

Health Care Services

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What is Health Economics

- **Economics:** is the study of scarcity (shortage) and choice.
- **-Health economics :** Is concerned with the application of economic principles to the health care system.

Why are we concerned with health economics

- There is a continuous change in medical technology (surgical procedure, equipments)
- Life expectancy is increasing.
- New diseases, such as AIDS.
- Reemergence of old diseases like malaria and TB.
- Resistance to antibiotics.
- Health care expenses are on the rise.
- Demand for health care is infinite
- Choices are necessary.
- Cost and benefits must be compared

Health care is different from other goods and services:

Because:

- We do not know when we are going to get ill, so it is unpredictable in nature.
- Consumers do not have perfect knowledge of their own health status and how to improve their health.
- Buyers cannot test the product before consuming it so relies on doctors knowledge.

The Public Health Policy Process



Two Main Types of Evaluation

- Studies of Process
- Studies of Outcome

Process Evaluation

- Process evaluation describes the program and the general environment in which it operates
 - ✓ Which services are being offered?
 - ✓ Who delivers the services?
 - ✓ Who are the persons served?

Studies of process

- Decide what the components of good care are
- Determine to what extent the care provided meet the established criteria

Example

- Criteria: Children should go for dental check ups every six months
- Evaluation: Determine what percentage of children have had their teeth checked in the last six months
- Limitations:
 1. Monitoring children's oral health doesn't ensure that the children have good oral health
 2. Criteria may change over time

Studies of Outcome

- **Outcome** denotes whether or not a patient benefits from the dental care provided
- Outcome measures include:
 - ✓ pain relief
 - ✓ Patient satisfaction
 - ✓ Quality of life

Outcome Evaluation

- Did the program meet its outcome objectives?
- Did the program make a difference?
- What change occurred in the population affected by the program?

Aspects of Care

- Efficacy
- Effectiveness
- Efficiency
- Equity
- Accessibility
- Acceptability
- Appropriateness

Efficacy

- "Efficacy is the extent to which a specific intervention, procedure, or service produces a beneficial result *under ideal conditions*. Ideally the determination of efficacy is based on the results of a Randomized Clinical Trial."

Example

- A new type of implant is tested in a Randomized Clinical Trial among a group of consenting subjects. Efficacy is a measure in a situation in which all conditions are controlled to maximize the effect of the implant.

Effectiveness

- "Effectiveness is a measure of the extent to which a specific intervention, procedure, or service, when deployed in the field *in routine circumstances*, does what it is intended to do for a specified population. A measure of the extent to which a health care intervention fulfills its objectives."

Example

- When the implant is offered in a "real-life" situation, tested in a community, many individuals may not want to have the surgical procedure , was it effective?
- Although under controlled conditions, when compliance was ensured, the treatment was shown to be efficacious.

Efficiency

- Efficiency involves the assessment of the costs of services . The most efficient service will produce the desired outcome at the lowest cost.
- The process of making the best use of scarce resources.
- If an intervention is shown to be not effective, there is no point looking at efficiency?
- If an intervention is shown to be effective, what is the cost-benefit ratio?

Efficiency (cont'd)

Categories of Cost

- Direct Cost: includes organizing and operating costs borne by the health care sector, such as physicians and nurses salaries, non-medical costs, incurred by patients or their families during treatment, such as transportation.
- Indirect Cost: in production due to absence from work, or reduced salaries result in less productivity.
- Intangible (indescribable) costs: psychic costs associated with treatment (pain due to surgery), disability, etc..

Equity

- Equity involves assessing differences in the needs of those receiving care, differences in their treatment or differences in their outcomes to ensure that services are fairly distributed. Thus people from minority groups or those of low socio-economic status, despite a similar or often higher prevalence of disease, may have lower rates of treatment.
- Even if treated on an equitable basis, outcomes may still be worse. They are often remedied by targeting of services to the disadvantaged group.

Access

- Access involves the assessment of barriers to care in order to ensure that people obtain the treatment they need when they need it.
- Barriers include:
 - * Cost
 - * Waiting lists
 - * Location of service

Acceptability

- Some services may not be used because of the way they are provided. Issues such as privacy, the gender or attitude of staff, and the setting of the service can influence the utilization of health services.

Appropriateness

- Any assessment of health services must measure whether the needs of the population are met.
- This requires constant assessment of the need.
- Why do you think our school health program is successful??

Aspects of Care

- Efficacy: *does it work?*
- Effectiveness: *how well does it work?*
- Efficiency: *is this the best way of doing it?*
- Equity: *is it fair?*
- Accessibility: *can everyone use the services?*
- Acceptability: *is it what they want?*
- Appropriateness: *is it what they need?*

Outcome Evaluation

- Did the program meet its outcome objectives?
- Did the program make a difference?
- What change occurred in the population affected by the program?

Measures of outcome

- Possible indicators of effectiveness in evaluating a Fissure sealant program:
 1. Number (or proportion) of children who receive fissure sealants.
 2. Number (or proportion) of children at (high) risk who received sealants
 3. Number (or proportion) of children who received sealants and do not develop dental caries

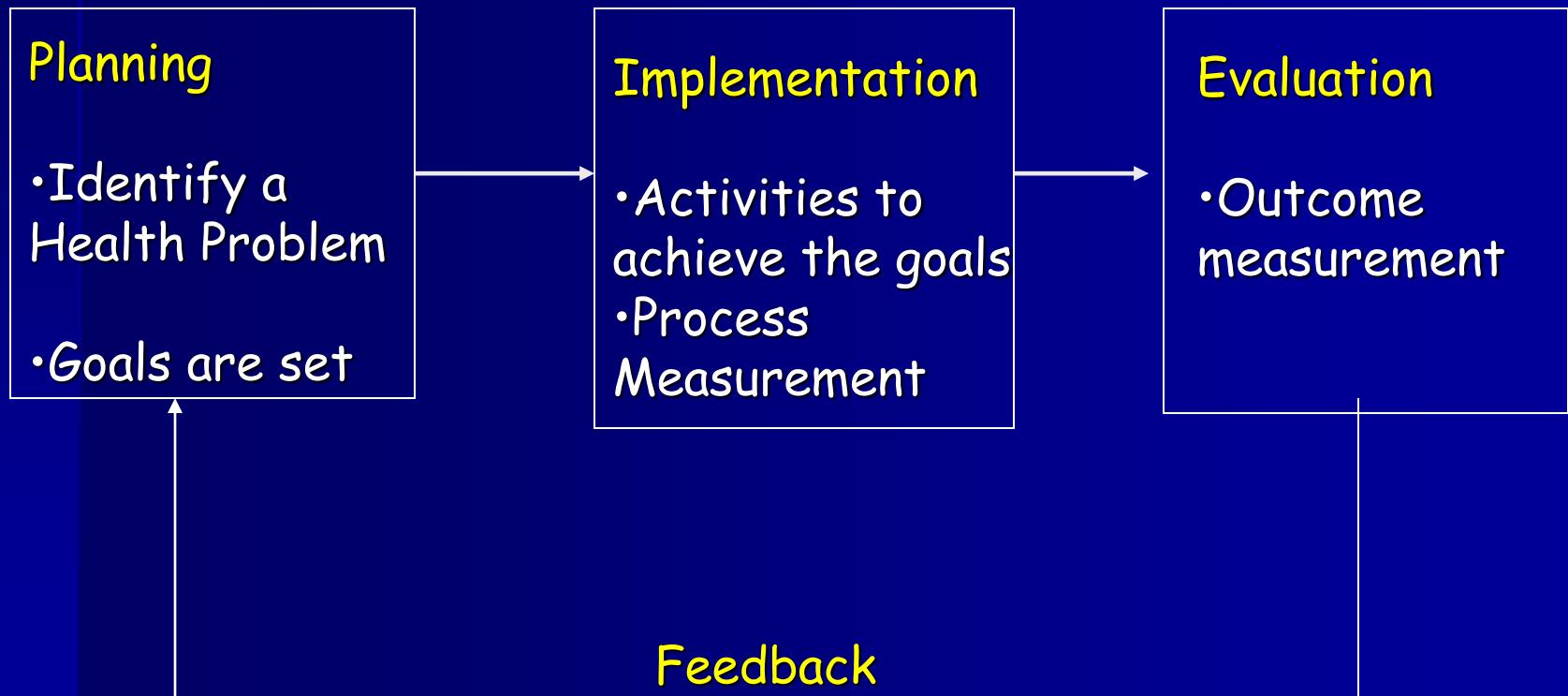
Characteristics of a measure of outcome

1. Quantifiable
2. Easy to define and diagnose
3. Can be standardized
4. The population served (and the comparison population) must be at risk for the same condition for which the intervention is being evaluated.

Possible measures for assessing the effectiveness of a fluoride tablet program

1. Number of children receiving it
2. Number of children who are caries free
3. Number of children with tooth decay

Evaluation Process



Outcomes Research

- **Outcomes research** denotes studies comparing the effects of two or more health care interventions or modalities- such as treatments, forms of health care organization or type and extent of insurance coverage, on health or economic outcomes.

Health Indicators:

- Morbidity and mortality
- Quality of life
- Patients' perceptions of their health status
- Patient satisfaction

Economic Indicators:

- Direct or indirect costs
- Hospitalization rates
- Lost days of work
- Days of restricted activity

Health Economics

Lecture 2

- Know the difference between the different health economic analysis
- Be able to assess and calculate Quality Adjusted Life Years

Techniques of health economic analysis:

1. Cost minimization analysis
2. Cost effectiveness analysis
3. Cost utility analysis
4. Cost benefit analysis

Cost-minimization analysis

- In which the outcomes are known or assumed to be identical and only the costs are compared. These conditions are rarely met, so the approach is rarely useful to the health-policymaker.

Cost-effectiveness analysis (CEA)

- CEA is a method to evaluate outcomes and costs of interventions designed to improve health. It involves the comparison of two therapies or more, and is usually expressed as a ratio (CE ratio). This ratio is commonly reported as dollars (or other currency) per health effect.
- The outcomes are expressed in "natural" units, e.g., life-years saved or cases of a disease prevented.

Cost-effectiveness analysis: Why ?

1. There's not enough money to fund every possible treatment.
2. We also want to get the most for the money, so we want to fund treatments that result in the best medical outcomes per dirham.

So to allocate resources adequately, we need to conduct this analysis.

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Actually, a long, healthy life costs more

Treating obesity and smoking is cheaper than keeping folks fit, study says

The Associated Press

Updated 7:00 p.m. CT, Mon., Feb. 4, 2008

LONDON - Preventing obesity and smoking can save lives, but it doesn't save money, researchers reported Monday.

It costs more to care for healthy people who live years longer, according to a Dutch study that counters the common perception that preventing obesity would save governments millions of dollars.

"It was a small surprise," said Pieter van Baal, an economist at the Netherlands' National Institute for Public Health and the Environment, who led the study. "But it also makes sense. If you live longer, then you cost the health system more."

In a paper published online Monday in the Public Library of Science Medicine journal, Dutch researchers found that the health costs of thin and healthy people in adulthood are more expensive than those of either fat people or smokers.

Van Baal and colleagues created a model to simulate lifetime health costs for three groups of 1,000 people: the "healthy-living" group (thin and non-smoking), obese people, and smokers. The model relied on "cost of illness" data and disease prevalence in the Netherlands in 2003.

The researchers found that from age 20 to 56, obese people racked up the most expensive health costs. But because both the smokers and the obese people died sooner than the healthy group, it cost less to treat them in the long run.

On average, healthy people lived 84 years. Smokers lived about 77 years, and obese people lived about 80 years. Smokers and obese people tended to have more heart disease than the healthy people. Cancer incidence, except for lung cancer, was the same in all three groups. Obese people had the most diabetes, and healthy people had the most strokes. Ultimately, the thin and healthy group cost the most, about \$417,000, from age 20 on.

The cost of care for obese people was \$371,000, and for smokers, about \$326,000.

Obesity experts said that fighting the epidemic is about more than just saving money.

Cost-utility analysis

- In which the outcomes are expressed as quality adjusted life years (QALYs) gained.
- This allows comparison of programs that have widely differing outcomes, without converting outcomes into monetary equivalents.

Possible Outcomes

1. Survival (adding years to life) screening for breast cancer=early detection and improve survival.
2. Quality of life (adding life to years) (although mastectomy and lumpectomy have equal survival rate, patient's quality of life is not the same.

- Outcomes from treatments or any other health-intervention have two basic components - the quantity and quality of life. Life expectancy has long been used, however, it only measures if people are dead or alive, without any consideration to quality.

Attempts to measure and value quality of life is a more recent innovation.

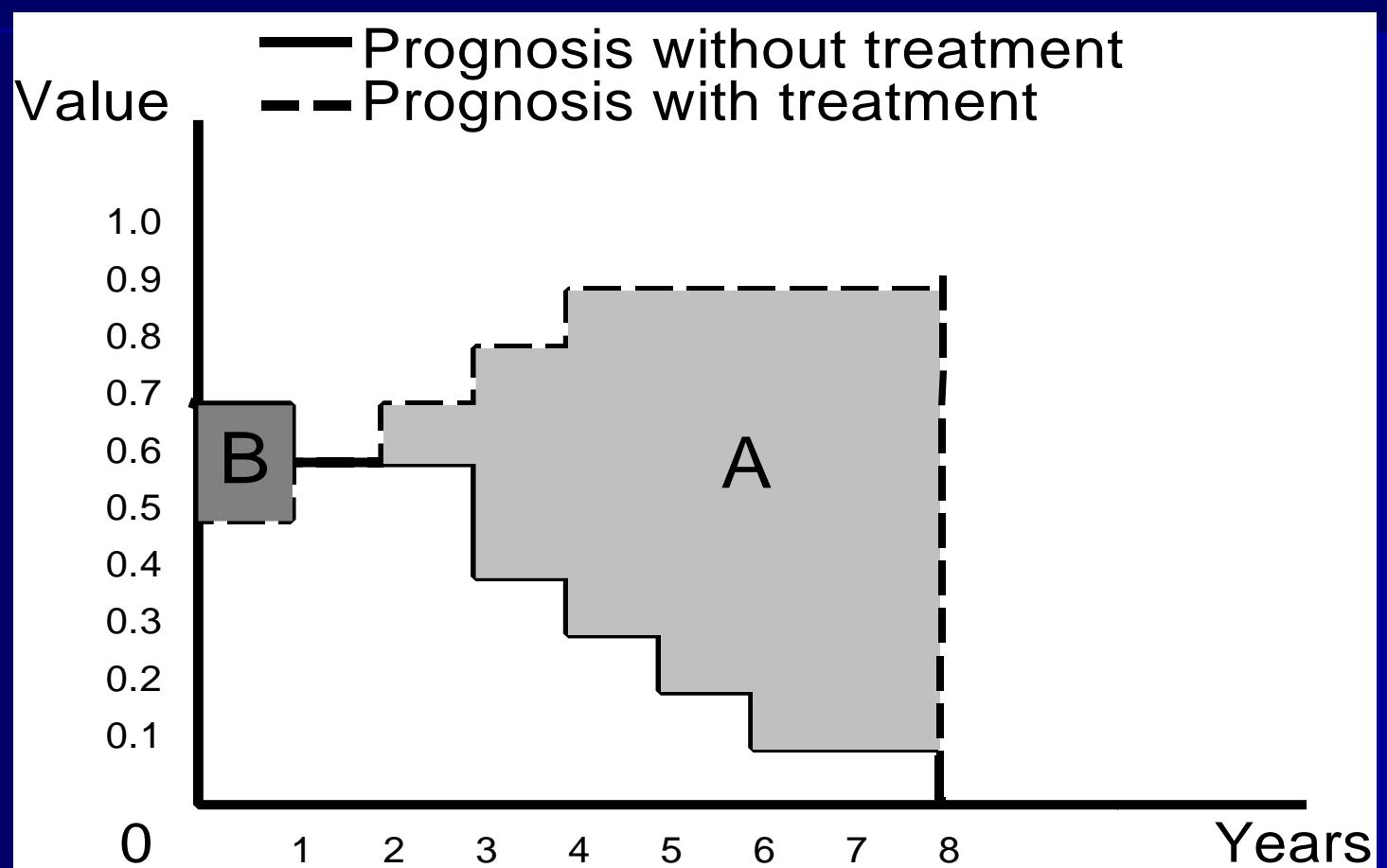
- If a person lives in perfect health for one year, that person will have 1 QALY.
- $(1 \text{ Year of Life} \times 1 \text{ Utility Value} = 1 \text{ QALY})$
- If a person lives in perfect health but only for half a year, that person will have 0.5 QALYs.
- $(0.5 \text{ Years of Life} \times 1 \text{ Utility Value} = 0.5 \text{ QALYs})$
- Conversely, if a person lives for 1 year in a situation with 0.5 utility (half of perfect health), that person will also have 0.5 QALYs.
- $(1 \text{ Year of Life} \times 0.5 \text{ Utility Value} = 0.5 \text{ QALYs})$

QALY (Continued)

In cost-effectiveness studies (or: health economic evaluations) the QALY is used to quantify the effectiveness of, for instance, a new medicine versus the current one. In other words, the current standard of care is taken as the baseline, and the QALYs gained from the new (improved) intervention are counted in addition.

The Quality Adjusted Life Year (QALY)

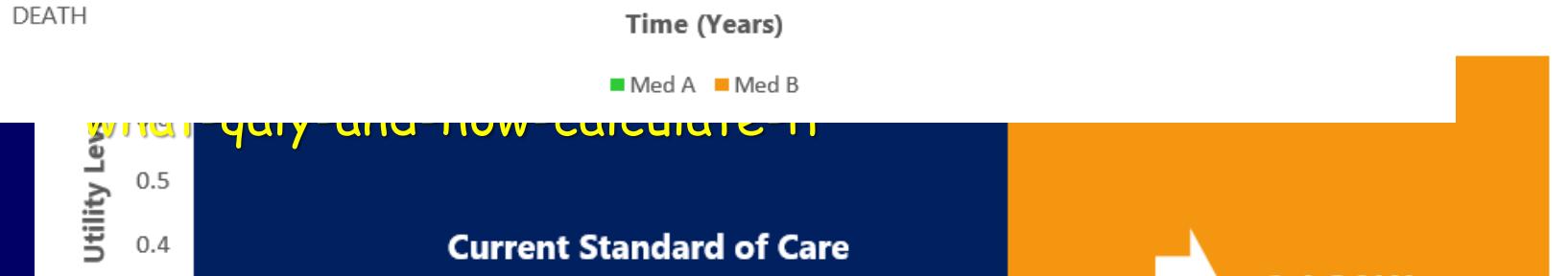
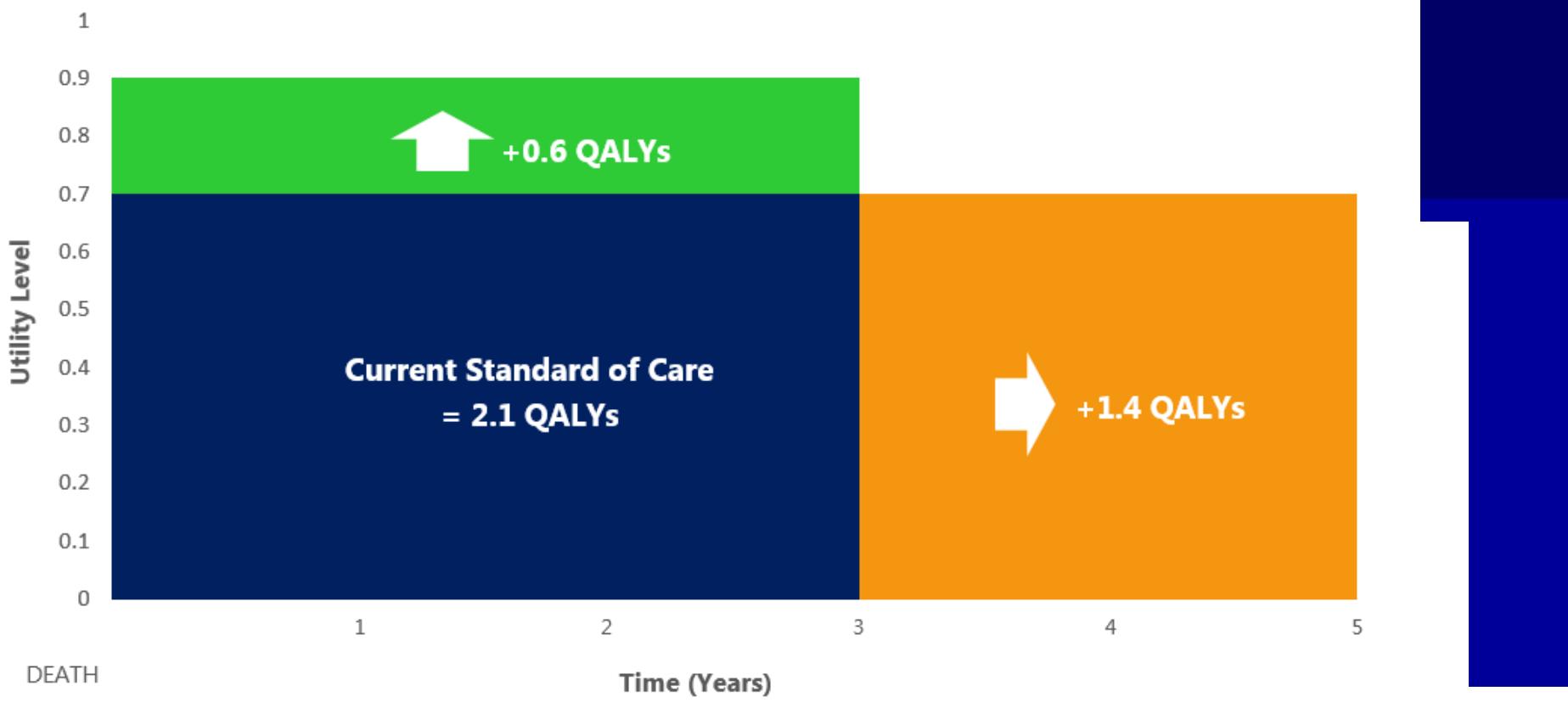
- QALY has been created to combine the quantity and quality of life. The basic idea of a QALY is straightforward. It takes one year of perfect health-life expectancy to be worth 1, but regards one year of less than perfect life expectancy as less than 1.
- QALYs provide an indication of the benefits gained from a variety of medical procedures in terms of quality of life and survival for the patient.



Source: University of Birmingham

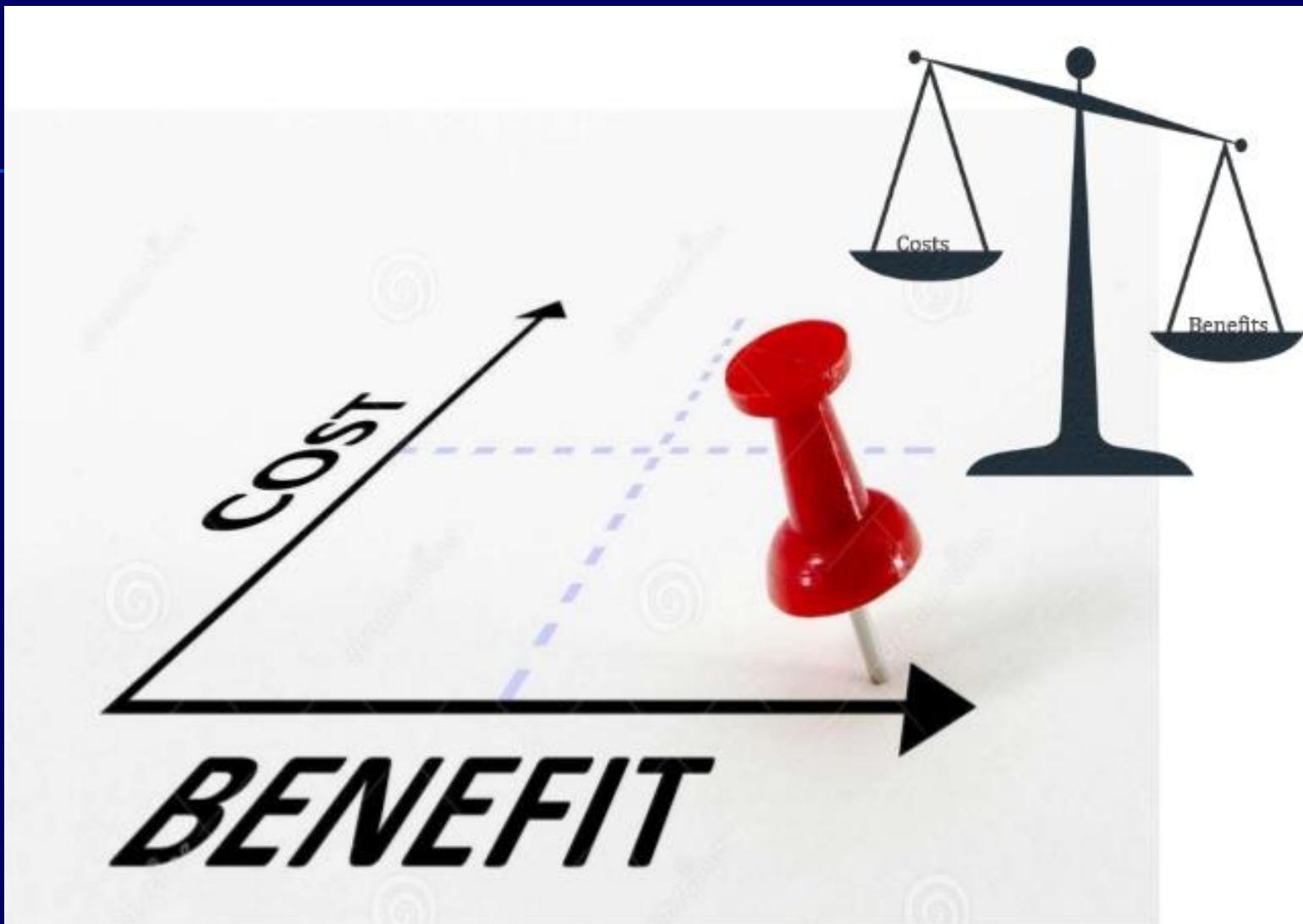
Example

- If a person lives for 3 years with a disease and the current standard of care for that disease means he/she lives with a utility level of 0.7, that person will have 2.1 QALYs.
 $(3 \text{ Years of Life} \times 0.7 \text{ Utility Value} = 2.1 \text{ QALYs})$
- If that person takes a new medicine (Med A) whereby his/her utility level increases to 0.9, that person will now have 2.7 QALYS. Therefore, the benefit of the new medicine will be counted as 0.6 QALYs as this is the increase over the current standard of care.
 $(3 \text{ Years of Life} \times 0.2 \text{ Additional Utility Level} = 0.6 \text{ QALYs})$
- Similarly, if a new medicine (Med B) prolongs the patient's life by 2 years, at a utility level of 0.7, the new medicine will provide the person with 1.4 additional QALYs.
 $(2 \text{ Years of Additional Life} \times 0.7 \text{ Utility Value} = 1.4 \text{ QALYs})$



Example

- We would like to fund treatments with the best cost-effectiveness ratios (Costs/Effectiveness).
- Accordingly programs are ranked and funding is allocated from most cost-effective to least.
- What if you have more than one program or treatment for the same condition, how can we decide which to choose?



Assume you have 4 programs, but only one can be implemented

Program	Cost (\$)	Effectiveness (QALY)	Ratio
A	4600	16.4	\$281
B	8600	17.1	\$503
C	10000	17.9	\$559
D	12600	17.7	\$712

Cost-benefit analysis

- In which all outcomes are converted to monetary equivalents. This has the advantage of enabling comparisons to be made across different types of programs.
- For example, cost-benefit analysis is used when evaluating the decision whether to build a new hospital or to provide better roads.
- So the main question asked in this type of evaluation is: *Do the economic benefits of providing a service outweigh the economic costs and is it worth doing at all?*

1. **benefit-cost ratio**, which is the total monetary cost of the benefit or outcomes, divided by the total monetary costs of obtaining them.
2. **Net rate of return**, which is total cost minus the total value of benefits.

Example

Program	Costs	Benefits	Net-benefit	B/C
A	100	200	100	2.0
B	90	60	-30	0.67
C	50	120	70	2.4
D	55	120	65	2.10

WE should exclude program B, because the ratio is less than 1.

If we rank the other three programs, then one can see that program C is first followed by D then A.

References and Required Reading: Cost–benefit, cost-effectiveness and cost–utility analyses of periodontitis prevention.
Braegger U et al, 2005.

Guidelines on Health Economic Evaluation
Consensus paper
April 2006
IPF Institut für
Pharmaökonomische
Forschung