Practical Issues in Measuring Costs in Research Studies

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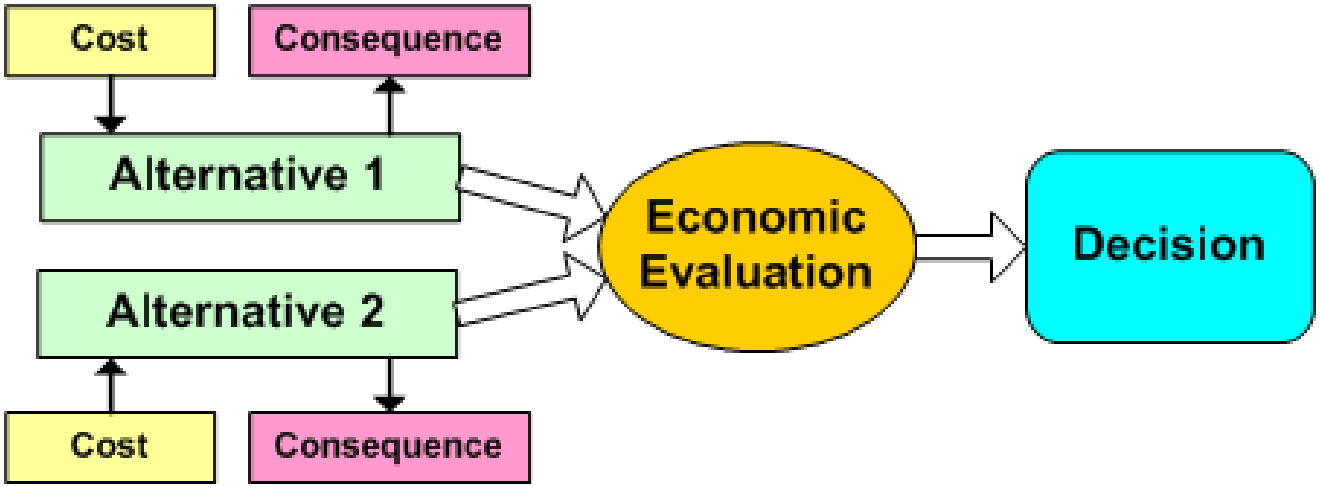
Learning Objectives

- Define economic evaluation and costs
- Describe types of cost analyses
- Demonstrate knowledge of issues to consider in designing a cost analysis
- Discuss the pros and cons of different options for each issue in measuring costs

Economic evaluation

Economic evaluation has been defined as ‘‘the comparative analysis of alternative courses of action in terms of both their costs and their consequences’’



Economic evaluation DOES NOT equal choosing the cheapest alternative

Drummond MF, Sculpher MJ, Torrance G, et al. Methods for the Economic Evaluation of Health Care Programmes. (3rd ed.) New York: Oxford University Press, 2005

Is economic evaluation appropriate?

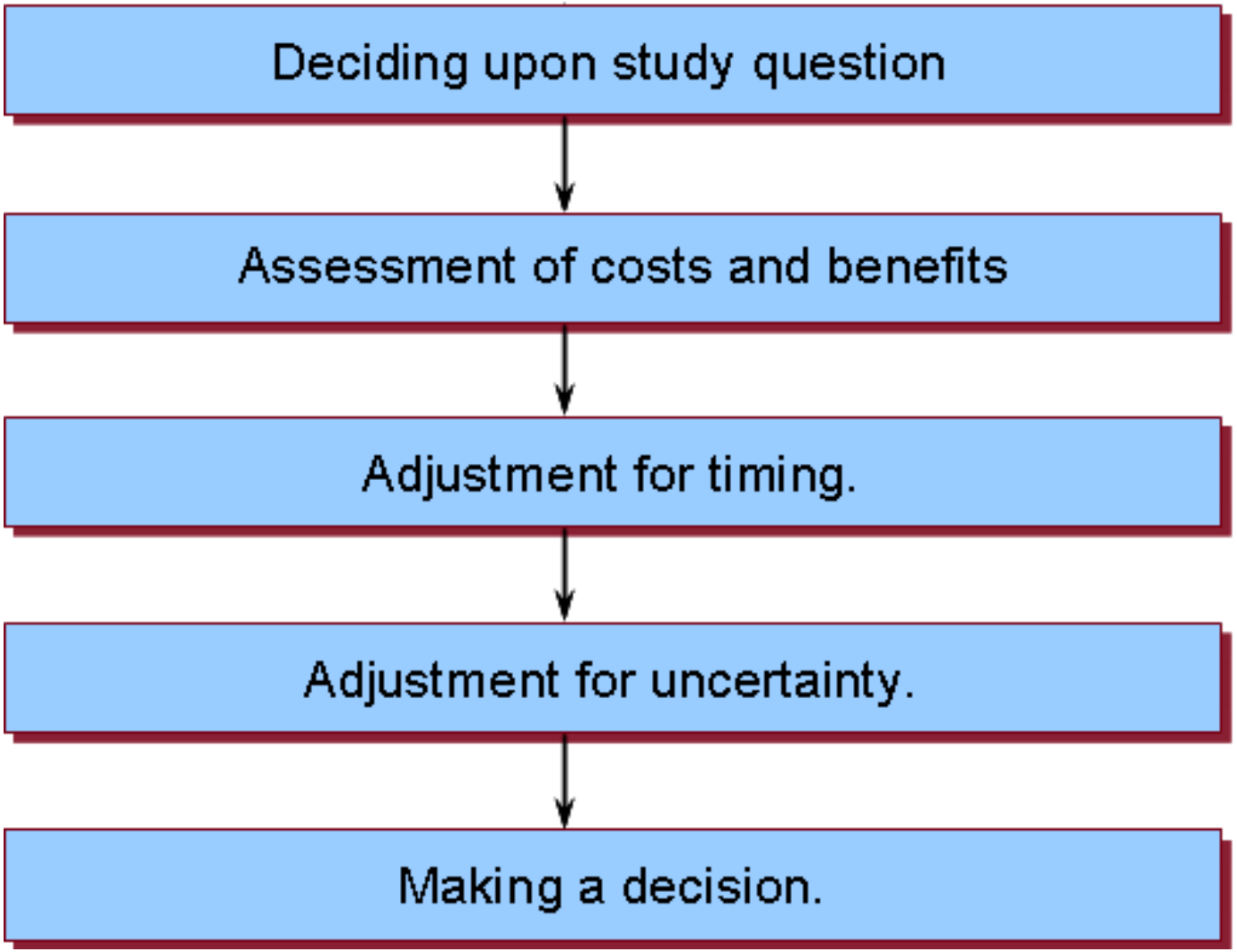
- Are differences in economic resource utilization meaningful from a societal perspective?
- Will adding economic component to the analysis influence clinical practice or health policy?
- Is collection of good economic data feasible and affordable within context of overall trial design?
- Does study design have external validity from an economic perspective?

Most interventions and treatments do not save money.

Top 10 Issues

1. Defining costs
2. Types of analyses
3. Types of cost (direct, indirect, intangible)
4. Incremental vs average costs
5. Study Perspective
6. Micro vs gross costing
7. Source of data
8. Adjusting for timing
9. Characterizing uncertainty
10. Characterizing heterogeneity

Stages in Economic Evaluation



Deciding upon the study question

- Identifying the problem and aims of evaluation
  - What is the problem?
  - Why is this problem important?
  - What aspects of the problem need to be explained?
- Choosing the alternative options
  - Describing the interventions accurately.
  - Defining the counterfactual intervention (comparator).
- Identifying stakeholders
  - Defining the info needs of stakeholders.
  - Considering how stakeholders will use the study results.

Deciding upon question (cont)

- Defining the perspective of the study
  - Patient / Providers / Payers / Healthcare system / Society.
  - Choosing a perspective depends on the audience.
- Defining the time frame and analytic horizon
  - Analytic horizon > Time frame.
- Choosing the study design
  - Prospective / Retrospective / Model.
  - Depends on data, time and resources available.

Types of analyses

- Single study vs model-based (cost-effectiveness analysis)
- Methodology
  - Cost-benefit analysis
  - Cost-effectiveness analysis
  - Disease burden analysis
  - Return on investment

	Valuation of costs		Valuation of outcomes
Cost of Illness	$	vs.	None
Cost Minimization	$	vs.	Assume same
Cost Effectiveness	$	÷	Natural units
Cost Utility	$	÷	Utiles (e.g., QALYs)
Cost Benefit	$	÷ or -	$

What do we mean by costs?

- Costs estimate the resources used in the production of a good or service
- Opportunity cost: the value of the best forgone option
- Charged amount: “price” or what the provider asks for
- Reimbursed amount: “allowable charge” is what the insurer will pay

Cost = Opportunity Cost

- Resources are scarce relative to needs
- Use of resources in one way prevents use in other ways
- Opportunity cost of intervention is best measured by health benefits (life years saved, quality adjusted life years (QALYs) gained) that could have been achieved had money been spent on next best alternative intervention or healthcare program

Unit Costs to Approximate Opportunity Costs

- Resources used in economic evaluations should be valued at opportunity cost
- Doing this is difficult (especially in health care, where there is no perfect market)
- Unit costs tend to be used instead, based on the costs of the various inputs.

Shadow Prices for Indirect Costs

- Valuation of resources for which no market exists, such as informal care, or patient time costs, requires methods to derive what economists call “shadow prices”—the true social value (or opportunity cost) of non-marketed resources, such as time and informal care
- Opportunity cost of time for working age adults is the wage they are, or could be making, in paid work

Costs are differentiated from…

- Health expenditures which refers to the amount of money paid for services
- Charges or fees, which refers to the amount charged, regardless of cost

3. Opportunity cost refers to:

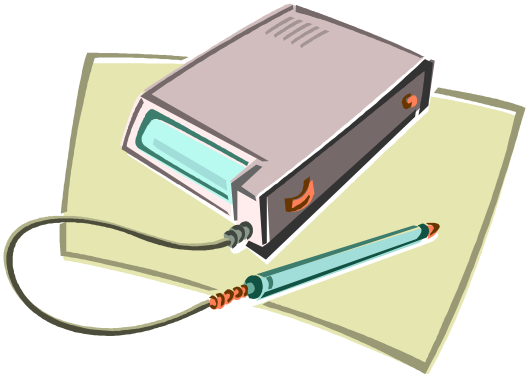
A. Amount a patient is willing to pay for a good or service
B. Amount that a hospital bills for a service
C. Value of the best forgone option
D. Cost that a monopoly charges for a product

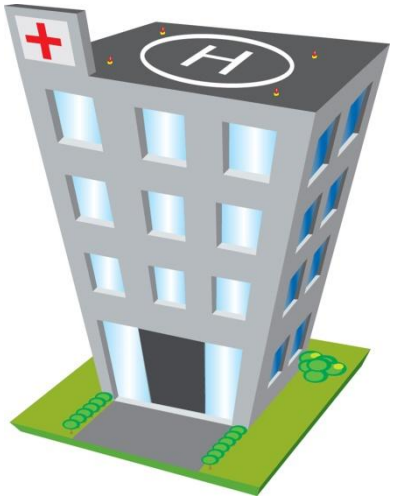
Review question

Type of costs

- Type of costs
  - Direct
    - Medical
    - Non-medical
  - Indirect
  - Intangible

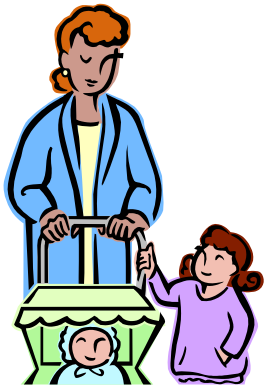
Direct medical costs





Example:
For chemotherapy
Chemo drugs
Other drugs
Intravenous supplies
Laboratory costs
Clinic costs
Physician visits

Direct nonmedical costs



Example:
Travel to visits
Babysitting

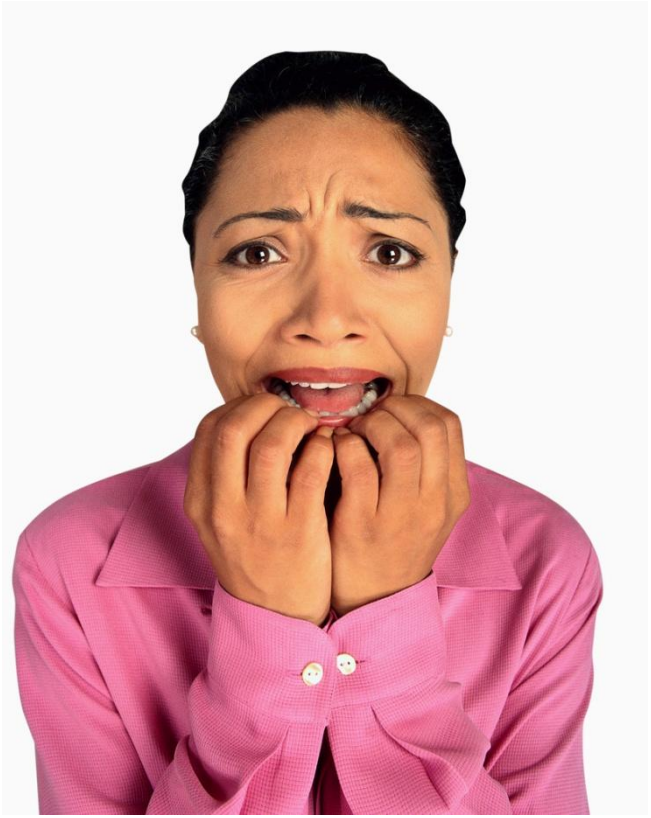
Indirect costs (or benefits)

Value of lost productivity of patients & unpaid caregiver (absenteeism and presenteeism)

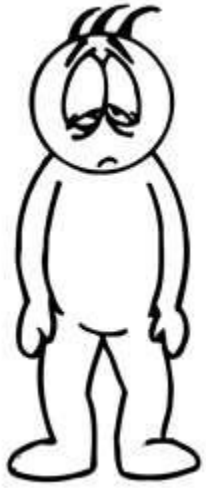
- Illness
- Disability
- Mortality

Intangible costs

Pain and suffering



Fatigue



Anxiety

What type of cost is this?

Patient pays for parking

A. Direct Medical
B. Direct non-medical
C. Indirect
D. Intangible

What type of cost is this?

Patient receives flu shot by pharmacist

A. Direct Medical
B. Direct non-medical
C. Indirect
D. Intangible

What type of cost is this?

A patient previously taking oral diabetic medication is anxious about administering an insulin shot

A. Direct Medical
B. Direct non-medical
C. Indirect
D. Intangible

4. Study Perspective

- Standpoint from which costs and outcomes are realized, e.g. society, third-party payer, hospital, or patient.
- Societal prospective recommended, identify all costs and all outcomes accordingly.
- But "society" may not be decision maker
- May want to take perspective of ministry of health, third-party payer, hospital manager, patient, etc.

Average vs Marginal/incremental costs

- If deciding between Medication A and Medication B, a provider would want to know the added cost and the added benefit of B vs A
- If added benefits of B outweigh added costs, provider might choose B
- Changes in cost = marginal or incremental cost
- Marginal related to an additional unit
- Incremental relates to a comparison between treatments
- Some use terms interchangeably

Incremental vs average costs

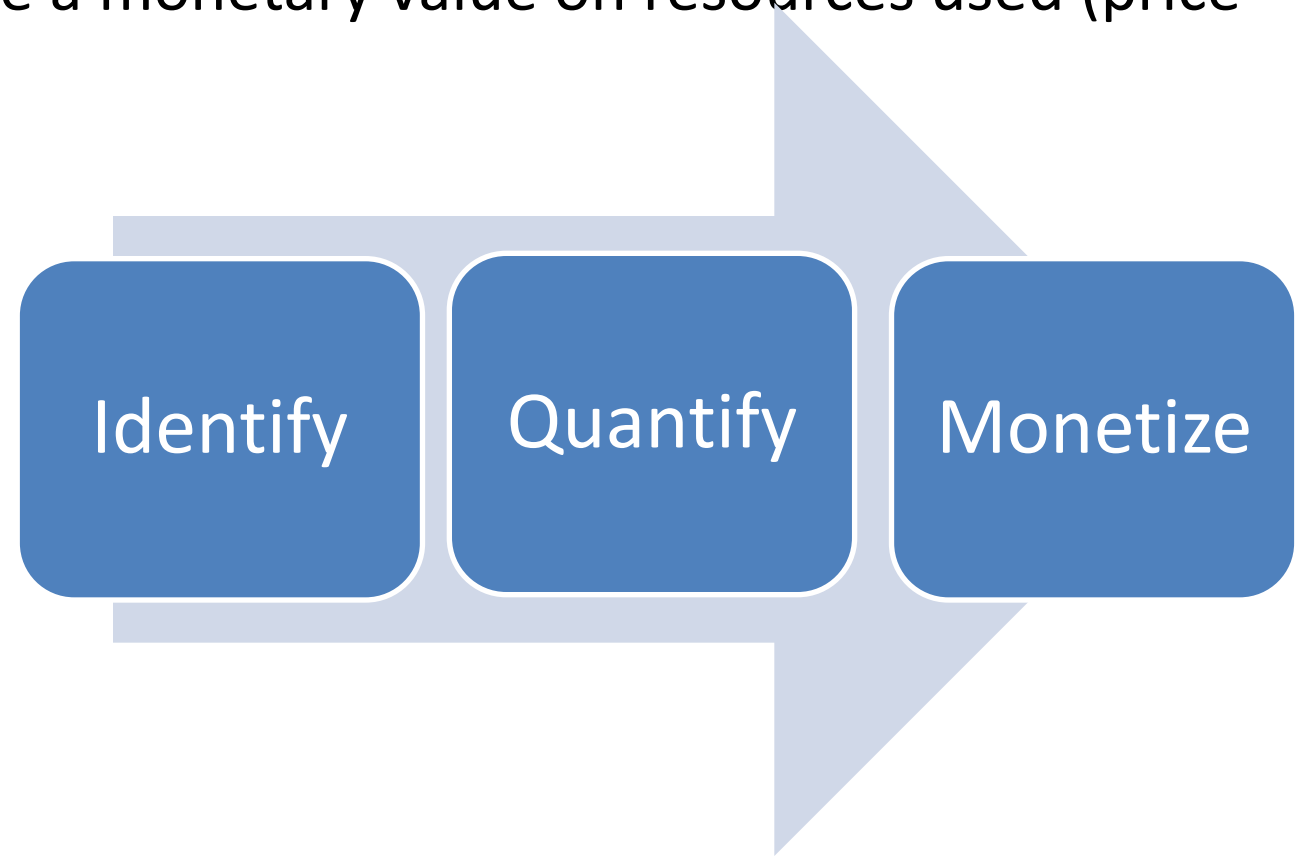
- the incremental rather than average cost effectiveness ratio should be estimated. The average cost per benefit (calculated by dividing the total cost of an intervention by the total benefits) may be less appropriate than the incremental ratio (derived by dividing the additional (incremental) costs by the additional (incremental) benefits).A recent study showed that the incremental cost effectiveness ratio for maternal age screening was 27% higher than the average ratio and concluded that the failure to consider incremental ratios could mislead decision markers about the opportunity cost of screening in Down's syndrome.
- Torgerson DJ, Spencer A. Marginal costs and benefits. BMJ. 1996;307:726–728.

Micro-costing and Gross Costing

- Micro costs: costs that are components of larger cost groups (e.g. an IV bag, pillow, gallon of gas)
- Gross costs: aggregated costs from an electronic dataset or medical literature
- Gross costing is easier as it relies on aggregated data from a single source but may miss important costs

Steps in Microcosting

- Identify all relevant resources that will be consumed
- Quantify the resources used
- Place a monetary value on resources used (price * quantity)



Potential Sources of Economic Data

- Clinical trial forms/medical record abstraction
- Hospital bills
- Health system cost-accounting systems (e.g. HMOs)
- Administrative claims data (e.g. Medicare, Medstat)
- Patient/provider survey (e.g. MEPS)
- Cost scenario
- Time-motion study
- Engineering study

Adjusting for timing

- Adjusting for inflation
  - Use Consumer Price Index to put all costs in constant $
- Discounting future costs and benefits
  - Prefer to have benefits now and bear costs in the future – ‘time preference’
  - Rate of time preference is termed ‘discount rate
  - To allow for differential timing of costs (and benefits) between programs all future costs (and benefits) should be stated in terms of **their present value** using discount rate.
  - Thus, future costs given less weight than present costs.
- Annuitization of capital costs
  - Capital costs represent an investment at start-up in an asset which is used and depreciated over time.
  - Annualize the initial capital outlay over the useful life of asset.

Sensitivity analysis

- Process of **assessing the robustness** of an economic evaluation by considering the effects of uncertainty.

- Consists in:
  - Identifying the (uncertain) variables.
  - Specifying the plausible range over which they should vary.
  - Recalculating results, usually based on:
    - One-way analysis
    - Multi-way analysis
    - Extreme scenario analysis
    - Threshold analysis.

Examining Heterogeneity

- Do the findings hold for subgroups of interest?

QUESTIONS?

EVALUATION
(Please take a few minutes to participate)

1. The objectives of the lecture were clearly stated

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree

2. The instructor fulfilled the objectives of the lecture.

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree

3. The instructor demonstrated knowledge of lecture content.

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree

4. The instructor communicated effectively.

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree

5. Global appraisal: Considering everything how would you rate this lecture?

a. Poor

b. Fair

c. Average

d. Good

e. Excellent

6. About you: What is your affiliation?

a. UH – JABSOM

b. UH Manoa

c. UHH – College of Pharmacy

d. Community

e. Other

7. What is your current status?

a. Master's level student

b. Doctoral student

c. Post-doctoral

d. Faculty

e. Other

8. Any suggestions for future lectures?

Please type in the text box and we will gather the information from there

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MAHALO FOR YOUR PARTICIPATION

Slides and Recordings will be Posted

- Center for Native and Pacific Health Disparities Research

http://www3.jabsom.hawaii.edu/native/

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