

# Principles of Pharmacoeconomics



## Background

- Assessing the clinical effectiveness of any new health care intervention, including medications, is important in determining the role of the new intervention in clinical practice.
- But the new interventions may provide only a **modest advantage (or no advantage) over existing treatment, usually at a higher cost.**
- pharmacoeconomics attempts to measure if the added benefit of one intervention is worth the added cost of that intervention.

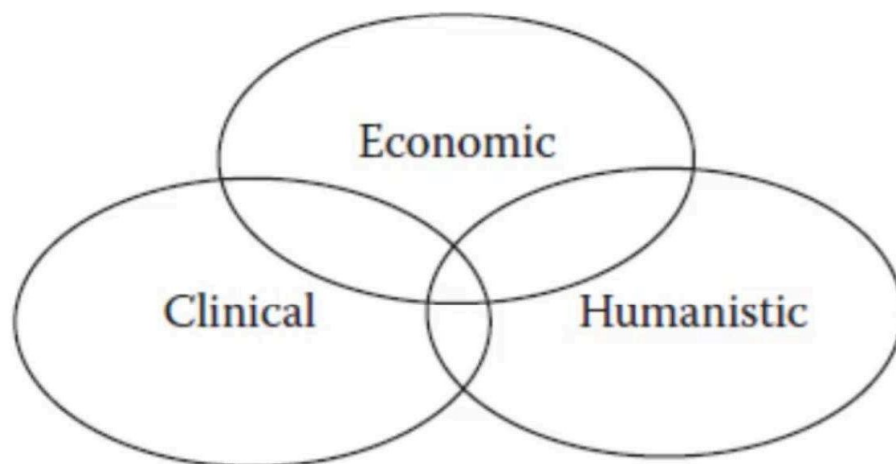
- **Pharmacoeconomics** has been defined as : the **description and analysis** of the costs of drug therapy to health care systems and society.
- It **identifies, measures, and compares** the **costs and consequences** of pharmaceutical products and services.



# Consequences

- Depending on perspective, the outcomes of health care are **multidimensional**.
- **The clinician** has traditionally been most concerned with **clinical outcomes** of treatments.
- **healthcare payers** and administrators have focused on the **resource use or economic outcome** of healthcare decisions.
- **Patients**, on the other hand, are seeking more information regarding the **humanistic outcomes of therapy**. Patients want to know how their **quality of life will** be affected with various treatments.

ECHO Model:  
Economic, Clinical, and Humanistic Outcomes



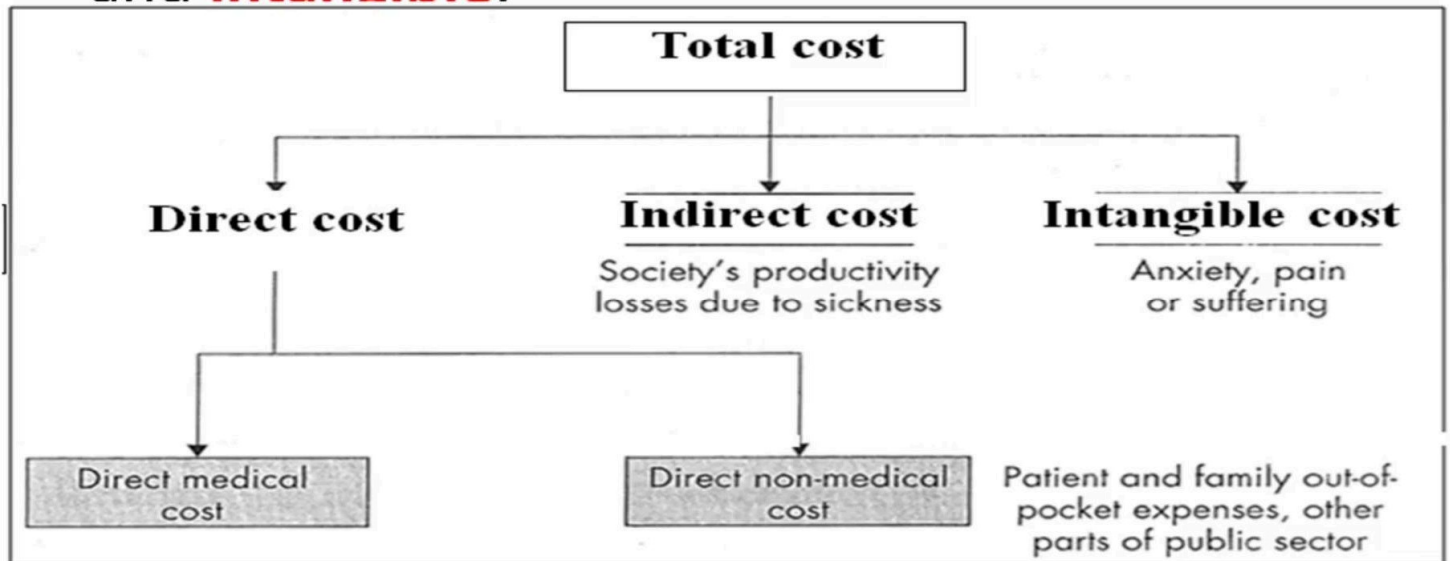
- Accordingly , the consequences (or outcomes) of medical care also can be categorized into three categories: economic, clinical, and humanistic.
- **Economic outcomes** are the **direct, indirect, and intangible** compared with the consequences of medical treatment alternatives.
- **Clinical outcomes** are the **medical events** that occur as a result of disease or treatment (e.g., **safety** and **efficacy** end points).
- **Humanistic outcomes** are the consequences of disease or treatment on patient **functional status or quality of life along several dimensions** (e.g., **physical function, social function, general health** and **well-being, and life satisfaction**).

## Positive versus negative consequences

- These consequences (outcomes) can be further categorized as **positive or negative**.
- An example of a positive outcome is **a desired effect of a drug (efficacy or effectiveness measure)**, possibly manifested as cases cured, life-years gained, .....
- Since all drugs have adverse effects, negative consequences also can occur with their use.
- **A negative outcome is an undesired or adverse effect of a drug**, possibly manifested as a treatment failure, an adverse drug reaction (ADR), a drug toxicity, or even death.
- **Pharmacoeconomic evaluations should include assessments of both types of outcomes.**

# Types of costs

- Costs are usually divided into **direct**, **indirect** and **intangible**.



## Direct Medical Costs

- Direct medical costs are the **cost of medically related inputs used directly to provide the treatment**.
- Examples of direct medical costs include the costs associated with the **pharmaceuticals**, **diagnostic** tests, **physician** visits, **pharmacist** visits, **emergency department** visits, and **hospitalizations**.
- Example:** during chemotherapy treatment, direct medical costs may include :
  - the chemotherapy products themselves.
  - other medications given to reduce side effects of the chemotherapy, intravenous supplies, laboratory tests, clinic costs, and physician visits

## Direct Nonmedical Costs

- Direct nonmedical costs are costs to patients and their families that are **directly associated with treatment but are not medical in nature**. Examples of direct nonmedical costs include the cost **of traveling to and from the physician's office, clinic, or the hospital; child care services for the children of a patient; and food and lodging required for the patients and their families during out-of-town treatment.**
- Using the example of chemotherapy treatment, patients may have increased travel costs related to traveling to the clinic or hospital. They may also have to hire a babysitter for the time they are undergoing treatment .

## Indirect costs

- Indirect costs are incurred by the **reduced productivity of a patient and their family, resulting from illness, death or treatment**. the following indirect costs can be calculated reliably from data:
  - **A-Time off work due to sick leave.**
  - **B-Early retirement.**
  - **C-Reduced productivity at work.**
- The significance of indirect costs depends upon the particular illness and treatments involved.
- Diseases such as **asthma, migraine** and **depression** affect working age groups, whereas other diseases, such as **Alzheimer's**, do not.
- Indirect costs are difficult to measure. Because of the difficulties concerning indirect costs, **they are not often included in economic studies**.
- However, it is likely that most interventions will affect indirect costs, so they should always be considered, if not measured .

- **Intangible costs**
- Intangible costs are difficult or impossible to measure, but they still occur and it is of value to identify them. They can include **anxiety, pain or suffering from an illness or treatment** .

## **Incremental costs and marginal costs**

- An incremental cost is the **difference in overall costs between two alternatives**.
- A marginal cost is the **cost of one or more intervention or expanding a program or service** (e.g. increasing the length of stay in hospital by one day) .

## Opportunity costs

- **opportunity cost is the value of the alternative that was forgone**.
- Imagine we have a choice of two effective treatments, A and B, **but only enough money for one of them**. If treatment A is funded rather than treatment B, the opportunity cost of funding A is the benefits we forgo in not choosing B.
- Consider, for example, two possible interventions: a **cancer screening program (intervention A)** and a **smoking cessation program (intervention B)**.
- If only one of these interventions can be funded then **the opportunity cost of funding A can be thought of as the number of life years that would have been gained through the smoking cessation program**.

## • Average cost

- Average cost is calculated by **dividing the total costs for the intervention by the total quantity of treatment units provided, such as the number of patients receiving a course of antibiotics**.



# Cost of illness

- The cost of illness (COI) is the **personal cost of acute or chronic disease**. The cost to the patient may be economic, social or psychological, .....etc.
- It differs from healthcare costs, meaning the societal cost of providing services related to the delivery of healthcare, rather than personal impact on individuals.
- **The direct medical costs of illness** include diagnosis, medical treatment, surgery and follow-up care . **Indirect costs of illness** are costs attributable to loss of productivity of patients with that disease or condition .

- **Intangible costs of illness** are the pain and suffering associated with illness .
- COI studies are used to:
- **indicate the magnitude of resources needed for a specific disease or condition**
- **And they may be used to compare the economic impact of one disease versus another** (e.g., costs of schizophrenia versus costs of asthma) or the economic impact of a disease on one country compared with another (**e.g., costs of D.M in Iraq versus costs of D.M in Jordan**) .
- The point of treating a patient with a disease is to reduce these costs of illness.