, efficiency, etc. as follows.

9.3.1 Price, Wage and Supply of Health Workers

Individuals are in the first place tempted to take to higher education more out of the attraction to the earning potential that such a professional career commands. Thus, higher demand for healthcare services and higher expected income play crucial roles in embracing the career in medical education. Historically, many developing and developed countries in the world have experienced severe shortages in the supply of health workers, particularly doctors and nurses. As a result, the market for doctors and nurses have suffered from the pressure of excess demand. This situation of excess demand puts upward pressure on their prices i.e. their wages or salaries. However, being far from a perfect market, the price mechanism in the market is often characterised by one or more of the following situation.

- Since the medical education market remains highly controlled, any automatic increase in the supply of medical workforce cannot be ensured. As a result, imperfection creeps into the market of medical education with hefty charges paid for a seat in the medical colleges.

- Doctors then attempt to increase their income by resorting to factors like demand inducement. A positive association between the density of health workforce (captured by physician density per thousand population) and their price is often
interpreted as evidence of monopolistic market and/or physician’s inducement of demand for medical care.

- In expectation of further income enhancement, workforce often migrate from developing to developed countries. This phenomenon of export of health workers from developing to developed countries has historically seen out-migration of trained persons from countries like India, Philippines and Vietnam in huge numbers to countries in Europe, Middle East and African countries.

- The above imperfection resulting from a state controlled healthcare system, does not allow the price for doctors’ services to be adjusted by the market. As a result, the price of health services itself reflects an average quality of service in the market. The workers with above-average quality would then opt for high salary positions in the private sector or migrate to other countries. This would further lower the average quality of the workforce in the market. This process would repeat itself till the market is characterised by low-quality doctors and nurses. Consumers too shift their demand to unregulated medical care, especially in developing countries. As a result, studies indicate that the poor patients often prefer untrained quacks or Rural Medical Practitioners (RMP) instead of doctors in the public sector. In India, the predominance of demand for services from RMPs is a combined result of market imperfections and information asymmetry.

In short, due to the presence of limited price mechanism in the market of medical manpower especially in developing countries, doctors and nurses either make use of non-price mechanisms like demand inducement to increase their income or exit from a market in pursuit of higher wages in other places. Quality too tends to suffer in the absence of perfect market forces to establish the required adjustment in the healthcare market. In Arrow’s words, ‘the general uncertainty about the prospects of medical treatment is socially handled by rigid entry requirement’ (1963).

9.3.2 Organizational Change and Technical Efficiency

Variations in the efficiency of healthcare workers could also be due to the differences in the efficiency levels of healthcare infrastructure as well as the presence of other adverse correlates of health outcomes like social determinants (like poverty and lack of education). The significance of organisational factors is underscored in this context in terms of higher budgetary provision which often help countries and specific hospital units to succeed in having the required allocations made in this regard. The measurement of technical efficiency is helpful to assess such organisational factors which in the case of a healthcare system is often calculated by using non-parametric methods like Data Envelopment Analysis and Stochastic Frontier Approach. These methodologies do not make any assumptions on the distribution of outputs nor do they need any a-priori information related to price. Hence they are currently being used in sectors like health and education, where profitability is not considered as the prime motive in the industry.

Measurement of technical efficiency can be of two types: (i) input oriented technical efficiency measure; and (ii) output oriented technical efficiency measure. The former deals with the minimum amount of input quantities (which can be proportionately reduced) without changing the quantities of output produced, while the latter deals with the maximisation of quantities of output (that can be proportionately increased) without altering the quantities of inputs. In case of output oriented measure, the TE of a Decision Making Unit (DMU) is computed by comparing its actual output with the maximum producible quantity on the frontier. In input oriented measure, the TE of a DMU is measured by comparing its actual input in use with the minimum input that
would produce the targeted output level i.e. by identifying how much can input quantities be proportionately reduced for each DMU without changing the actual output bundle.

The idea of input and output oriented technical efficiency can be presented by a graphical presentation for the case of a single input and single output (Figure 9.5). The horizontal axis represents the input used by the firm and the vertical axis shows the output produced with the point \( A(x_o, y_o) \) representing the actual input-output bundle from which \( y^* = f(x_o) \), the maximum output producible from input \( x_o \) can be potentially realised. The 

output-oriented measure of technical efficiency is given by \( \text{TE}_o = \frac{y_o}{y^*} \), which is the comparison of actual output with the maximum producible quantity from the observed input. Assuming that for the output level \( y_0 \) the quantity of input can be proportionately reduced till the frontier \( y_o \) is reached with an input \( x^* \), the input-oriented technical efficiency measure for the concerned DMU is given as \( \text{TE}_i = \frac{x^*}{x_o} \). Since the value of \( \text{TE} \), calculated by this method, lies between 0 and 1, a score of 1 will signify that the firm is fully efficient and a score below 1 signifies inefficiency.

Figure 9.5: Input and Output Oriented Technical Efficiency

The healthcare finance, along with other inputs, is often not fully utilised to reach the maximum output (health status) and therefore there remains a large scope for improving the effect of health finance on the health status. Since improving the efficiency of spending would remain a critical strategy in the financing for ‘universal health coverage’, funding would remain an important correlate in improving the health status of people.

9.3.3 Pharmaceutical Pricing

The global pharmaceutical industry selling vaccines, drugs, consumables, etc. represents classical monopolistic competitive conditions with patents and product differentiation leading to prices that are far higher than the production and marketing costs. With firms attempting to move to partial monopoly by introducing newer products, they undergo huge R&D costs, as well as promotional expenditures, sometimes sacrificing the short run profit. Patents, in the form of guarantee document for the intellectual property of the firm, offers virtual monopoly to the patent holder to charge high price for the product for the entire term of the patent. After the expiry of patent term, the companies face the competition from generic producers forcing them to reduce the prices. However, under the existing market structure, many firms go for ‘ever-greening
of patents’ by applying for new patent term, often foregoing their earlier patent term by one or two years, with little value added to the existing product so that they can enjoy the monopoly rights for a longer period. The prices at which the drugs and vaccines are supplied in the market, therefore, seldom represent the pure market conditions. Further, the political economy behind the pharmaceutical lobby often controls the prices of medicines. Added to this is the induced demand created by brand-sensitive physicians, who continue to prescribe high priced originator brands even when low price generics are available in the market. A partial market which is price-inelastic, therefore, co-exists with another part of highly elastic market segment. These characteristics often result in the co-occurrence of a plethora of generics for each molecule in any market.

With the pharmaceutical industry always appearing to be at or near the top of industry rankings in terms of after-tax profit returns, most of the countries, apart from patenting system, offer a host of institutional arrangements for controlling the prices and profits of the pharmaceutical companies. To curtail the burden of the citizens by the rising healthcare costs, most of the developing as well as developed countries, impose pharmaceutical price controls. Though there are countless variations in the ways governments control prices, mainly they take the form of any one or combination of following five forms: (i) reference pricing; (ii) case-to-case negotiation; (iii) formula pricing; (iv) profit regulations; and (v) capping constraint controls. Under the first, comparable drugs are put in a reference category and prices are allowed only at the lowest of the group. This, however, creates non-price pseudo competition particularly in developing countries. The pharma giants refuse to reduce their price in these countries in accordance with the prevailing market conditions. General over-the-board price regulation system in developing countries are often used as a safeguard to control the healthcare costs. Although it is argued that these controls, in effect, distort the pharmaceutical and healthcare market, it must be recognized that leaving everything to the markets would lead to extremely high prices inducing more inequity and vulnerability particularly for the large number of poor in developing countries.

9.3.4 Technology and Healthcare

New technologies have revolutionised the ways in which the healthcare services are practiced. Among the best selling prescription drugs, nearly 10 percent are new every year. Advances in medical technology, involving both diagnostics and treatment, have been a driving force behind the rapid growth of healthcare expenditures. Research indicates that the growth of medical technology is a prime cause for quadrupling the per-capita healthcare costs over the period 1970 to 1986. Due to the availability of new technology, previously untreatable conditions become treatable and hence one encounters a larger and unexpected medical care costs than before. This essentially means a higher mean and variance of expenditure. Thus, a rational individual would like to demand not only higher medical services, but also higher insurance coverage to protect himself from major expenditure like the organ transplant resulting in higher average health expenditure over the life time of a person. On the other hand, the discoveries of newer vaccines of dreaded diseases have resulted in a reduction of individual’s expected level of expenditure for treating the disease in the long run. Thus, the nature of new technology actually determines the degree and direction of change in the demand for healthcare. Three types of technology can be typified as follows:

- **No-technology**: It offers better provider-patient relationship by pain management and psychological support (for diseases like advanced stages of cancer, severe arthritis, stroke, etc.).
- **Half-way technology**: It adjusts to disease and postpones death (e.g. organ transplant, chemotherapy, radiation therapy, etc.).

- **High technology**: It comes from the genuine understanding of disease for preventing the incidence of disease (vaccines, prevention of nutritional disorders, etc.).

The effect of technology on medical care would depend on how far the high technology is being replaced by half-way technology or no technology. The half-way technology is encouraged by cost-reimbursement insurance system that has dominated hospital and medical care so far.

The issue of technology and supply of pharmaceutical products is thus linked to the patent system. Patents are of two types: product patent and process patent. The former stops anybody else other than the patent holder from producing the product itself, while the latter stops the competitors from producing the product by the same process as the patent holder. Surely, the former is far more stricter patent framework than the latter. The global pharmaceutical giants invest a large share of their turnover in R & D trying to hold patent on the newer drugs. Thus, they charge very high monopoly price on the originator brands. After the expiry of patents, competition starts coming from generic producers, when under competition, the price of the drugs tend to fall. However, studies have found that even under generic competition, originator patent holder does not reduce the price as he enjoys a substantial market share by promoting their brands through the physicians. The doctors, who do not pay for the drugs, choose the originator brands for the patients, thus undermining the impact of patent expiry on the healthcare costs.

### 9.3.5 Government Policy

Earlier in section 9.3.3 we outlined the government’s efforts to control prices of medicines and vaccines to ensure the supply of drugs to the wider population. However, evidence suggests that even with strict control in prices the governments have not sufficiently succeeded in providing access to medicines in majority of countries. According to WHO estimates, nearly a third of the world’s population lacks access to the most basic essential medicines, while in the poorest parts of Africa and Asia this figure is close to half (WHO, 2003). In contrast, only 0.3 percent of population in high-income countries lack access, thus putting a highly disproportionate share of burden of non-access on the developing and poorer countries.

India is a paradox in this context, where more than 65 percent of population has absolutely no access to essential medicines, in spite of enough industrial capabilities to become the third highest producer of drug volume in the world and one of the largest exporters of generic drugs. India, known as the ‘global pharmacy of South’ suffers mainly from a lack of proper public distribution facilities. Recently, many states have taken up specific policies to improve access to medicines in the country. In the Tamil Nadu model, considered the benchmark model to provide free medicines to every patient visiting public health facilities, an autonomous public sector body [named Tamil Nadu Medical Services Corporation (TNMCS)] procures high quality generic medicines through a transparent bidding system and then supplies to the public health facilities through a demand sensitive coordination. Bihar, Delhi, Madhya Pradesh, Kerala and Rajasthan have also come up with similar, though differentiated models. West Bengal, for the first time, introduced a Public Private Partnership model to achieve huge cost cutting of existing marketed products by introducing nearly one hundred Fair Price Medicine shops across the state.
Under the aegis of healthcare reform, many Asian and African countries have introduced Performance Based Finance (PBF) in order to bypass the typical principal-agent problem of the public sector health facilities. The idea behind PBF was, essentially, to incentivise the manpower at the supply side to improve the delivery of services. PBF is defined as a mechanism by which the health providers are, at least, partially funded on the basis of their performance. It is in contrast to the line-time approach where a health provider offers the inputs, including manpower, equipment and drugs. By increasing the income of health providers, PBF aims to bring together greater motivation and better technical efficiency, and even encourage staff to work in remote areas. While increasing the overall service utilisation, it can also lead to greater accountability of the health workers. Critics, however, point out that expansion of service utilisation might result in severe inequity with the potential to adversely affect the related non-incentivised services.

India has also introduced the PBF in the form of Accredited Social Health Activist (ASHA) under the National Rural Health Mission (NRHM). ASHAs are expected to be paid according to incentive schemes based on PBF to encourage Institutional Delivery (ID), Antenatal Check Up (ANC) and Complete Immunization (CI). They are paid in piecemeal for each ANC taken, ID in government hospital, accompanying mothers for ID, etc. Though several studies have shown significant improvement in healthcare utilisation after the initiation of NRHM, some counterproductive evidence of neglecting non-incentivised services and unequal utilisation of maternal care services have also come up.

Check Your Progress 3 [answer the questions in about 100 words in the space given]

1) In a government controlled education market for medical personnel, how does the price mechanism fail to establish an efficient market for healthcare manpower?

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2) Distinguish between the two major types of technical efficiency measurement techniques that are usually applied in industries like health where profitability is not the main priority.

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3) Do you agree that ‘finance’ would remain an important correlate in improving the health status of the population? Why?

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4) What is meant by ‘ever greening of patents’? How does this, along with other factors, influence the prices in the healthcare market to remain high?

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5) What mechanisms are usually adopted by both the developed and developing countries to control the monopolistic behaviour of pharmaceutical industry? How does it work?

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6) Do you agree that the issue of technology and the supply of pharmaceutical products is linked to the system of patents? How?

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7) How is the ‘performance based finance’ (PBF) system defined? What has been the feedback on its working in India?

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9.4 LET US SUM UP

The demand and supply of healthcare ideally do not follow similar economic logic as for other goods. Though income, wage and prices interact in some way to control the market for health services, the unique nature of healthcare affecting the consumer’s utility via the indirect route of controlling health status needs to be recognised. Also, healthcare utilisation is profoundly affected and determined by several non-economic social factors which result in serious inequity and vulnerability. Education, ethnicity and occupation impose strong impact not only on healthcare demand, but also on the final health outcome. Likewise, several non-market relations and government interventions often distort the supply of healthcare goods, including medicines. Existence of patents, price and profit controls, barriers to migrate, etc. create strong effects on the supply of health goods and services. Additionally, the impact of technology on healthcare costs and hence demand would depend on the nature of technology per se, rather than the cost involved.
### 9.5 KEY WORDS

**Structural Determinants**: Are characteristics that generate social and economic stratification, such as economic, political, social and education systems. The structural determinants thus capture the nature of macro development issues.

**Proximal Determinants**: Proximal determinants are the circumstances of daily life like the quality of the family environment and peer relationships, availability of food, housing, recreation, access to education, etc. The proximal determinants concern themselves with the micro issues across and within the household framework.

**Fuzzy Demand**: A situation where it is extremely difficult to accurately delineate the relationship between the price and the quantity demanded for medical care.

**HAZ/WAZ**: Variables used for representing chronic nutritional deficiency and acute malnourishment respectively. HAZ relates to stunted height while WAZ refers to excess weight.

**Performance Based Finance (PBF)**: PBF is defined as a mechanism by which the health providers are, at least, partially funded on the basis of their performance. It is in contrast to the *line-time approach* where a health provider offers the inputs, including manpower, equipment and drugs.

**Arrow’s impossibility theory**: The Arrow's impossibility theorem is a social-choice paradox illustrating the impossibility of having an ideal voting structure that is reflective of specific fairness criteria, such as Pareto efficiency. Arrow's impossibility theorem states that a clear order of preferences cannot be determined while adhering to mandatory principles of fair voting procedures.

### 9.6 SUGGESTED REFERENCES FOR FURTHER READING


9.7 ANSWERS/HINTS TO CYP EXERCISES

Check Your Progress 1
1) See 9.1 and answer.
2) See 9.2 and answer.
3) See 9.2 and answer.
4) See 9.2 and answer.
5) See 9.2 and answer.
6) See 9.2 and answer.
7) See 9.2 and answer.
8) See 9.2 and answer.

Check Your Progress 2
1) See 9.2.1 and answer.
2) See 9.2.1 and answer.
3) See 9.2.1 and answer.
4) See 9.2.1 and answer.
5) See 9.2.2 and answer.
6) See 9.2.3 and answer.
7) See 9.2.4 and answer.
8) See 9.2.4 and answer.
9) See 9.2.4 and answer.
10) See 9.2.4 and answer.
Check Your Progress 3

1) See 9.3.1 and answer.
2) See 9.3.2 and answer.
3) See 9.3.2 and answer.
4) See 9.3.3 and answer.
5) See 9.3.3 and answer.
6) See 9.3.4 and answer.
7) See 9.3.5 and answer.