

PHARMACOECONOMICS



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Shaping Lives...
Empowering Communities...

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DEFINITIONS

According to ISPOR (Indian Society for Pharmacoeconomics and Outcomes Research)

“**Pharmaco-economics** is the field of study which evaluates the **behaviour** of individuals, firms and markets relevant to the use of **pharmaceutical products, services and programs**, and which frequently focuses on the **costs** (inputs) and **consequences** (outcomes) of that use”.

PRICE:

It is the amount a customer pays for a product or service.

COST:

It is the monetary value of resources consumed in production or delivery of product or a service.

QOL:

An individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

HRQOL:

It is a multi-dimensional concept that includes domains related to physical, mental, emotional, and social functioning.

It goes beyond direct measures of population health, life expectancy, and causes of death, and focuses on the impact health status has on quality of life.

TIME TRADE OFF (TTO):

It is a tool to help determine the QOL of patient.

QALY:

Quality Adjusted Life Years

DISCOUNTING:

It is a method for time adjustment for costs where the future costs are brought to the present.

COSTS

- According to ACCP (American College of Clinical Pharmacy) the costs can be categorized as
 - DIRECT COST
 - INDIRECT COST
 - INTANGIBLE COST
 - OPPORTUNITY COST
 - INCREMENTAL COST

DIRECT COST

- These are the resources consumed in the prevention, detection or treatment of a disease or illness.
- It involves transfer of money

A) DIRECT MEDICAL COST:

represents costs that are incurred during provision of care. Eg) Cost of drugs, lab tests, salaries of health care professionals

B) DIRECT NON-MEDICAL COST:

Arising due to illness but do not involve purchasing medical services. Eg) Cost of transportation, cost of special clothings, etc.,

INDIRECT COST

- External cost or indirect medical cost.
- These are costs of reduced productivity.
- It is the one borne by the patient and family.
- Eg) Wages and salaries lost due to mortality and morbidity

INTANGIBLE COSTS

- These are costs incurred, which represent non-financial outcomes of disease and medical care, which cannot be expressed in money value.
- Eg) costs of mental agony, pain, suffering, loss of energy etc.,
- It is difficult to measure or give monetary value on these costs.
- Presently these costs are omitted (or) included in indirect

OPPORTUNITY COSTS

- It is the benefit forgone when selecting one therapy alternative over the next best alternative.
- It includes the cost of lost opportunity or revenue forgone.

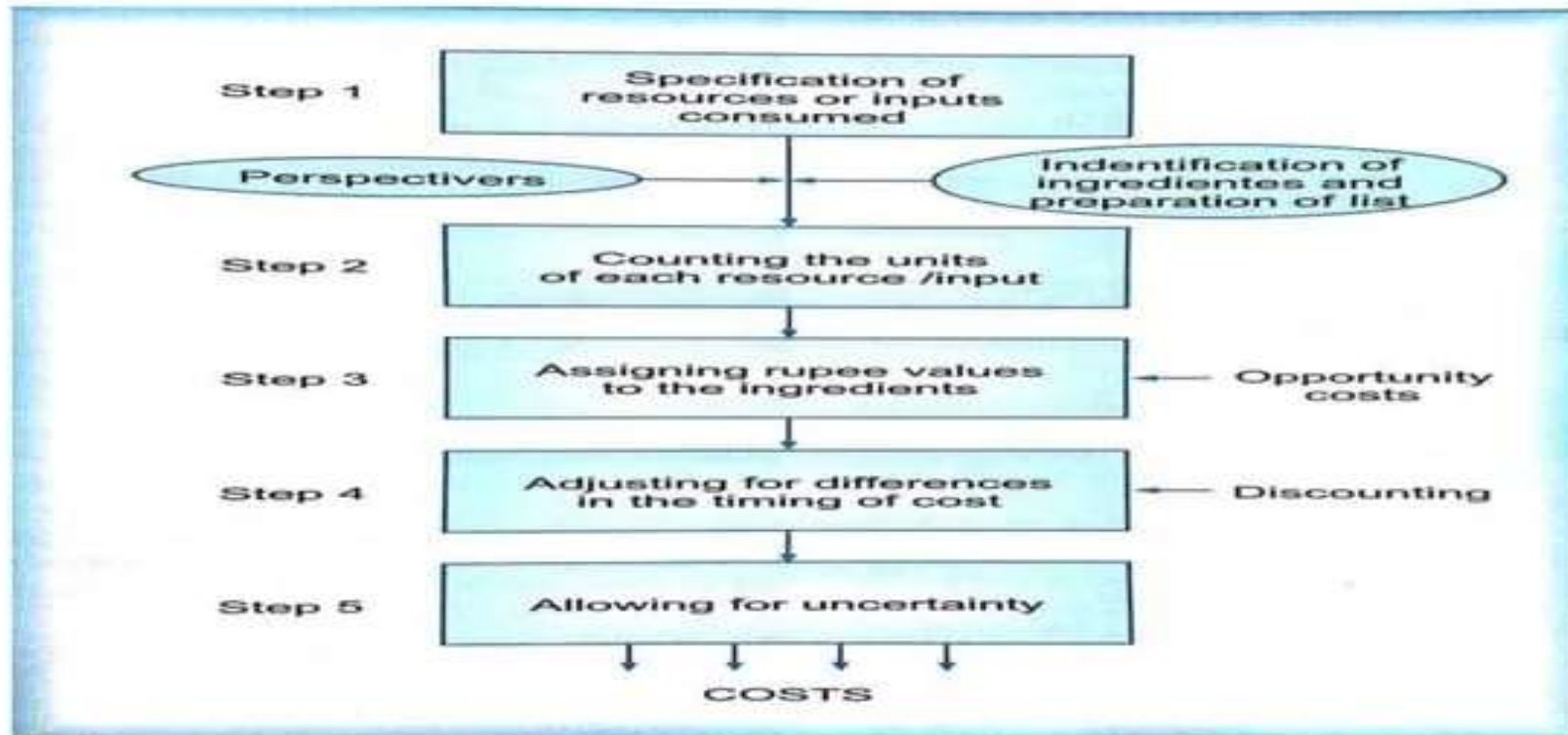
INCREMENTAL COSTS

- It is the cost associated with increasing production by one unit.
- It represent additional cost that a program or therapy alternative imposes over another, compared to the additional effect, benefit or outcome it provides.
- These are extra costs required to produce an additional unit of effect.

OTHERS

- Average costs
- Fixed costs
- Variable costs

COST DETERMINATION



OUTCOMES

- The outcomes (or) benefits (or) consequences can be categorized as [ECHO model]
 - Economic outcomes
 - Clinical outcomes and
 - Humanistic outcomes

ECONOMIC OUTCOMES

- Related to direct, indirect and intangible costs of medical treatment alternatives.
- Expressed in terms of money value.
- Include savings due to treatment (direct) as well as production gains to return to work (indirect)

CLINICAL OUTCOMES

- These are medical events or results that occur as a result of disease or its treatment.
- Includes improvement of disease condition, cure of the disease, no. of lives saved, no. of deaths averted, etc.,

INTERMEDIATE OUTCOME:

- Serves as indicator for more relevant final outcomes.

Eg) Decrease in LDL is an intermediate outcome where the final outcome is decrease in MI rate and increase in lives saved.

HUMANISTIC OUTCOMES

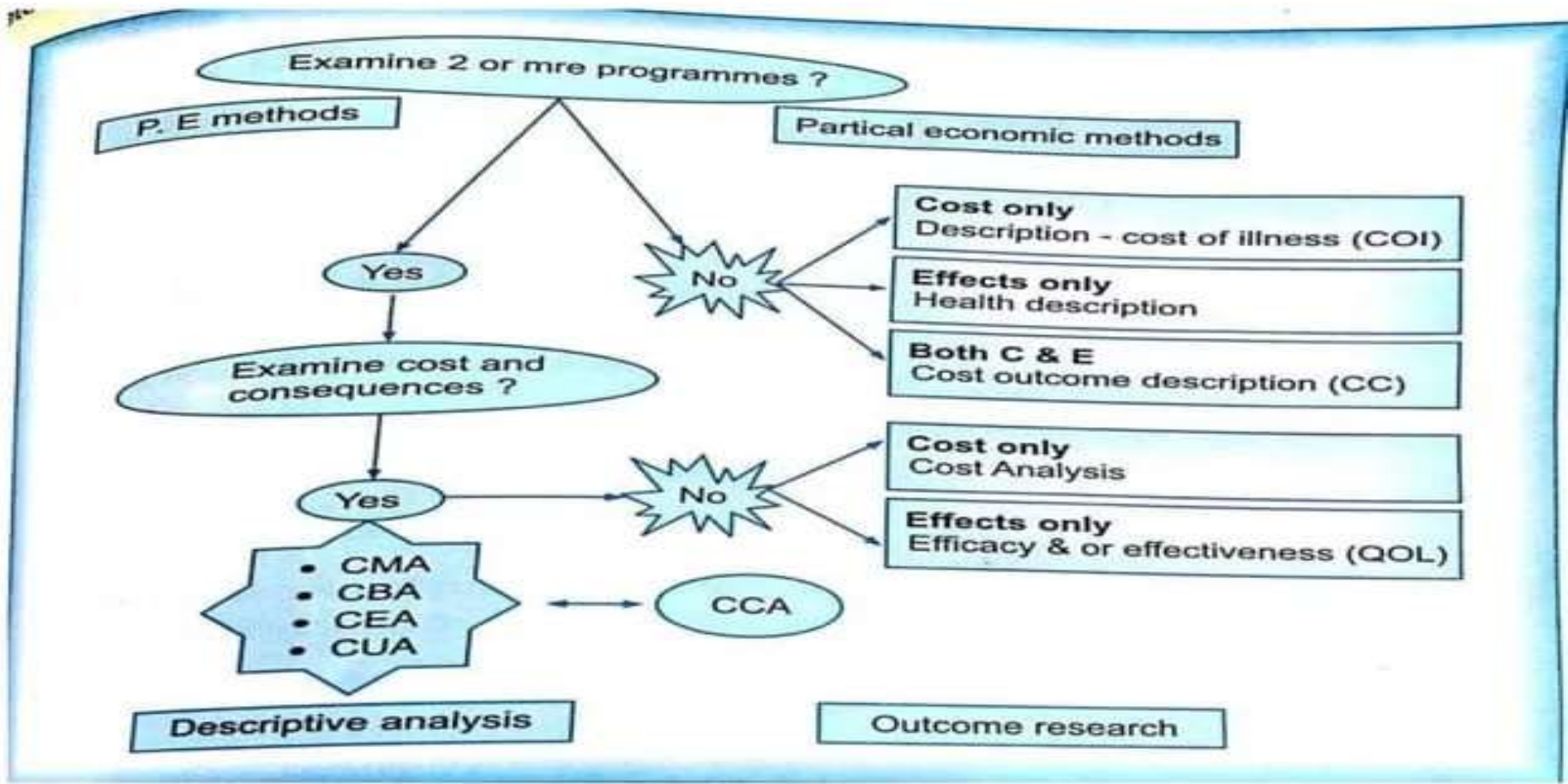
- These are the outcomes of diseases or their treatment on the functions or HRQOL.
- Includes healthy life, general well being, social compatibility and physical functions.

PERSPECTIVES

- Refers to the point of view from which the economic analysis is performed.
- PE study can be conducted from a single perspective or a group of perspective.
- The generally used perspectives are:
 - Patient perspective
 - Provider perspective
 - Payer perspective
 - Society perspective

PE MODELS

- PE models help the authorities to allocate the limited resources of medicine and health care facilities among the various stakeholders.
- Three important factors for any economic analysis is
 - Identification and choice among alternatives
 - Assessment of costs and consequences
 - Decision making within the limited/ fixed or available budgets



COST BENEFIT ANALYSIS

- It compares the total costs of each alternative to resultant consequences or benefits of the intervention measured in monetary units
- Benefits are measured using contingent evaluation.
 - WTP
 - WTA

COST BENEFIT RATIO

$$\text{CBR} = \text{Total benefits} / \text{Total costs}$$

- If B/C ratio is > 1
 - Benefit outweighs the cost
 - Hence such program is of good value
- If B/C ratio is $= 1$
 - Benefit is equal to the cost
- If B/C ratio is < 1
 - Cost of providing treatment outweighs the benefits
 - Hence not economically beneficial

APPLICATIONS

- Useful in comparing two or more alternatives with different outcomes
- Helpful in deciding implementation of projects by government or funding agencies.

LIMITATIONS:

- Converting benefit into monetary value is difficult

COST EFFECTIVENESS ANALYSIS

- It is a technique used to aid in decision making between alternative; when the costs are measured in monetary terms while the consequences are measured in natural unit changes in health.
- When the treatment alternatives are not therapeutically equivalent or when it is not desirable to measure the outcome in terms of rupees or money value it is used.

ADVANTAGES

- The outputs or the outcomes are measured in natural health units and need not be converted as in CBA
- CEA compares program or treatment alternatives with different safety and efficacy profiles

DISADVANTAGES:

- The outcome have to be evaluated in the same clinical unit
- When several outcomes results from a medical intervention CEA consider these two outcomes only if a common measure of outcome can be developed.
- Effectiveness should be evidenced and should be reliable, reproducible and valid

APPLICATIONS

- The health care units are commonly used in clinical trials and are very much familiar to researchers
- Choose from among the various competing programs or alternatives.
- It has great use in formulary system, choosing programs or therapies and comparison of drugs or devices.
- It also helps to identify which treatment alternative represents the best outcome for the rupees spent.
- CEA can provide valuable data to endorse drug policy, formulary system and individual patient treatment decisions.

COST MINIMIZATION ANALYSIS

- CMA is a PE method used to compare 2 or more treatment alternatives that are equal in efficacy.
- Outcomes are not compared because of the underlying assumption that the treatment alternatives are therapeutically equivalent.
- The primary objective of the CMA is to identify the least costly alternative

ADVANTAGES

- CMA is the simple and straightforward method of evaluation
- The study need not analyse the outcome and can focus on inputs only for assessing the costs

DISADVANTAGE:

- It can be applied to only limited cases.

APPLICATIONS

- CMA is often applied in formulary decision making
- Best method to compare the various branded products of same drug
- It can also be used to study the generic versus branded products.

COST UTILITY ANALYSIS

- CUA is considered to be an extension of CEA
- In CUA both quantity and quality of life, often measured from the patient's perspective, are merged into a single unit by calculating utility or preference for the alternatives and then calculating QALY.
- Utilities are measured using either the rating scale, TTO or standard gamble approaches.
- In this evaluation, drug/interventions with different outcomes can be compared.

ADVANTAGE

- Can be applied to the comparison of different types of health outcomes and disease with multiple outcomes of interest using one common unit like QALY.

DISADVANTAGE:

- It is often difficult to determine an accurate utility or QALY value

APPLICATION

- When QOL is the important health care outcome to be measured or evaluated CUA is having appropriate applications.

COST OF ILLNESS

- COI is also known as Burden of Disease (BOD) or Burden of illness (BOI)
- It is an economic evaluation method used to identify and estimate the overall cost of a particular disease for a defined population
- It involves measuring the direct and indirect cost attributable to a specific disease
- The COI studies usually include some metric of 'health loss' and try to measure the resource cost incurred in treating the related diseases.

APPLICATIONS

- COI studies are frequently used by policy makers and other government organisations
- The published COI reports are used in law suits to recover medical insurance claims
- COI are often cited in disease studies that attempt to highlight the importance of particular disease
- It help authorities to appropriately target specific problems and policies

LIMITATIONS

- They are limited in determining how resources are to be allocated because they do not measure benefits
- Studies can vary by perspective, sources of data, inclusion of indirect cost and the time frame of cost.

MODELS COMPARISON

MODELS	COST MEASUREMENT	OUTCOME MEASUREMENT	DECISION RULE
Cost Of Illness (COI)	Monetary	Not assessed	-
Cost Minimization (CMA)	Monetary	Assumed to be equal in groups	Lowest monetary cost
Cost Benefit (CBA)	Monetary	Monetary	Net monetary gain
Cost Effectiveness (CEA)	Monetary	Natural units/ units of effects	CE ratios using incremental of marginal analysis
Cost Utility (CUA)	Monetary	Utility like QALY	Cost per QALY and League tables

PE EVALUATION

- The important criteria for construction or conduct of a PE study can be listed as:
 - Study objective
 - Study perspective
 - PE method
 - Study design
 - Choice of interventions
 - Costs and consequences
 - Discounting
 - Study results
 - Sensitivity analysis
 - Study conclusions
 - Sponsorship and bias
 - Use of a comparator

APPLICATIONS

- It aid in decision making
 - Including drug in formulary
 - Clinical decision
 - Which drug provide net benefits to a particular group of patients
 - Which drug is best for pharmaceutical manufacturer to develop and the right place to market
 - What is the expected QOL improvement with a certain drug.
- In drug use policy/guidelines development
- In resource allocation by government or funding agencies or hospitals etc.,

THANK YOU