2. Social support networks
3. Education and literacy
4. Employment/working conditions
5. Social environments
6. Physical environments
7. Personal health practices and coping skills
8. Healthy child development
9. Biology and genetics
10. Health care services
11. Gender
12. Culture

Health economics: Health economics is the study of the value of health and how it can be produced most efficiently and distributed to maximize social welfare. Health economics is concerned with issues related to the allocation of scarce resources to improve health. This includes both resource allocation within health economy to the health sector and within healthcare system to different activities and individuals.

Importance of health economics:

1. To formulate health services.
2. To estimate the true cost of delivering healthcare or to estimate all real costs like patient's time, loss of output elsewhere in the system.
3. To evaluate the relative costs and benefits of particular policy options.
4. To estimate effects of certain economic variables such as user charges, time and distance cost of accessibility etc. on the utilization of health services.

Health outcomes:

1. Life expectancy (length in years)
2. Nutritional status (weight for age or height)
3. Crude birth rate (CBR)
4. Crude death rate (CDR)
5. Morbidity rate
6. Prevalence rate
7. Incidence rate

Key concepts of economics:

Cost: A cost is the value of money that has been used up to produce something or deliver a service, and hence is not available for use anymore.

Classification of cost:

A. On the basis of nature of costs:

1. **Fixed cost:** It is the cost of fixed inputs used in production. These costs do not vary with the change in volume of production e.g. rent of a building, depreciation of materials.
2. **Variable cost:** It is the cost of variable inputs used in production. These costs vary with the change in volume of production e.g. cost of raw materials, elasticity cost.
3. **Semi variable cost:** It refers to costs which are partly fixed and partly variable. These types of costs do not directly affect the level of production but may vary with change in production facilities e.g. administrative cost, maintenance cost, depreciation cost etc.
4. **Total cost:** It refers to the total cost of production.
   Total cost = Fixed cost + Variable cost.
5. **Marginal cost:** It refers to the additional cost of producing one extra unit of a product.

$$MC = TC_n — TC_{n-1}$$

result, a single firm cannot influence the market price so that a firm under perfect competition is a price taker and not a price maker. Similarly, there are a large number of buyers and an individual buyer buys only a small portion of the total output available.

2. **Homogenous goods:** Under perfect competition, all firms sell homogenous goods which are identical in quantity, shape, size, color, packaging etc. So the products are perfect substitutes of each other.
3. **Free entry and free exit:** Any firm can enter or leave the industry whenever it wishes. The condition of free entry and free exit ensures that, all the firms under perfect competition will earn normal profits in the long run. If the existing firms are earning supernormal profits, new firms would be attracted to enter the industry and increases the total supply. This will reduce the market price and the supernormal profit will not sustain. On the other hand, if existing firms incur supernormal loss, then firms would leave the industry, thus reducing the supply. As a result, price will again rise and the loss will be wiped out.
4. **Profit maximization:** The goal of all firms is maximization of profit.
5. **No Government regulation:** There is no government intervention in the market.
6. **Perfect mobility of factors:** Resources can move freely from one firm to another without any restriction. The labors are not unionized and they can move between jobs and skills.
7. **Perfect knowledge:** Individual buyer and seller have perfect knowledge about market and information is given free of cost. Each firm knows the price prevailing in the market and would not sell the commodity which is higher or lower than the market price. Similarly, each buyer knows the prevailing market price and he/she is not allowed to pay higher price than that. The firm also has a perfect knowledge about the techniques of productions. Each firm is able to make use of the best techniques of production.

B. **Imperfect competition:** A market or industry in which individual firms have some control over the price of their output is called imperfect competition. All firms in an imperfectly competitive market have one thing in common: They exercise market power; the ability to raise price without losing the demand for their product. In imperfectly competitive markets, competition occurs among firms by differentiating their products, advertising, improving quality, cut prices and so forth.

a. **Monopoly:** Monopoly is a market structure in which a commodity is supplied by a single firm.
Features:

1. **Single seller and large number of buyers:** Under monopoly, there is one seller and therefore a firm faces no competition from other firms. Though there are large numbers of buyers, no single user can influence the monopoly price by his action.
2. **No close substitutes:** Under monopoly, there is no close substitute for the product sold by the monopolist. According to Prof. Boulding, a pure monopolist is therefore a firm producing a product which has no substitute among the products of any other firms.
3. **Restriction on the entry of new firms:** Under monopoly, new firms cannot enter the industry.
4. **Price maker:** A monopoly firm has full control over the supply of its products and hence it has full control over its price also. A monopoly firm can influence the market price by varying its supply, e.g., it can make the price of its product by supplying less of it.
5. **Possibility of price discrimination:** Price discrimination is defined as that market situation where a single seller sells the same commodity at two different prices in two different markets at the same time, depending upon the elasticity of demand on the two goods in their respective market. Under such circumstances, a monopolist can incur supernormal loss then firms would leave the industry, thus reducing the supply. As a result, price will again rise and the loss will be wiped out.

b. **Monopolistic competition:** It is that form of market in which there are large numbers of sellers selling differentiated products which are similar in nature but not homogenous, e.g., the different brands of soap. These are closely related goods with a little difference in color, size and shape. We separate them from each other. The concept of monopolistic competition was developed by an American economist Chamberline. It is a combination of perfect competition and monopoly.
Features:

1. **Large number of sellers and buyers:** In monopolistic competition, the number of sellers is large and each other act independently without any mutual dependence. Here the action of an individual firm regarding change in price has no effect on the market price. The firms under monopolistic competition are not price takers.

4. Externalities of Health Care

Externality: An externality is a positive or negative consequence of an economic activity experienced by unrelated third parties. Pollution emitted by a factory that spoils the surrounding environment and affects the health of nearby residents is an example of a negative externality. The effect of a well-educated labor force on the productivity of a company is an example of a positive externality.

Positive externality: Positive externalities refer to the benefits enjoyed by people outside the market place due to a firm's actions but for which they do not pay any amount.

Examples:

1. Vaccination has an associated positive benefit for others because it reduces the risk of contraction.
2. Caring for health of others.
3. Private health increases national wealth.
4. Knowledge and technology.
5. Communicable disease surveillance and infectious disease control.

Negative externality: Negative externalities are the negative consequences faced by outsiders due to a firm's action for which it is not charged anything by the market.

Examples:

1. The passive smoking endured by non-smokers when people smoke at public places.
2. The noise and vibration caused by trains to people who live nearby mass transit systems
3. The effect of air, water and noise pollution.

Externalities are a type of market failure. Let us consider a company who is authorized by the Government to build and operate an urban mass transit line in a city. The company pays for land it buys and incurs all the costs related to construction, but there is no way to compensate the residents who live nearby for the noise and discomfort they face due to construction activities. These represent negative externalities. However, once the mass transit line is operational, those who live nearby benefit the most not only from the decrease in travel time but through appreciation in the market of their properties. These are the positive externalities. They result from diversion between private benefits and social benefits and between private costs and social costs of different economic activities.

Possible solutions: There are several general types of solutions to the problem of externalities:

1. Pigovian taxes or subsidies intended to redress economic injustice or imbalances.
2. Regulation to limit activity that might cause negative externalities.
3. Government provision of services with positive externalities.
4. Lawsuits to compensate affected parties for negative externalities.
5. Mediation or negotiation between those affected by externalities and those causing them.

Global externalities:

Examples:

1. **Communicable diseases**
    - HIV/AIDS – global (geographic and demographic)
    - Tuberculosis – global (geographic and demographic)
    - Malaria – regional (geographic)
    - Acute respiratory infection, diarrhea – local (geographic and demographic)
2. **Economic effects of ill health**
    - HIV/AIDS in southern Africa – regional to global

5. Economic Burden of Health Problem

Economic evaluation: Economic evaluation may be defined as the comparative analysis of alternative courses of action in terms of both their costs and consequences. It involves two main areas: first, the costs and consequences of programs and second, choices which have to be made in allocation of resources. Economic evaluation does aim to determine how resources can give the greatest benefit. An economic evaluation will measure two parameters – costs and outcome (effect). Because two parameters are measured, the results of an economic evaluation will not necessarily tell us which treatment option is better in the same way that a clinical trial might.

Features that characterize an economic evaluation or analysis:

1. First, it deals with both the inputs and outputs, sometimes called cost and consequences of activities.
2. Second, economic analysis concerns itself with choices. Resource scarcity and our consequent disability to produce desired outputs, necessities must and will be made in all areas of human activity.
3. Economic analysis seeks to identify and make explicit set of criteria which may be useful in deciding among different uses of scarce resources.

What economic evaluation does?

1. Always compares any healthcare program with an alternative for example, no treatment or routine care.
2. Always measure the benefits produced by all alternatives compared.
3. Always measures the cost of any program.

Therefore, the basic tasks of any economic evaluation are to:

1. Identify
2. Measure
3. Value
4. Compare cost and consequences of the alternatives being compared

Types of economic evaluation:

1. **Partial economic evaluation:** It includes simple descriptive tabulations of outcomes or resources consumed and requires a minimum of time and effort. It is of 4 types:
    a. Cost comparison or cost analysis study
    b. Cost of illness study
    c. Cost of outcome description
    d. Cost description
2. **Full economic evaluation:** It includes the followings:
    a. Cost minimization analysis (CMA)
    b. Cost effectiveness analysis (CEA)
    c. Cost benefit analysis (CBA)
    d. Cost utility analysis (CUA)

They are discussed below:

a. **Cost minimization analysis:** If the outcomes of the alternative strategies are demonstrated to be equivalent, then analysis will consist of simply comparing costs and choosing the cheapest option. Demonstration of equivalence of outcome may entail presentation of primary data from the study itself, or presentation of secondary data, such as the results of a meta-analysis.
Example 1: Two drugs can be used to lower the level of blood cholesterol. No other side effects or any other costs are associated with the drugs.
    - Drug A costs 2000 Tk per month and drug B costs 1500 Tk per month. Both reduces cholesterol level by the same amount. Which one should we select? Why?

    Example 2: Suppose we are comparing two programs involving minor surgery for adults, where our common outcome of interest is 'operation successfully completed'.

The beauty of the QALY therefore is that it allows us to compare the health effect of a new cancer therapy with the health effect of a new anti-depressant (or with any other medical intervention).

DALY

The disability adjusted life years or DALY is a summary measure of the public health widely used to quantify burden of disease. In the DALY philosophy, every person is born with a certain number of life years potentially lived in optimal health. People may lose these healthy life years through living with illness and/or through dying before a reference life expectancy. These losses in healthy life years are exactly what is measured by the DALY metric. Ten DALYs for instance, correspond to ten lost years of healthy life, attributable to morbidity, mortality or both.

DALY = YLL + YLD

Here, YLL = Years of life lost due to premature death
YLD = Years of life lived with disability

YLL = w (a — b)

Where, w = age weight
a = Life expectancy at birth
b = Age at the time of death

YLD = wd

Where, w = Disability weight for the disease
d = Duration of the disability or disease

The disability weights (DWs) are a crucial component of the DALY calculation, as they translate morbidity into healthy life years lost, thus enabling comparison of morbidity and mortality. A DW, scaled from 0 (perfect health) to 1 (worst possible health state), can be interpreted as the proportional reduction in good health due to an adverse health state. Living 10 years with a DW of 0.1 or 5 years with a DW of 0.20, thus both correspond to losing 1 full healthy life year. For example, a female patient develops severe alcohol use disorder at age 40 and consequently dies at age 60. This condition has a DW of 0.55 and is thus assumed to cause a 55% reduction in good health or equivalently, a loss of 55% of the potential healthy life years lived during the 20 years of suffering from this condition. The number of YLDs for this patient is therefore, calculated as:

YLD = 1 (60 — 40) × 0.55

= 11

According to Coale-Demeny Model Life Table West, life expectancy at birth for males is 80 and for females is 82.5. In the latest Global Burden of Disease study, a new model life table was developed, with a life expectancy at birth of 86 for both males and females.

Continuing the aforementioned example, the life expectancy of the 60-year old female is 22.5 years in the Coale-Demeny Model Life Table West. Dying at the age of 60 will thus cause a loss of 22.5 full life years potentially lived in optimal health:

YLL = 1 × 22.5

So, DALY = YLD + YLL

= 11 + 22.5

= 33.5

Uses of DALY:

1. Setting health service priorities.

3. Assessing performance of healthcare systems
4. Comparing action and health gain
5. Identifying high-risk populations
6. Planning for future needs
7. Setting priorities in health research