INDIRECT COSTS

Indirect costs are incurred by the **reduced productivity** of a patient and their family, resulting from illness, death or treatment.

They may include also

- *time off work*
- *time spent going to healthcare providers*
- *time spent caring for the patient by relatives*
- *time forgone from leisure*

INDIRECT COSTS

Only the following indirect costs can be calculated reliably from data:

- Time off work due to sick leave
- Early retirement
- Reduced productivity at work

INDIRECT COSTS

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 carrying out one more intervention or expanding a program or service (e.g. increasing the length of stay in hospital by one day).

OPPORTUNITY COSTS

Represent the economic benefit forgone when using one therapy instead of the next best alternative therapy.

Therefore, if a resource has been used to purchase a program or treatment alternative, then the opportunity to use it for another purpose is lost.

In other words, 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.

OPPORTUNITY COSTS

Consider, for example, two possible interventions:

intervention A	intervention B
Cancer screening program	Smoking cessation program

If only one of these interventions can be funded then the opportunity cost of funding intervention A can be thought of as the number of life years that would have been gained through the smoking cessation program.

OPPORTUNITY COSTS

If, for example, you spend time and money going to a movie, you cannot spend that time at home reading a book, and you can't spend the money on something else.

If your next-best alternative to seeing the movie is reading the book,

- then the opportunity cost of seeing the movie
- is the money spent plus the pleasure you forgo by not reading the book....

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.

HOW ARE COSTS VALUED?

The two ways of collecting costs are either '**top down**' or '**bottom up**' (also called **micro costing**).

Top-down studies use the total budget to produce average costs per patient. This method is the quicker one, but assumes that all patients have the same diagnosis, severity of illness and treatment.

Bottom-up studies measure resource use by individual patients and so are able to detect treatment differences between patients. This method produces much better quality costs, but can be time-consuming and expensive

WHEN TO STOP COLLECTING COSTS

It is important to carry on collecting information about resource use until it is clear that no more events are likely to occur related to the original intervention.

These events may be further interventions, such as treatment, or they can be side effects of the intervention, and consequences of failed treatment.

The study must carry on collecting cost information until all these events have stopped occurring.

WHEN TO STOP COLLECTING COSTS

This may be a month, a year, or longer, depending on the type of intervention or illness being treated.

The time when costs are no longer collected should coincide with when outcomes are also no longer going to be collected and is called the **time horizon**.

Often, trials do not continue with such a long-term follow-up period because of expense, and a shorter time horizon will be employed.

TIMING ADJUSTMENTS FOR COSTS: STANDARDIZATION OF COSTS

BRINGING PAST COSTS TO THE PRESENT

When costs are estimated from information collected for more than 1 year before the study, adjustment of costs is needed; this is also referred to as **standardization of costs**.

If retrospective data are used to assess resources used over a number of years back, these costs should be adjusted.

If you compared costs for patients who received treatment in 2000 with patients who received treatment in 2005, the comparison of resources used would not be a fair comparison because treatment costs tend to go up each year, so patients who received the same treatment in 2000 would have lower costs than those who received the treatment in 2005.

BRINGING PAST COSTS TO THE PRESENT

Adjustment of the 2000 costs to the amount they would have cost in 2005 is needed before a direct (fair) comparison can be made between these groups.

For example, if the objective of the study is to estimate the difference in the costs of chemotherapy regimens, information on the past use of these two treatments might be collected from a review of medical records.

If the retrospective review of these medical records dates back for more than 1 year, it may be necessary to standardize the cost of both medications by calculating the number of units (doses) used per case and multiplying this number by the current unit cost for each medication.

BRINGING PAST COSTS TO THE PRESENT

TABLE 2.2. EXAMPLE OF STANDARDIZATION: UNITS MULTIPLIED BY COSTS

Medical Resources Used to Treat Mild Infection	*Units of Each Resource*	*Cost per Unit in 2005 US Dollars*	*Total Cost in 2005 US Dollars*
Office visit	Two visits	$62.00	$124.00
Laboratory service to culture organism	One laboratory service	$53.00	$53.00
Antibiotic medication	28 capsules	$1.03	$28.84
TOTAL			$205.84

BRINGING PAST COSTS TO THE PRESENT

Another method used to standardize past costs is to multiply all of the costs from the year the data were collected by the medical inflation rate for that year.

Medical Consumer Price Index (CPI) inflation rates can be found at the Bureau of Labor Statistics' website (www.bls.gov) and have been between 4% - 5% each year since 2000.

BRINGING PAST COSTS TO THE PRESENT

TABLE 2.3. EXAMPLE OF STANDARDIZATION: USING MEDICAL CONSUMER PRICE INDEX (MCPI) INFLATION RATES

Medical Resources Used to Treat Mild Infection	*Cost Estimate for Resource*	*Year of Cost Estimate*	*Cost Adjusted to 2005 US Dollars*
Office visits	$115.00	2003	$125.46[a]
Laboratory service to culture organism	$50.00	2004	$52.25[b]
Antibiotic medication	$28.84	2005	$28.84
TOTAL			$206.55

Medical CPI for 2004 = 4.4 %; Medical CPI for 2005 = 4.5%

[a]*$115 x 1.044 [1 + MCPI 2004] x 1.045 [1 + MCPI for 2005]*

[b]*$50 x 1.045 [1 + MCPI for 2005]*

BRINGING FUTURE COSTS (BENEFITS) TO THE PRESENT: DISCOUNTING

BRINGING FUTURE COSTS (BENEFITS) TO THE PRESENT: DISCOUNTING

If costs are estimated based on dollars spent or saved in future years, another type of modification, called discounting, is needed.

There is a time-value associated with money.

People (and businesses) prefer to receive money today rather than at a later time.

Therefore money received today is worth more than the same amount of money received next year.

BRINGING FUTURE COSTS (BENEFITS) TO THE PRESENT: DISCOUNTING

Modifications for this time value are estimated using a discount rate.

From this parameter, the present value (**PV**) of future expenditures and savings can be calculated.

The **discount rate** generally accepted for health care interventions is between **3%** and **6%**.

BRINGING FUTURE COSTS (BENEFITS) TO THE PRESENT: DISCOUNTING

The discount factor is equal to $1/(1 + r)^t$

r is the discount rate

t is the number of years in the future that the cost or savings occur

EXAMPLE

For example, if the expenses of cancer treatment for the next 3 years are

$5,000 for year 1

$3,000 for year 2

$4,000 for year 3

Discounting should be used to determine total expenses in present value (PV) terms.

If one assumes that the expenses occur at the beginning of each year, then first year costs are not discounted.

EXAMPLE

TABLE 2.4. EXAMPLE OF DISCOUNTING: COSTS ASSESSED AT BEGINNING OF EACH YEAR*

Year Costs are Incurred	*Estimated Costs without Discounting*	*Calculation*	*Present Value*
Year 1	$5,000	$5,000/1	$5,000
Year 2	$3,000	$3,000/1.05	$2,857
Year 3	$4,000	$4,000/$(1.05)^2$	$3,628
Total	$12,000		$11,485

**Using a 5% discount rate.*

EXAMPLE

TABLE 2.5. EXAMPLE OF DISCOUNTING: COSTS ASSESSED AT END OF EACH YEAR*

Year Costs are Incurred	*Estimated Costs without Discounting*	*Calculation*	*Present Value*
Year 1	$5,000	$5,000/1.05	$4,762
Year 2	$3,000	$3,000/$(1.05)^2$	$2,721
Year 3	$4,000	$4,000/$(1.05)^3$	$3,455
Total	$12,000		$10,938

**Using a 5% discount rate.*

EXAMPLE

- **What are the total costs for a hip replacement?**

The total cost for the hip replacement operation is £5,000.

- **What are the total costs for drug treatment?**

The total cost for the drug treatment is £5,000.

- **What is the impact of discounting the costs?**

The costs for the hip replacement all occur in the first year (now). This means that they should not be discounted.

The costs for drug treatment occur over a 5-year period. This means that they must be adjusted for discounting.

EXAMPLE

In the analysis, **future costs** must be given **less weight** because they have a lower impact than an equivalent cost occurring now.

The further in the future the cost, in terms of years, the less weight they are given.

Using the above formula and discount rate of **3.5%** we can calculate the discount factor for each year.

EXAMPLE

$$D_0 = 1/(1 + 0.035)^0 = 1$$

$$D_1 = 1/(1 + 0.035)^1 = 0.966$$

$$D_2 = 1/(1 + 0.035)^2 = 0.934$$

$$D_3 = 1/(1 + 0.035)^3 = 0.902$$

$$D_4 = 1/(1 + 0.035)^4 = 0.871$$

EXAMPLE

Intervention	*Costs (£) arising during*					
	Year 0	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Total*
Hip replacement	5,000					5,000
Painkillers (discounted)	1,000	1,000 x 0.966 = 966	1,000 x 0.934 = 934	1,000 x 0.902 = 902	1,000 x 0.871 = 871	4,673

EXAMPLE

This example shows that when discounting is taken into account, drug treatment over 5 years period is cheaper than hip replacement.

Therefore, future costs have to be discounted in any economic evaluation.

Studies will generally discount costs if the intervention lasts more than 1 year.

COST OF 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

COST OF ILLNESS

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.

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.


PLEASE
STOP


PLEASE...