BLOCK 3
HEALTH POLICY

BLOCK 3 INTRODUCTION

Block 3 is on Health Policy. It has two units (Units 6 and 7). **Unit 6** is on Market Failure and the Role of Government. It first outlines the 'characteristics of healthcare market'. Given this, it then discusses the 'factors influencing the demand and supply of healthcare services'. Situations in which government intervention in healthcare services would be needed is explained next. The role of health insurance in terms of their types, demand and market failure issues are also discussed in this unit.

Unit 7 is on Public Health Services. The unit first discusses investment issues in public health services. The twin issues of health externality i.e. positive externality of consumption and the negative externality of production are discussed next. A brief account of 'economics of epidemiology' and 'universal healthcare' is also given.

UNIT 6 MARKET FAILURE AND ROLE OF GOVERNMENT

Structure

6.0 OBJECTIVES

After reading this unit, you will be able to:

- delineate the characteristics of healthcare market;
- outline the factors that influence the demand and supply of healthcare services;
- state the areas in which government intervention in healthcare services are warranted;
- define the concept of health insurance;
- discuss the types of health insurance systems;
- illustrate how the 'optimal premium' and the 'optimal choice of insurance' is arrived at in a hypothetical case; and
- indicate the factors that result in 'market failure' in health insurance.

6.1 INTRODUCTION

A market is a group of buyers and sellers carrying out economic transactions with each other. The demand and supply of commodities by these agents

determine the prices in the economy. Prices, in turn, determine the allocation of resources in the economy. The allocation refers to: (i) allocation of factors of inputs for production; and (ii) distribution of goods or income among various members of the society for consumption. According to the First Welfare Theorem, when the markets are perfectly competitive, the allocation is Pareto optimal. A Pareto optimal allocation is one where 'no economic agent can be made better off without making somebody else worse off'. The market for healthcare comprises providers of healthcare services, users of healthcare services and intermediaries like insurance companies who facilitate the users to pay for and avail of healthcare.

Healthcare as an economic good has some peculiar characteristics because of which the market fails either in the sense that the price signals do not exist or in the sense that the prices do not lead to a Pareto optimal allocation of healthcare. This generates an economic rationale for government intervention in the healthcare market.

6.2 CHARACTERISTICS OF HEALTHCARE MARKET

The following factors can be identified as specific to healthcare market requiring government intervention to ensure that the welfare considerations of equity and access are met.

Uncertainty: The need for healthcare is uncertain, infrequent and may not be backed by the financial ability of the consumer to pay for its services (Arrow, 1963).

Externality: Health and healthcare, as economic goods are characterised by externalities. Externalities mean that the actions of an agent have an influence on the well-being of others. The cost of the externalities is not reflected in the market through the price signal due to which there could be either under-provision of some desirable healthcare services (e.g. immunisation or preventive healthcare) or overprovision of some undesirable healthcare goods (e.g. free availability of antibiotics making them become ineffective due to overuse, cigarettes and tobacco products).

Public Good: Some healthcare services like sanitation, vector control, clean drinking water, clean air, etc. have characteristics of public good. A public good is a good having the two features of: (i) consumption by some not reducing the amount available for consumption by the others (i.e. non-rivalry) and (ii) non-excludability i.e. no person can be excluded from consuming the good even if he does not pay for it. This gives rise to the problem of 'free rider' in the sense that consumers wish to consume a commodity without having to pay for it. This in turn leads to a violation of Pareto optimal allocation of healthcare because the providers of healthcare cannot charge a price from the consumers of healthcare. Hence, they do not produce sufficient healthcare for all (e.g. the cost of mosquito control is

borne by only few but provides benefit for all. Thus, enough mosquito control doesn't take place.).

Merit Good: Healthcare is often thought of as a merit good because good health is not only desirable for its own sake but is also desired because of its inter-linkages with economic development and social welfare. Hence, it is the need for healthcare, and not its demand, that should determine its consumption. In other words, allocation of healthcare should be according to its need and not according to the ability to pay for it.

Information Asymmetry: Healthcare market is characterised by information asymmetry between the buyer and supplier of healthcare. The healthcare practitioner who provides the healthcare to the patient (i.e. principal), is also an agent who determines how much healthcare the patient ought to be consuming. This causes market failure as it leads to what is called as the 'supplier induced demand' for healthcare. This means that how much of total healthcare is to be consumed is determined by the supplier and not by the individuals who need the healthcare.

Monopoly Power: The healthcare market also exhibits monopoly power as it is characterised by 'barriers to entry'. This is because specialised skills are required to provide the services of a physician or a hospital.

Cost Inflation of Healthcare: An emerging trend in the healthcare market is the spiralling costs of healthcare which calls for active government intervention.

Due to the above factors identifiable as specific to the healthcare market, provision of healthcare services makes a perfect case for government intervention for the sake of both equity and efficiency. Efficiency refers to the property of healthcare being allocated in a Pareto Optimal manner whereas equity refers to a fair distribution of healthcare services among all the members of the society irrespective of ones' 'ability to pay' for it.

6.2.1 Factors Influencing Demand and Supply of Healthcare Services

In the light of the specific characteristics of the healthcare sector, in order to determine how the government can intervene in the health sector it is necessary to understand the factors that influence the supply and demand of healthcare. These mainly relate to the issues of delivery, access and financing of healthcare services.

Healthcare Delivery: Healthcare delivery refers to the provision and distribution of healthcare services to the population. These services could be curative, preventive or rehabilitative and are provided in hospitals, health centres or doctors' clinics. Public provision of healthcare takes place when these institutions are run by the government and it puts the lowest financial burden on the patient at the point of seeking healthcare. Various countries

have different healthcare systems with a mix of public and private healthcare providers i.e. the services are delivered either only by public or a combination of both private and public. From welfare and socio-economic development perspectives, efficiency of healthcare delivery is as important as the choice of the service provider.

Healthcare Access: Healthcare access refers to the ability of the people to use the healthcare services. Some of the reasons due to which healthcare may not be accessible are: (i) it may be expensive, (ii) it may be located in a distant place, (iii) it may involve long travelling or waiting time. Due to such reasons, access to healthcare is basically said to refer to the 'opportunities open to people for seeking treatment' (Le Grand, 1982). Money and time costs incurred by individuals in obtaining healthcare are thus one way of gauging accessibility. According to Olson & Rodgers (1991), access is the maximum attainable level of consumption of medical care, given the individual's income, and the time and money costs of availing healthcare.

Healthcare Financing: Healthcare financing refers to the methods by which funds are mobilised and payment for healthcare services are made. It includes expenditure for both the establishment of healthcare infrastructure (i.e. cost of establishing health centres/institutions) and the cost incurred by individuals for availing the healthcare services. Such healthcare financing is made predominantly by: (i) taxes, (ii) out-of-pocket payments by users on healthcare, (iii) voluntary private insurance and (iv) social insurance which is generally compulsory. At times, a small proportion of healthcare is financed by donations from charitable organisations. These forms of financing healthcare are not mutually exclusive and are generally used in combination with each other. The system of healthcare delivery can in fact be separated from its financing i.e. irrespective of who provides healthcare, the services can be funded by any of the above systems. Availability of healthcare facilities i.e. the supply of healthcare is a necessary but not sufficient condition to ensure its efficient or equitable allocation among its users. Healthcare facilities may exist in a society yet everyone may not be able access and avail it in his time of need. This happens when healthcare is either not accessible or is not utilised.

Healthcare Utilisation: Given the factors governing the provision of delivery and access, healthcare utilisation refers to the willingness of the people to seek healthcare. Demand for healthcare arises only when people utilise healthcare. Even if healthcare is accessible, people may not actually seek healthcare due to ignorance or lack of motivation. There could be several other reasons due to which healthcare services may not be utilised e.g. lack of faith or poor quality of medical facilities, cultural inhibitions, lack of awareness, gender biases etc.

6.3 GOVERNMENT INTERVENTION IN HEALTHCARE SERVICES

Government intervention in healthcare services is warranted both for healthcare delivery and its financing mechanisms. The role of the government in both these areas has a bearing on healthcare access and utilisation. In order to ensure an efficient and equitable distribution of healthcare in the society, the government can primarily use three instruments viz. (i) public provision of healthcare, (ii) financing or subsidising the cost of healthcare and (iii) regulating the healthcare market.

6.3.1 Public Provision of Healthcare Services

Healthcare can be classified into two broad categories viz. preventive and curative. Curative care is the treatment given by health professionals to a person who is sick. It is just like any other economic good which can be transacted in the market. At times, this care may be expensive and the person needing it may not have the ability to pay for it. Preventive care comprises activities like sanitation, clean drinking water, healthy lifestyle, etc. Most of these have the characteristics of public goods and it is unlikely that the markets for them will be efficient. Under these circumstances, one way in which the government can intervene is by way of providing these services directly. Provision of healthcare by the government involves decisions about: (i) which type of services to deliver, (ii) which population groups should receive these services, (iii) how to generate financial resources for these services, (iv) should these services be provided for free or for a fee, etc. Choice on whether a service should be provided by the government or left to the private providers has an influence on the accessibility and utilisation of healthcare.

6.3.2 Financing or Subsidising of Healthcare Services

The purpose of health financing is to make funding available, as well as to set the right financial incentives to health service providers, so as to ensure that all individuals have access to effective healthcare (WHO, 2000). Thus, there are three functions of health financing viz. revenue collection, purchasing and pooling. The objective of ensuring access to healthcare when people are sick without putting them to financial hardships can be achieved by instituting a system of pre-payment and then pooling the collected financial resources. In other words, people pay for healthcare when they are healthy and then draw from the pool when they are sick. Let us illustrate this with an example. Suppose there is a group of 100 people who have similar risk of falling ill. Let us say that once a year one person falls ill and incurs an expenditure of 50000 rupees. Since, who is going to fall ill is uncertain, the members of the group can collect 500 rupees from everyone every year. This gives them a pool of 50000 rupees. This money can be used to pay for the healthcare expenses of the person who falls ill. In this way, an uncertain and large

expenditure is converted into a certain but small expenditure. This is the fundamental principle of risk pooling and insurance.

Healthcare financing system of any country can be judged by two core indicators. One, the share of total health expenditure in the GDP of the country. Second, the share of public expenditure in the total health expenditure of the country. In developing countries, it is generally observed that the share of total health expenditure in the GDP is low and the share of private out-of-pocket-expenditure in the total health expenditure is very high. Both these problems hinder the access to healthcare causing financial distress to those who need to seek healthcare. Hence, it is a challenge in these countries to raise sufficient funds for healthcare and reduce the reliance on out-of-pocket-expenditure on healthcare.

The designing of healthcare financing in any country is a complex process. Governments have to decide whether the users should pay for healthcare out of their own pockets or should healthcare be subsidised. Policymakers need to determine: (i) how much of government revenues should be allocated for healthcare; (ii) should the revenues be raised by general taxes or earmarked taxes; (iii) should there be a system of compulsory health insurance or not; and (iv) should there be user charges in public health facilities or not. When healthcare is financed by taxes, the users may receive these services free of cost or at a subsidised price. When healthcare is financed by insurance, the time of payment for healthcare gets separated from the time of its usage. It also helps in breaking up the payment from a lump sum cost of healthcare to smaller portions. When the payment for healthcare is to be made out-of-pocket, the buyer has to pay the market price of the service right at the time of buying or availing it. In terms of financial burden of healthcare, therefore, out-of-pocket payment has the highest burden while tax or social insurance financed healthcare has the lowest burden. Quite clearly, therefore, healthcare will have the lowest access and utilisation when its financial burden is the greatest i.e. when it has to be met entirely by ones' own resources. We shall discuss the issues relating to the financing of healthcare by insurance in the next section of the unit (Section 6.4).

6.3.3 Regulation of Health Sector

The governments play an overarching role in determining the health policy of a country which influences the health status of its people and the financial and non-financial burden of healthcare. For instance, the government regulates many sectors of the healthcare industry such as the pharmaceuticals, medical insurance, diagnostic facilities, hospitals, etc. Such regulations are done to keep a check on the prices of drugs, health services provided by the private sector, etc.

Check Your Progress 1 [answer within the space given in about 50-100 words]

1) How can you justify the rationale for government intervention in the healthcare market?

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2) Healthcare is both a public good as well as a merit good? Justify.

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3) How does Olson and Rodgers define 'access to healthcare'?

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4) Why is the availability of healthcare facility only a necessary but not sufficient condition to ensure its utilisation?

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5) What are the two categories into which healthcare, as a good, is divided? Which of them is like any other economic good and why?

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6) What are the two core indicators which help judge the healthcare financing system of a country?

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6.4 HEALTH INSURANCE

Healthcare expenditure is uncertain and infrequent. Not all individuals fall sick. Who actually falls sick and when he falls sick being random events, how much expenditure is incurred on medical care is uncertain. At times, one may get afflicted with a disease having a forbiddingly high cost of treatment. According to Arrow (1963), this makes health a naturally insurable commodity. Health insurance plays an important role in the financing of healthcare and influencing the demand and supply of healthcare.

In the context of health insurance, we need to know four important terms commonly used viz. insurance coverage, premium, copayment/coinsurance and deductibles. When an individual falls sick and incurs healthcare expenditure, it can be thought of as loss of income. *Insurance coverage* refers to that amount which he will receive by the insurance company by way of compensation for the loss suffered. To avail this coverage, one must have purchased a health insurance policy and have paid up the 'premiums' duly before the time of sickness and the required treatment for which he is eligible to receive the 'insurance coverage'. Thus, *premium* is like the cost of the policy. It refers to the regular payments that the buyer makes towards the policy. It may be paid on a monthly or an annual basis. The amount of premium paid depends on the amount of coverage. The price of insurance coverage is typically defined as the 'ratio of insurance coverage to the amount of premium'. An insurance policy is said to be *actuarially fair* when the expected compensation paid out by the insurance company is equal to the premium charged by it.

When an insured person incurs a healthcare expenditure, he pays for some part of it out-of-his-pocket while the rest of it is reimbursed by the insurance company. The part which is paid by the individual himself is known as *copayment* or *coinsurance*. For instance, if a total of rupees 1000 are incurred on medical care and the insurance company reimburses rupees 800 then the copayment is Rs. 200 or 20 percent. Deductible is another form in which the total cost of healthcare is shared between the insurance company and the insured individual. It is a part of the total cost which is not covered by insurance. For instance, suppose the total cost of an episode of illness consist of doctor's fee, expenditure on drugs and cost of transportation to the

doctor's clinic. If the cost of transportation is not covered by insurance and the patient has to pay it out of his own pocket, then it is a deductible.

Earlier, in Sub-section 6.3.2, we introduced the concept of risk pooling. In that context, if we consider the contribution of Rs. 500 as a premium to a health insurance policy, it follows that a viable insurance scheme requires that a large number of people should be part of the scheme so that the per person premium payment is low. It also requires that each member has an independent chance of falling sick or incurring potential loss.

6.4.1 Types of Insurance

Three types of insurance viz. private insurance, social insurance and community based insurance are distinguished. When insurance policies are supplied in the market by private entities it is called *private insurance*. These are generally voluntary. Insurance premium is based upon an individual's rating of risk and past history of healthcare utilisation. The higher the risk, the greater is the premium. High risk individuals may not be able to participate in the insurance either because of high premium cost or because the insurance companies do not offer them the insurance policy because of their poor health conditions. This defeats the principle of social justice as those in the greatest need of insurance are left out of it. When insurance is provided by the government, it is called social insurance. Generally, it is compulsory. This is like a welfare programme of the government because instead of charging the premium on the basis of risk, they are charged according to the 'ability to pay'. Usually, the funding for the premium is from the payrolls of employees at proportional rates, like a tax. In some countries, the employer pays premium for the employees. Sometimes, the premium payments for vulnerable segments of population are subsidised by the government. Thus, it becomes a mode of redistribution of income from the privileged to the underprivileged groups of population. This form of insurance was first introduced by Bismarck in Germany in the late nineteenth century. Medicare and Medicaid are two types of social insurance policies that are currently used in the US for funding medical care and enhancing access of healthcare.

When insurance is organised by a non-profit organisation or a cooperative as a self-help for the community in a particular geographical area, it is known as *community based insurance*. In such cases, the health insurance premium is based on community rating. This means that the premium is based upon the healthcare utilisation experience of the entire population of the area irrespective of the age, gender, health risk and past history of healthcare utilisation of the individuals. This leads to cross subsidisation of premium from the low risk individuals to high risk individuals. It brings down the average cost of healthcare for the vulnerable groups and works like a welfare scheme for the society helping in improving the healthcare access.

6.4.2 Demand for Insurance

If an individual faces a situation of uncertain income rather than a definite income, then the appropriate way to gauge his income and utility are by his 'expected income' and 'expected utility', respectively. Given that there are two possibilities that he can either be sick or healthy, if he falls sick with a probability of p = 0.05, then he will be healthy with a probability of (1–p) = 0.95. So, if his income is Rs. 10,000/-, and he incurs a health expenditure of Rs. 1000/- when he falls sick, then his income after financing his sickness will be Rs. 9000/-. Let his utility function be: U = √I, where I denotes income.

The expected income of the individual will be determined as:

E (I) = (Probability of being healthy) * (income when healthy) + (Probability of falling sick) * (income when sick)

= 0.95 * 10000 + 0.05 * 9000 = 9500 + 450 = 9950.

The expected utility of the individual will be determined as:

E (U) = (Probability of being healthy) * (utility when healthy) + (Probability of falling sick) * (utility when sick)

= 0.95 * √10000 + 0.05 * √9000 = 0.95 * 100 + 0.05 * 94.9

= 95 + 4.7 = 99.7

The actual loss suffered by the individual upon falling sick is Rs. 1000/- . Therefore, the expected loss is 0.05 * 1000 = 50. Actuarially fair insurance will give a coverage of Rs.1000 for a premium of Rs. 50. Full insurance is an insurance where the amount of coverage purchased is equal to the amount of actual loss incurred in the event of being sick. If full insurance is purchased at a fair price, then his income when he falls sick will be '9000 + insurance coverage – premium' i.e. it is equal to Rs. 9950. The income, when he is healthy will be 10,000 – premium i.e. it is equal to Rs. 9950. So, by purchasing insurance, he gets an income of Rs. 9950/- whether he is healthy or sick. So by purchasing insurance, an uncertain income is converted into a certain income. The utility after purchasing insurance is √9950 = 99.7. Thus, the utility after purchasing a fair and full insurance is the same as expected utility. But this utility is certain and there is no element of risk.

How much coverage will the individual buy is determined by equating the per unit price ratio of the insured and uninsured bundle (or income) with the marginal rate of substitution (MRS) of the income with and without insurance. If a premium of Rs. k is paid for buying a certain health coverage (of Re 1), then the relative price ratio is $\frac{k}{1-k}$. Hence, MRS = $\frac{p\ .\ MU\ of\ income\ when\ sick}{(1-p).MU\ of\ income\ when\ healthy}$ where, p is the probability of falling sick. After insurance, (i) income when sick = 10000 – premium + compensation

for loss and (ii) income when healthy = 10000 – premium. Therefore under optimal choice of insurance, if the insurance is fair:

$$\frac{k}{1-k} = \frac{p}{1-p} \qquad (6.1)$$

In this case, MU of income when sick will be equal to MU of income when healthy implying that income when sick will be equal to income when healthy. This in turn implies that the individual will buy full insurance. If the insurance is less than fair, then $\frac{k}{1-k} > \frac{p}{1-p}$. To fulfil Equation (6.1), MU of income when sick will have to be greater than MU of income when healthy. This means that income when sick will have to be less than income when healthy, since for the risk averse person MU of income declines as income falls. This also implies that the person will not buy full insurance but will buy less than full insurance.

6.4.3 Market Failure in Health Insurance

An insured person's behaviour is likely to be different from an uninsured person. This increases the probability of making an insurance claim or the size of the claim. There are two main reasons for this. One, the insured person may become careless about staying in good health since he does not have to incur the cost of ill health out of his own pocket. This increases the probability of seeking health insurance claims. Second, there may be an increase in the size of the claims. This can happen due to behavioural responses of either the patient or the provider. The patient, because he is covered by insurance may demand greater healthcare or more expensive healthcare. Third, the provider may increase the amount of healthcare or the price of healthcare knowing that the cost of healthcare is covered by insurance. In both these cases, health insurance leads to greater utilisation of healthcare services more than what is either ideally desired or what is preventable by being more careful towards ones' own health. Such situations are explained by the term 'moral hazard'. Copayments and deductibles are the strategies used by insurance companies to curb moral hazard.

Another type of situation leading to market failure occurs due to information asymmetry. This can be of two types: (i) adverse selection; and (ii) cream skimming. Adverse selection is a process where only the high risk individuals buy insurance. This is possible because of information asymmetry wherein the insurance company has no way of knowing whether the buyer of insurance is a low risk or high risk individual. The insurance premium is decided on the basis of an average level of risk. The low risk individuals do not buy this insurance because it does not reflect their level of risk. But the high risk individuals buy this insurance and the premium collected are not sufficient to pool the risk of all individuals. This leads to the insurance company incurring losses, making the insurance market unsustainable. Cream skimming is another type of situation which again arises due to information asymmetry where the insurance company has more information

about the level of risk of the individual purchasing insurance. Here, the insurance company designs its policies in such a way as to cover only the low risk individuals leaving out the high risk individuals out of the insurance coverage. This also leads to inefficient allocation of healthcare. Thus, both moral hazard and risk selection lead to inefficient allocations and market failures.

Check Your Progress 2 [answer within the space given in about 50-100 words]

1) When is an insurance policy said to be 'actuarially fair'? What is a necessary condition for a health insurance policy to be successful?

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2) How is a 'social insurance' just like a welfare programme?

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3) How does 'adverse selection' makes an insurance market inefficient or unsustainable? Why does this happen?

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4) What is 'cream skimming'? How does this influence the insurance market?

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5) Under what circumstances, tutoring impacts the mainstream education negatively?

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6.5 LET US SUM UP

The healthcare sector are characterised by certain features like uncertainty, information asymmetry, monopoly power, etc. These render the sector prone to colluding behaviour in which the services of healthcare delivery do not reach all sections of the people particularly the economically disadvantaged. In view of this, government has to not only play a major role of service provider but has to step in to regulate the private providers. One mechanism by which the risk of high health expenditures can be met is by allowing the insurance market to operate. The insurance market can however function efficiently if the number of insured is large to keep the average cost of premiums the lowest. The large coverage can happen in an economy where most of the workers are on payrolls (i.e. a more formal economy than an informal economy) from where a proportionate contribution can be compulsorily deducted. But since this is not possible in developing economies, conditions for the efficient functioning rarely prevail which requires the governmental interference and involvement. Issues of information asymmetry and risk selection interferes with the insurance market to cause its failure. To cope with such situations of moral hazard, the insurance market adopts the instruments of copayments and deductibles as strategies to curb such practices.

6.6 KEY WORDS

Healthcare Finance : Refers to methods by which funds to set up and run healthcare services are raised.

Healthcare Utilisation : Refers to the willingness of people to seek healthcare services overcoming by institutional arrangements the barriers for it due to economic and social factors.

Out-of-pocket expenditure : Refers to the private healthcare expenses incurred by persons seeking healthcare. Its higher ratio indicates lower levels of public healthcare expenditure.

Risk Selection : Refers to the insurance market designing its polices to cover only the low risk (called cream skimming) or a situation of 'adverse selection' in which only the high risk individuals buy insurance.

6.7 SOME USEFUL BOOKS AND REFERENCES

1) Fried, Bruce and Laura Gaydos (2002). World Health Systems: Challenges and Perspectives, Chicago: Health Administration Press.

2) Gottret, Pablo & Schieber, George (2006). Health Financing Revisited: A Practitioner's Guide. Washington, DC: World Bank.

3) Health System Financing, WHO, 2008.

6.8 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Healthcare is an economic good but with some peculiar characteristics due to which the price signals either do not exist, there is market failure providing a rationale for government intervention.

2) Certain healthcare services like sanitation, drinking water, clean air are public goods since they satisfy the non-rivulrous and non-excludability characteristics. But viewed from its inter-linkage with social welfare, it is a merit good which all should enjoy irrespective of ability to afford or pay for it.

3) As the maximum attainable level of consumption of medical care, given the individual's income, and the time and money costs of availing healthcare.

4) Healthcare utilisation refers to the willingness of the people to seek healthcare. Demand for healthcare arises only when people utilise healthcare. Even if healthcare is accessible, people may not actually seek healthcare due to ignorance or lack of motivation. There could be several other reasons due to which healthcare services may not be utilised e.g. lack of faith or poor quality of medical facilities, cultural inhibitions, lack of awareness, gender biases, etc.

5) Preventive and curative. Of these two, curative healthcare is like any economic good in the sense that 'ability to pay and willingness to pay' both operate here for its availing which is also the case for any economic good. This is in the sense that it does not fall into the realm of either a merit good or a public good.

6) The share of total health expenditure in the GDP and the share of public health expenditure in the total health expenditure of the country. The

proportion of out-of-pocket health expenditure (OPE) to total health expenditure in the country is indirectly reflective of this as the two are inversely related i.e. higher the OPE, lower is the degree of public healthcare financing in the country.

Check Your Progress 2

1) When the expected compensation from the insurance coverage is equal to the number of premiums charged by the insurance company. For an insurance policy to be successful it requires that a large number of persons should be part of the scheme and each member must have an independent chance of falling sick.

2) Firstly, it is a government insurance and compulsory for all ensuring largest participation. Second, instead of charging premium on the basis of risk, they are charged on the basis 'ability to pay' often from the payrolls of employees at proportional rates.

3) By only the high risk patients coming forward to buy insurance, the payment to be made by the insurance company will be much higher than the premiums paid. The principle of large number of persons, with independent chances of falling sick, is violated here. This happens because of information asymmetry i.e. the insurance company does not know the high risk or the low risk status of the buyer.

4) Cream skimming is a situation where the insurance company designs its policies to insure only the low risk persons leaving out the high risk persons. Here again, the principles of buying fair insurance is violated. This is possible if the insurance company is privy to information asymmetry with more information on the risk status of the individuals being available with them.

UNIT 7 PUBLIC HEALTH SERVICES

Structure

7.0 OBJECTIVES

After reading this unit, you will be able to:

- define the concept of 'public health' distinguishing it from that of 'healthcare';
- explicate the concepts of 'social marginal benefit' and 'social marginal cost';
- discuss the issue of 'economics of health externality';
- explain the concerns behind the 'economics of epidemiology' in the context of public health services; and
- describe the concept of 'universal healthcare'.

7.1 INTRODUCTION

Public health is defined by C Winslow as '*the science and the art of preventing diseases, prolonging life and promoting physical health and efficiency through organised community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organisation of medical and nursing services for the early diagnosis and preventive treatment of diseases and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health'*. In several ways, public health is different from healthcare (or medical care). *First*, while the former regards the community

as its beneficiary, the latter is concerned with individual patients. Public health organisations have the responsibility of assuring that the services needed for the protection of general health of the people of the community are available and accessible to everyone. These services include a whole array of activities like: vector control, monitoring waste disposal, ensuring improved sanitation system and safe drinking water, imparting basic health education to all, improving slaughter house hygiene, assuring food safety, applying public health regulations, etc. *Secondly*, while public health focuses on preventing illness itself, healthcare focuses on healing its patients who are ill. Comparing the benefits of these two systems, we find while medical care provides immediate impact by treating an ill person, public health provides benefits in the longer run and in most cases in a more significant way. The absence of public health facilities affects the poorest section the most by increasing Disability Adjusted Life Years (DALY), health expenditure and hence by falling in to '*medical poverty trap*' and lower earning capacity.

Given the above distinction, the economics of public health services can be broadly discussed under three sub-heads. First, the economics of externality which plays a very crucial role in understanding the nature of the services and its market presence. The second issue, which is relatively new in the literature of economics, considers the economics of epidemiology. Third is the issue of universal healthcare. Discussion in separate sections on each of these three dimensions is, therefore, the subject and scope of the present unit on 'public health services'. But before we move on to these, we shall read a little more on what has been the nature of public investment (i.e. government investment) on public health and why it has been particularly low across countries.

7.2 INVESTMENT IN PUBLIC HEALTH SERVICES

Considering the importance of public investment in public health, the actual investment by the government is far smaller than on medical care. Almost all countries, except a few like Cuba, has followed this trend of spending more on medical care than on public health. The primary factors for this general neglect of the public health facilities are the following:

- Most of these services are invisible to the public and their need is recognised only when the system fails.
- It is easier to calculate the immediate cost of organising the public health system, but it is extremely difficult to measure the benefits accruing from it in the long-run. Thus, people and the state are often unwilling to pay short-term costs in order to obtain a benefit in long term.
- Public health is like a public good, creating many externality benefits to the society as a whole. However, controversy arises because those who pay for public health are not those who benefit from it primarily. The

existence of a sharp difference between private benefits and social benefits creates economic barriers to have private investment and almost unequivocally it is supposed to be a responsibility of the government. However, within the government also we find a gross neglect of public health because often those who need the services most do not share their voice in public policies. Therefore, the willingness to pay for public health by the elite (politicians, bureaucrats and donors) is minimum. It is therefore notable that majority of developing countries with successful public health policies have been from non democratic regimes.

When India ushered into independence, the public health policies only assumed population control measures and vertical disease specific programmes (e.g. TB, Leprosy). The huge population was a major barrier to development and hence technocratic intervention for sterilisation (without endogenous shift in education and other social characteristic) was followed. The public health services were merged to medical services and funds were continuously diverted from the public health priorities to medical care priorities. In the 1960s, water and sanitation were separated from the health sector and there was little mention of sanitary inspectors in the plans.

Given this situation, only a small percent of government finances has gone to public health activities and almost nothing for disease surveillance. After the initiation of globalisation policies in Indian economy, the neglect of public health continued, except in immunisation. Under the latter, massive funds were injected to pulse polio, while funds for rural sanitation and water supply (and urban water supply) got neglected. Likewise, the allocation for HIV AIDS is some years was more than the total for all other communicable disease programmes combined. On the average, the states spend only about 10 percent of its health budget in public health programmes. Thus, there has been a general neglect of investment in public health policies due to the three reasons stated above.

7.3 ECONOMICS OF HEALTH EXTERNALITY

In a private market transaction, where a buyer and a seller exchange goods or services for money (or for other goods or services), an externality occurs if a person's activity (consumption or production) affects the well-being of an uninvolved person. The term *externality* actually comes from the fact that: (i) someone *external* to the action or transaction (neither a buyer, nor a seller) is affected by the production or consumption of the good, but, (ii) neither the buyer, nor the seller bears the cost (or enjoys the benefits) of that good and/or service. For instance, a river flowing by the steel plant receives the affluent from the factory, resulting in degradation of water quality and high risk of diseases from water pollution who consumes fish caught from that river. The burden of those diseases is borne by the individuals who consume those fish, who are neither the producer nor the consumer of steel from that factory. Thus, a *negative externality* occurs for the community at large. On the other

hand, people get vaccines to protect themselves from communicable and infectious diseases. However, once one person receives the vaccine and truncates the cycle of germ/infection of the disease to spread, not only he himself, but also others (with whom he spends time) gets benefits. Thus, those people do not pay for the vaccine but enjoy the benefit of protection against the infection. In this case, a *positive externality* is generated.

The problem with goods with externalities is that private market transactions do not produce efficient amounts of these goods. In other words, private market transactions will either lead to *overproduction* of goods with negative externalities or *underproduction* of goods with positive externalities. This inefficiency results in market failure in the long run. This happens primarily because private cost and benefits differ substantially from social cost and benefits under market transactions with externality. This needs us to recapitulate the definitions of 'social marginal benefit' and 'private marginal cost' in order to better appreciate the nuances involved in the behaviours of market agents.

For any *positive consumption externality*, social marginal benefit (SMB) is defined as the sum of direct benefit to consumers (by consuming an additional unit of a good i.e. private marginal benefits: PMB) plus the cost associated with the consumption of the good imposed on others (i.e. negative Marginal Cost or expense for others). Thus: SMB = PMB + MC. Similarly, for any transaction with *negative production externality*, social marginal cost (SMC) is defined as the sum of direct cost to producers for producing an additional unit of a good (i.e. producer's marginal cost or PMC) plus the Marginal Damage (MD) i.e. any additional cost imposed on an external person associated with the production of the good but not paid for by the producers of those goods. Thus, social marginal cost is the sum of producer's marginal cost plus marginal damage i.e. SMC = PMC + MD. With this distinction understood, we can now proceed to discuss the positive externality of consumption and the negative externalities of production since both these have close links to economics of health and healthcare.

7.3.1 Positive Externality of Consumption

We use the usual supply-and-demand framework to explain the effect of this externality. Under consumption externality, the supply curve for public health services is not affected since it takes all costs into account. But, there is a problem with respect to the demand curve. It represents only the private benefits to the buyers of the good, but not the benefits to uninvolved *external* people. This needs us to introduce a new curve, called the 'Social Benefit' (SB) (or public health) curve, which includes benefits to buyers and non-buyers (Fig. 7.1). Due to the presence of the extra benefit to the society, people demand more of the public health services at each price level and hence the SB curve stays to the right of the usual demand curve. The market is cleared at price P_{mkt} and quantity Q_{mkt} though the outcome is not the efficient outcome. The efficient outcome occurs where supply crosses the SB

curve i.e. at the point (P*, Q*). Here, $Q_{mkt} < Q^*$, meaning that the market produces less than the efficient amount of this good. Also, $P_{mkt} < P^*$, meaning that the market price is less than the efficient price.

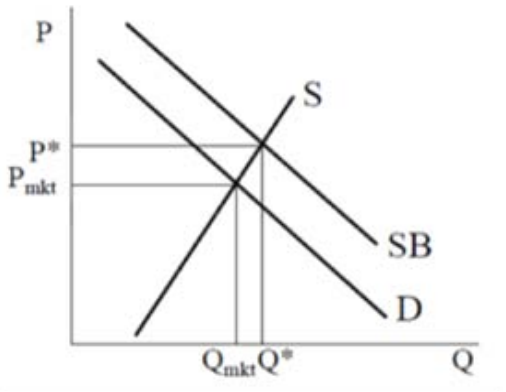

Fig. 7.1: Market Clearing with Positive Consumption Externality

7.3.2 Negative Externality of Production

We use a similar demand-supply framework where the market outcome is once again not the efficient outcome. The supply curve represents only private costs of production i.e. costs incurred by firms for producing the good. In other words, it does not represent *all* costs viz. costs imposed on uninvolved or external agents due to negative externality. This, therefore, again requires the introduction of another curve, called the 'Social Cost' (SC) curve which represents the total cost of production including both the production cost and the externality cost. It lies to the left of the usual supply curve because, due to the externality, the supplier will supply at each price level i.e. the supplier is ready to supply any amount of good (Fig. 7.2).

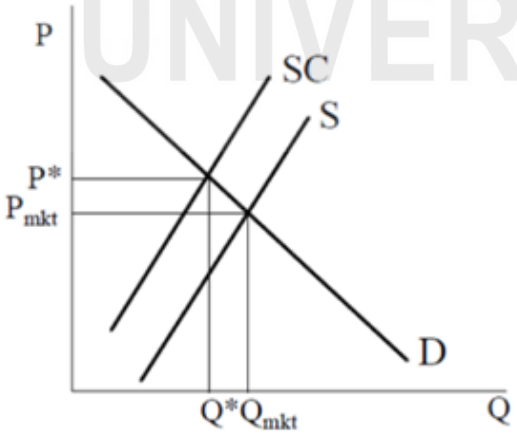

Fig. 7.2: Market Clearing with Negative Production Externality

The efficient level of outcome, however, occurs where the demand curve and the supply curve (SC) intersect i.e. (P*, Q*). Since here, $Q_{mkt} > Q^*$, this essentially means that the market produces more than the efficient amount of this good i.e. 'overproduces'. Further, since $P_{mkt} < P^*$ it is also at a level where the market price is less than the efficient price. The overproduction of goods with negative externalities occurs because the price of the good to the

buyer does not cover *all the costs* of producing or consuming the good. If all costs were accounted for, the prices of these goods would be higher and people would consume less of them. If the cost of the negative externality (i.e. the harms from water pollution, in the earlier example) were imposed on the good as a tax, the smaller amount demanded as tax would make up for the efficient amount in the sense of the 'cost of cleaning up'. In that case, the consumers would demand less of that good and the negative externality would be internalised. In other words, the tax could be used to meet the cost of the illness that steel production imposed on the people residing below the river. Such a tax would at least assist in arriving at an efficient outcome even though it is a negative externality for the unintended external hapless consumer.

Public goods are examples of goods with positive externalities. When a unit of an extreme public good is produced, everyone in the market gets to consume it, whether or not they pay for it. In other words, a public good is a good with the two specific characteristics of: (i) *non-excludability* i.e. once the good has been produced, non-payers cannot be excluded from using and benefiting from the good; and (ii) *non-rivalry* i.e. the consumption of the good by one additional person does not reduce anyone else's enjoyment of the good.

Classic instances of public good in public health services are the vaccination services, solid waste management, abatement of vector borne diseases, etc. The fact that these goods are non-excludable makes it very difficult to provide these goods efficiently through private market transactions. Also, the amount of benefit each person receives may differ and is hard to measure making it harder to provide these goods privately. For instance, the provision of improved drinking water is often undertaken by the government and it benefits all sections of population. But, the households belonging to higher income strata benefit relatively less because most of them have access to privately owned water purification systems. Notwithstanding this, the benefit derived from the provision is far more important for poorer households, who do not have access to such high priced water treatment equipments. If people are charged for such a public good which is beneficial to the poor, then there is an incentive to understate the value of the good to them. This is known as the '*free rider*' problem. As a result, it is often found that the public health services are under-produced in an economy and hence needs active intervention from the government to correct the inefficiency.

The famous Coase Theorem suggests that when there are well-developed property rights and costless bargaining, negotiations between the party creating the negative externality and the party affected by such an externality can bring about a socially optimum outcome. For instance, if the ground where solid waste is dumped by the households is owned by an individual, club or even the public agency, they will charge the households dumping

wastes on that place to pay for the marginal damage (MD) per unit of pollution.

Check Your Progress 1 [answer within the space given in about 50-100 words]

1) Define 'public health' in your own words bringing out what your consider as its major components?

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2) Is 'public health' the same as 'health care'? If not, in what respects is it different?

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3) State the three reasons as to why governments generally tend to spend to far more on 'healthcare' than on 'public health'?

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4) Why does 'market failure' occur in private market transactions?

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5) Define the terms Social Marginal Benefit and Social Marginal Cost?

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6) What is meant by saying that a 'negative externality is internalised'?

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7) Give some examples of 'public good' in public health services.

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7.4 ECONOMICS OF EPIDEMIOLOGY

A major concern in public health services is to provide the services in the prevention of infectious diseases. According to the latest World Health Report, every year there are billions deaths world-wide, out of which more than one-third is caused by infectious diseases. The overwhelming burden of these deaths is borne by developing countries. The morbidity and mortality from diseases like tuberculosis, malaria, diarrhoea, acute respiratory diseases have been serious from historical times and related public policy has always attempted to reduce their incidence as well as prevalence. According to Epidemiological Transition Theory (Omran, 1971), the disease pattern changes over the trajectory of economic development. While in the initial phases, infectious diseases predominate, as the economy moves on the path of development, public health services improve and the incidence from these diseases recede. However, certain life-style diseases, related primarily to individual habits and occupation, surface. There is also always a scope for resurgence of infectious diseases (e.g. HIV/AIDS pandemic in the 1980s, a communicable disease linked to personal health behaviours like unsafe sex, injectible drug usage, etc.). Like other communicable diseases, this disease also attracted intense public policy attention aimed at prevention of the

disease by creating mass awareness for controlling the fatality by supply of comprehensive health services under the public sector provisioning.

Though infectious diseases have been the prime cause of morbidity and mortality and hence of loss of productivity all over the developing countries, economists have rarely participated in outlining the public health programmes and their evaluations. The entire process has been dominated by medical and public health professionals. However, economic evaluation and chalking out of policy options assume significance in the context of overall economic development. In market-dominated economies, economists have proposed several government interventions in the provisioning of public health services, owing to their nature of public good outlined before.

The literature on economics of epidemiology can be divided into three distinct sets. *First*, the question of how far the economic and biological epidemiology differ in their predictions of short and long term prevalence of infectious diseases. Economists argue that communicable diseases occur primarily due to the complex interaction between demand for prevention at the individual and societal level and the extent of incidence of diseases. They attempt to estimate the increase in demand for prevention arising out of increase in disease occurrence. Biological epidemiologic analysis looks at how various patterns of personal health behaviours affect the disease control. The economic-epidemiological studies analyse the implications of behavioural changes in response to the disease pattern in the economy. They attempt to locate how far these changes in behaviour can influence the broad public health measures by essentially estimating the *prevalence of elasticity of private demand* for prevention of infectious diseases. Such elasticity estimates provide a measure of the changes in prevalence demand in response to disease outbreak which differ across countries and sub-regions. Such differences are also found across different infectious diseases. Thus, the elasticity for vaccine-preventable diseases (like tuberculosis, hepatitis, measles, chicken pox, etc.) may be high as people might demand more vaccines to prevent them. The theory of *prevalence elasticity of private demand* for prevention of infectious disease has two important implications viz. (i) growth of infectious diseases could be self-limiting as it induces changes in private demand for prevention; and (ii) the decline of the disease might slow down prevention efforts (i.e. with the intensity of public health interventions tending to get weaker) before the complete eradication of the disease is achieved.

Secondly, epidemiologic economics attempts to evaluate the impact of public health programmes for eradicating certain communicable diseases. Eradication of a disease may not be Pareto optimal from the perspective of current population because the cost of vaccination for a large section of population outweighs the benefits derived from further lowering the near-extinct disease. However, it has to continue even if cost-benefit analysis goes against them, as the future generation too needs to be covered and hence the

dynamic market needs continuous involvement in vaccine-preventable diseases. Though public health policies have attempted to control the missing markets of future generations by offering price subsidies and mandatory immunisation programmes in almost all countries, they have not been successful in many cases. Economists working in the area posit that higher vaccine coverage in any population impart stronger positive externality for the non-vaccinated people due to occurrence of *herd-immunity*. Hence, the non-vaccinated people have less incentive even with subsidies to get enrolled in compulsory programmes. The prevalence-elasticity of the disease lowers the price-elasticity of demand of subsidies and hence lowers the total effective demand of increased mandatory coverage of immunisation programme. The increase in demand from those who are subsidised is partially or fully offset by the decline in demand for those who are outside the coverage.

Thirdly, epidemiologic economists' work has contributed in measuring the welfare loss from a disease and the welfare gains from medical research. The apparent loss of welfare from prevalence of a disease can be treated as a random tax on the behaviour of the risky individuals. This tax will distort the demand for risky behaviours (like smoking, alcohol consumption) inducing them to forgo risky consumptions while simultaneously contributing to the investment needs of better sanitation and potable drinking water supply needs. Thus, the simple 'cost of illness analysis' does not consider the total welfare loss or gain arising from the disease pattern and improved sanitation infrastructure.

7.5 UNIVERSAL HEALTHCARE

Universal Healthcare or Coverage (UHC) exists when all people in an economy receive the quality health services they need without suffering personal financial hardship. UHC combines two key elements: (i) people's use of the health services they need; and (ii) the economic consequences of doing so. The first objective is that everyone should have access to a full-range of health services including promotion, prevention, treatment, rehabilitation and palliative care. The implication of the term universal (or everyone in the definition) is that there is a strong issue of equity related to the access. The second objective is to ensure protection from the financial risk associated with seeking healthcare. In other words, it means that for utilisation of healthcare, individuals are not forced to suffer any financial risk. This is best attended if the free public healthcare provisions are available for all. In case of partial coverage of financial risk, the out of pocket expenditure (OOPE) for health should not result in catastrophic healthcare expenditure i.e. it should not exceed more than 40 percent of non-food expenditure of the household. Combining these two, the UHC attempts to reduce the incidence of medical poverty trap which results in: (i) untreated morbidity, (ii) reduced access to healthcare, (iii) long-term impoverishment and (iv) irrational use of drugs.

A recent study of statistical trends from 153 countries (published in The Lancet in 2012) found that broader the health coverage, better is the access to necessary healthcare and improved population health, with the largest gains accruing to poorer people. A number of countries have gained substantially from UHC in terms of financial protection. Thailand is one of those countries, which benefitted largely from UHC through using a mix of taxes, compulsory health insurance and optional private insurance. This way, Thailand could reduce direct OOPE, estimated to be around 18 percent of total health expenditure, one of the lowest in a country-wise comparison.

In assessing current coverage levels and devising strategies to increase coverage, countries need to answer three questions: (i) who is covered?; (ii) what services are covered (and at what level of quality)?; and (iii) how much financial protection do citizens have while accessing services? This represents a cube depicted in Fig. 7.3. The ultimate aim of a country should be to fill up the cube, though no country so far has been able to achieve this. The best way to make progress towards UHC is to involve all relevant stakeholders (including the general population) in producing a strategy that is most appropriate for the country. This strategy should prioritise actions and investments along each axis but should also recognise that trade-offs are necessary and that imperatives change over time (i.e. as the economy develops, the population ages or the disease burden shifts).

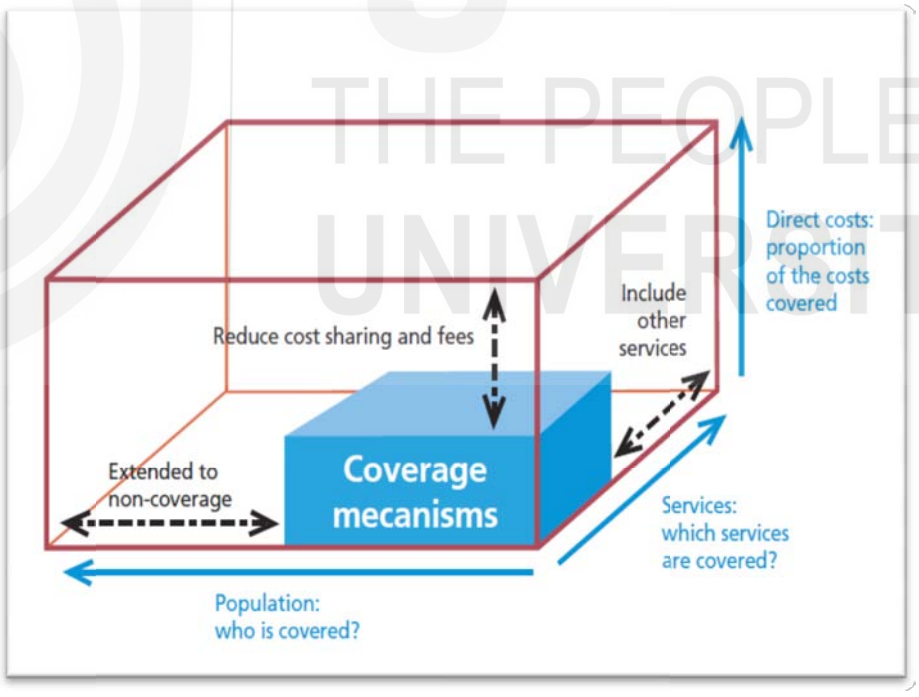

Fig. 7.3: Towards the Universal Healthcare Cube

In terms of certain UHC indicators related to public health, global population coverage already surpassed the 80 percent minimum proposed by the global monitoring framework (Fig. 7.4). This is true for DTP3 vaccination, which, in 2013, reached 84 percent of one-year-olds. It is also true of access to improved water sources (a major non-health sector variable) having profound implications for population health. In terms of reproductive and maternal

health indicators, 73 percent of live births take place in the presence of a skilled birth attendant. However, substantial gaps remained in certain areas. Access to Anti Retroviral treatment (ART) for HIV AIDS patients

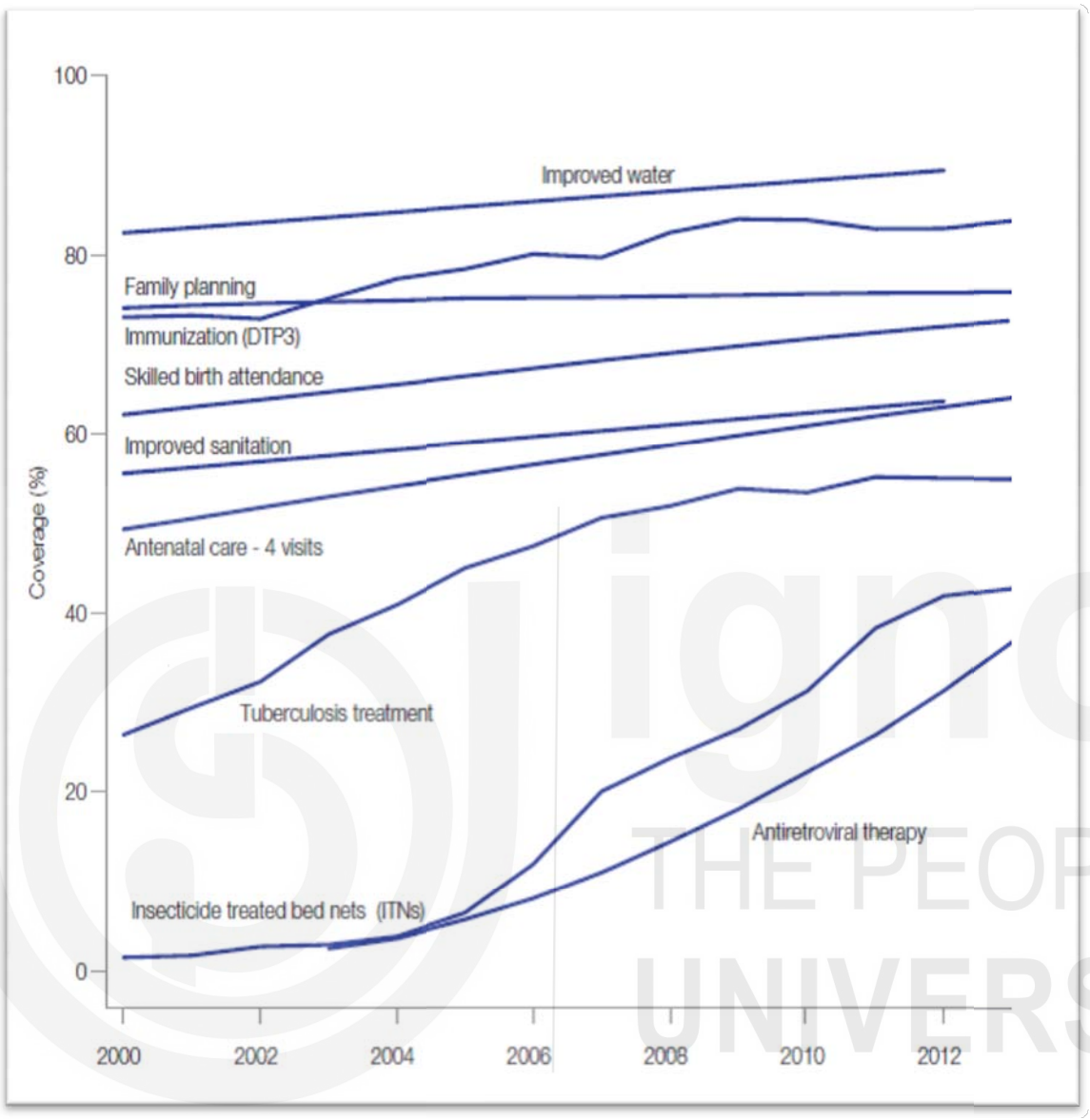

Fig. 7.4: Global Trends in Coverage of UHC Indicators (2000-2013)

Source: World Bank 2015

remains low, with only 37 percent of people living with HIV receiving ART. For TB, an estimated 64 percent of cases are detected out of which 84 percent are reported as having been successfully treated. Finally, access to sanitation remains a major concern, with 36 percent of the world's population lacking access to improved sanitation facilities, placing them at risk of several water borne diseases including dysentery, cholera and typhoid. Family planning coverage, though relatively high, has seen virtually no improvement since 2000. Though coverage of public health services improved substantially over the last decade, there are still huge gaps in different income groups across the countries. The indicators with the highest levels of inequity are observed for access to sanitation, skilled birth attendance and antenatal services (Fig. 7.5).

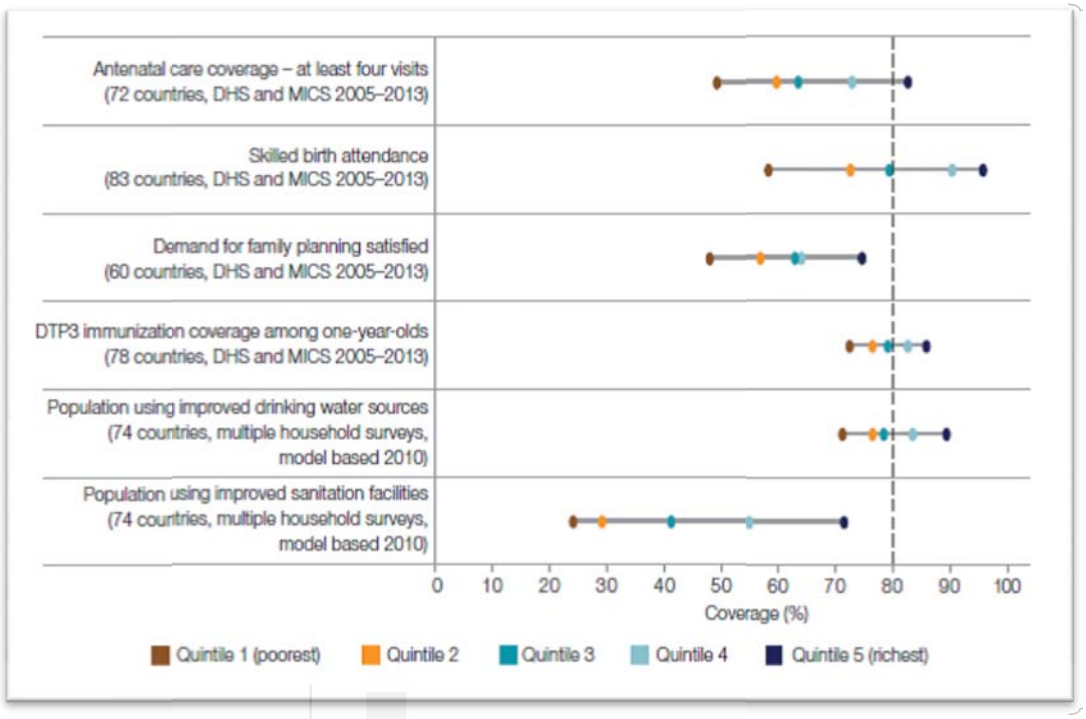

Fig. 7.5: Median Coverage of Selected Interventions by Wealth Quintile, in Low- and Middle-Income Countries

Source: World Bank 2015

In terms of financial protection, there is a considerable variation in general government expenditure on health and OOPE payment between rich and poor countries, with people in low- and lower-middle-income countries paying relatively more OOP than people in high-income countries. The most vulnerable region is South Asia, where people in the countries of that region are forced to undertake average OOPE accounting for 50 percent of Total Health Expenditure (Fig. 7.6).

In short, the coverage of basic public healthcare under UHC has improved substantially across low and middle-income countries, though there remains concerns of inequity and financial protection.

Fig. 7.6: Out-of-Pocket Expenditure on Health as a Percentage of Total Expenditure on Health, 2013

Source: World Bank 2015

Check Your Progress 2 [answer within the space given in about 50-100 words]

1) What does 'prevalence of elasticity of private demand' attempts to estimate?

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2) State the two important implications of the theory of 'prevalence elasticity of private demand' for infectious diseases.

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3) Why does the dynamic nature of markets makes it to need continuous involvement in vaccine-preventable diseases?

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4) What are the two key elements of a 'universal health coverage' (UHC)? What are its implications?

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5) State the main components of UHC cube?

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7.6 LET US SUM UP

The unit deals with the economics of public health services, especially for developing countries. First, it distinguishes the difference between public health and healthcare services identifying the contrasting markets and beneficiaries for each type of service. In doing this, it develops the rationale

behind under-investment in public healthcare, though evidence suggests that it brings in critical gains in the final outcome of health. The unit then introduces the concepts of microeconomics in terms of positive and negative externality in the consumption of public health services. Identifying private and social benefits from positive externalities and private and social costs from negative externalities, the importance of policy intervention and government's support to correct the market is explained. The issues related to economics of epidemiology are explained. This is a relatively new concept in which the concept of 'prevalence elasticity of demand for public health services' is used to point out the fact that, in many cases, growth of infectious diseases could be self-limiting and the corresponding decline of the disease might slow down prevention efforts before the complete eradication of the disease is achieved. The section on Universal Health Services (UHC) explains that though there has been sure sign of improvements in access to public health services, there still remains concerns about access to sanitation.

7.7 KEY WORDS

Economics of externality	:	An externality is said to occur if a person's activity (consumption or production) affects the well-being of an uninvolved person. The term *externality* implies that: (i) someone *external* to the action or transaction (neither a buyer nor a seller) is affected by the production or consumption of a good and (ii) neither the buyer, nor the seller bears the cost of coping with that.
Social Marginal Benefit	:	This is defined as the sum of the direct benefit to consumers (i.e. private marginal benefits: PMB) plus the cost associated with the consumption of the good imposed on others (i.e. negative Marginal Cost or expense for others). Thus: SMB = PMB + MC.
Social Marginal Cost	:	This is the sum of producer's marginal cost plus marginal damage i.e. SMC = PMC + MD.
Prevalence Elasticity of Private Demand	:	Provides a measure of the changes in prevalence demand in response to disease outbreak which differ across countries and sub-regions.

7.8 SOME USEFUL BOOKS AND REFERENCES

1) Gregory Mankiw (2014). *Principles of Microeconomics*, 2nd edition, Chapters 10 and 11.

2) Anthony J. Culyer and Joseph P. Newhouse (2000). Handbook of Health Economics, Elsevier.

3) Monica Das Gupta (2005). Public Health in India: A Dangerous Neglect, Economic & Political Weekly, Vol. 40, Issue No. 49, 03 Dec, 2005

7.9 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Prevention of disease, promotion of physical health and efficiency, control of community infections, education in personal hygiene, access to medical and nursing services for early diagnosis and preventive treatment, etc.

2) No. Focus on public health is different from that of healthcare in two broad respects viz. (i) community versus individual and (ii) from prevention to healing.

3) Invisibility of public health services to the public, difficulty of measuring its benefits in the long run, controversy on externality benefits i.e. payers and beneficiaries being different.

4) Because they either lead to *overproduction* of goods with negative externalities or *underproduction* of goods with positive externalities.

5) SMB = PMB + MC. SMC = PMC + MD.

6) If the cost of the negative externality were imposed on the good as a tax, the tax would make up for the 'cost of cleaning up'. The consumers would then demand less of that good and the negative externality is said to be internalised.

7) Vaccination services, solid waste management, abatement of vector-borne diseases, etc.

Check Your Progress 2

1) The changes in prevalence demand in response to a disease outbreak.

2) The self-limiting character of infectious diseases and the decline of the disease slowing down the prevention efforts in terms of the intensity of public health intervention.

3) Since the future generation also needs to be covered despite the fact that the efforts to eradicate the communicable diseases are not pareto optimal for the current population.

4) People's use of the health services they need and their economic consequences. The implication is of equity related to access.

5) Reduction in cost sharing and fees, population and services covered, etc.

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