

Assessment of Costs in Health Care

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Learning objectives

- To identify, measure, and value the types of costs used in economic evaluation
- Define different types of health related costs
- Understand how costs can be estimated
- Understand the different types of costs
- To provide an example calculation

Key points from the previous lecture

- There are **limited resources** and thus health systems **can not afford** all health care interventions
- Health economics can aid decision making
- PE is comparative, weighing the costs and benefits

Introduction

- Economic evaluations are tools that health economists use to assess the cost-effectiveness of health care interventions.
- An economic evaluation is about comparing the cost and outcome of alternative treatments
- They consist of two components:
 - inputs (costs)
 - outputs (benefits)

Assessing health interventions/services

- Input

output

**Health
services/interventions**

- Costs

Consequences

- **Space**
- **Computers & equipment's**
- **Time of health care providers**

**e.g. employing a
clinical pharmacist**



- **Prevent medication errors**
- **Prevents readmission and ED visits**
- **Shorten length of hospital stay**
- **Better quality of life**

Costing Analysis

The cost analysis involves identifying, measuring, and valuing resources.

- **Identify:** What are the resource use categories needed to be estimated (Based on the perspective)
- **Measure:** How much of each resource is required (How to estimate these resource categories will be based on the data source available)
- **Value:** to attach a unit costs to each resource categories to estimate the total cost

Total costs

- Total costs represent resource use quantity consumed multiplied by its unit cost
- Unit costs are the price of each unit of resource.
 - i.e. cost of medication pack such as Tamoxifen
 - i.e. cost of one surgical procedure

Try this

- Determine the cost associated with the pharmacist time providing patient discharge education services?.
- Knowing that
 - The pharmacist spent on average 15 min per patient
 - The cost of pharmacist time per hour is 25 JDs

Answer: $15 * 25/60 = 6.25$ JD per patient

Examples of Unit cost

- Pharmacist time (25 JD per hour)
- First year resident (35 JD per hour)
- Dietary Specialist time (20 JD per hour)
- Hospital bed (216 JD per day stay)
- Medicine (10 JD per tablet, 25 JD per vial, 15 per 50 ml bottle)
- Operation room (500 JD per hour)

- Total cost: cost of producing a particular quantity of output.
 - 200 JDs to produce 1000 plastic bottle
 - 500 JDs to prevent 12 cases of pneumonia
 - 1000 JDs to detect 10 cases of early stage breast cancer
- **Total cost of production = Fixed costs + variable costs**
- It is necessary to know which costs are fixed and which are variable before you can start to work out the true production costs of a product, or how much it costs to deliver a service.

Direct costs

Direct costs are the cost associated directly with the health care intervention and it include medical and non-medical costs

Direct medical costs:

Costs incurred by the health service and it include

- ❑ **Fixed costs:** Incurred whether patients are treated or not
- **Capital cost:** Cost associated with setup the service including building an operating room or purchasing an equipment
- **Overhead costs:** Cost associated with running the service including light, heat, or water supply
- Fixed costs which do not vary with the quantity of output in the short run (about 1 year). However, it varies with time, rather than quantity

- ❑ **Variable costs:** Cost associated with treating patients and it varies with the level of output, i.e. number of patients treated . E.g. drug, tests, disposable equipment

Check your understanding

- You are the production manager in a Jordanian manufacturer. You ought to propose to JDFA a reasonable price for a generic paracetamol syrup you are producing.
- The costs are:
 - 1 Ton of Paracetamol powder = 200 JDs to produce 2000 bottle
 - 1 tank of water = 50 JDs
 - 2000 glass bottle = 20 JDs
 - Production line (include machines) = 300 JDs

- 1. Which of these variable or fixed costs?**
- 2. What is the total production cost?**
- 3. What would be a reasonable price to propose?**

Answers

- Production line is fixed, other are variable costs
- Total production cost= 570 JDs
- Cost per bottle = $570/2000 = .28$ JD



The selling price would be the above plus profit.

Direct costs

Direct non-medical costs:

Cost incurred by the patient itself
patients' out-of-pocket expenses (e.g. travelling costs
from and to hospital)

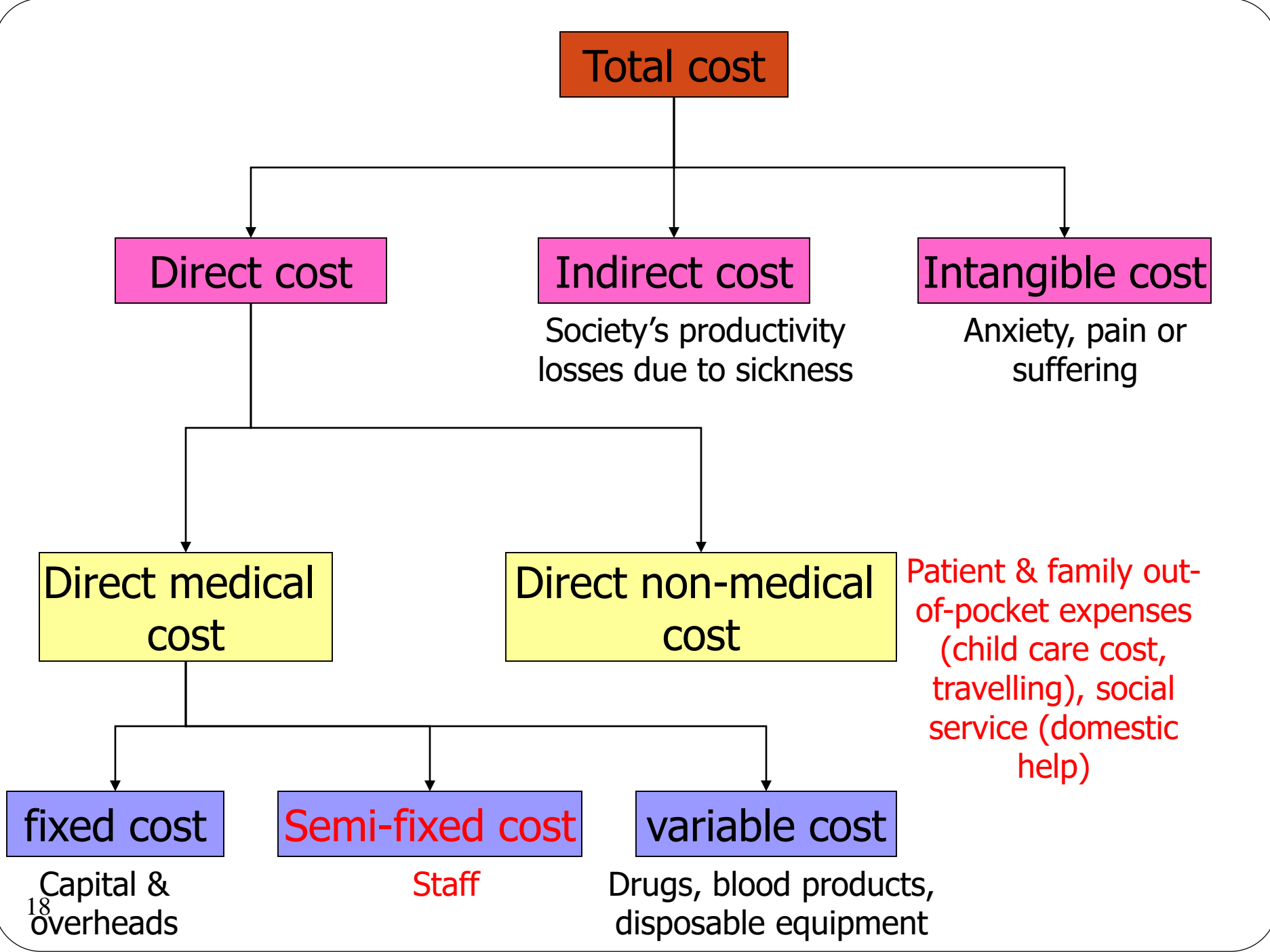
Indirect costs

- Incurred by the reduced productivity of a patient, and their family, resulting from illness, death or treatment.
 - time off work due to sick leave
 - early retirement
 - reduced productivity at work
- Morbidity costs: that are incurred from missing work i.e. lost productivity
- Mortality costs: that are incurred due to premature death
- The indirect cost has its great impact if the disease affecting the working aging group

Intangible costs

Cost resulted from anxiety, pain or suffering from an illness or from a treatment.

Difficult or “impossible” to attach a monetary value but it might be captured in the QoL



Think of the Costs associated with prescribing a Medicine

- Acquisition cost (direct cost)
- Transportation cost (direct non-medical cost)
- Supply management cost (i.e., storage facility cost) (direct fixed cost)
- Cost of supplies and equipment to administer medicines, such as syringes and needles (direct variable cost)
- Personnel costs to prepare and administer such as physicians, pharmacists, and nurses
- Other direct costs (e.g., ADRs, hospital room charges, laboratory fees)

Opportunity costs

- Opportunity costs reflect the fact that choices have to be made between interventions because of the scarcity of resources.
- It can be used to explain the consequences of choosing between two alternatives.

e.g. 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;** the next best alternative use of the resources.

- We need to be sure that spending money on the new therapy will buy more benefit than spending that money in some other part of the health care system

Example

- Two possible interventions: a cancer screening programme (intervention A) and the next best alternative, a smoking cessation programme (intervention B).
- Only one of these interventions can be funded within the available budget.
- The opportunity cost of funding A can be thought as the benefits that would have been gained through the smoking cessation programme.

- Opportunity costs: the value of the forgone benefits because the resource is not available for its best alternative use
 - i.e. money spent on one resource that can't be spent for other purposes; the value of the next best use that is forgone
 - If a resource is used to purchase a programme or treatment, then the opportunity to use it for another purchase is lost

Opportunity costs

- We should be less concerned with how much a health care intervention costs, but rather with what other benefits we are giving up by using the money in that way.
- Opportunity costs is not always an actual cost but represent the value forgone or saved as a result of selecting once service/intervention

Incremental cost:

- Difference in overall costs between running a service and not running it or comparing different health care intervention or programme.
- This includes comparing the difference in fixed and variable costs between different health care programme

e.g.

- Additional costs of spending a week in Canada rather than staying home
- The additional administration cost for cartridge vs. penfill form of a medicine (assuming that the fixed and other variable costs are similar between both forms)

Average cost

An **average cost**: total cost of therapy divided by the total quantity of treatment units provided

marginal costs

- A **marginal cost**: Cost of treating one more patients by carrying out one more intervention or one extra test (in case of screening).
- **Most commonly include the variable costs. However, some fixed cost may incurred if the level of output exceed the capacity**
- The change in total costs resulting from a marginal change in activity.
- The cost of producing one extra unit of activity, e.g. one more test; treating on more patient. Can vary markedly from the average cost

Average vs. marginal costs.

No. patients	Total cost (£)	Average cost (£)	Marginal cost (£)
10	4000	400	0
20	5000	250	100
30	6000	200	100
40	6800	170	80
50	7400	??	??

Answers: 148 60

Example calculation

Pharmacy Based Cholesterol Screening Service

Fixed costs:

renovation of screening area:	£5000
screening machine	£1200
training costs	£1500



Variable costs:

pharmacist's time screening	£2 per patient
Reagents	£0.50 per patient
disposable equipment	£0.50 per patient

Example calculation

- What are the fixed costs for setting up the screening service? £7,700
- What are the variable costs for screening 1000 patients over a year?
 $£3 * 1000 = £3000$
- What are the total costs to the pharmacist of setting up and running the service for one year (assuming 1000 patients are screened)?
 $£7,700 + £3000 = £10,700$



Example calculation cont.

- What is the average cost of screening a patient over this first year? $10,700/1000 = \text{£}10.70$
- What is the marginal cost of screening the 1001th patient? $\text{£}3$



Measuring the Benefits of Health

- Benefits, outcomes and consequences refer to the effect on the patient, not the effect on people providing the service.
- The principal outcome categories used in economic evaluation are:
 - effectiveness
 - quality of life
 - Utility
 - expressing benefits as monetary values (Willing to pay)

Keep this in your mind for next time

- Costing methods are common to **all types of economic evaluations**
- However, the range of costs is determined by the **perspective** of the analysis