MEASURING PATIENT OUTCOMES FOR USE IN ECONOMIC EVALUATIONS

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QUALITY-ADJUSTED LIFE YEARS

All the approaches above give **utility** measures that range from 0 to 1 where the higher the score, the better the health-related quality considered to be.

These utility measures are used to generate **quality adjusted life-years** (QALY).

QUALITY-ADJUSTED LIFE YEARS

A QALY combines survival periods (quantity of life) with health status valuations (quality of life) to provide a standard unit for measuring health gain.

One QALY is 1 year in perfect health.

One QALY could also be 2 years at half perfect health.

QUALITY-ADJUSTED LIFE YEARS

To determine QALYs, one multiplies the utility value associated with a given state of health by the years lived in that state.

A year of life lived in perfect health is worth 1 QALY

(1 year of life × 1 Utility value)

QUALITY-ADJUSTED LIFE YEARS

A year of life lived in a state of less than perfect health is worth less than 1 QALY; for example, 1 year of life lived in a situation with utility 0.5

(e.g. bedbound, 1 year × 0.5 Utility) is assigned 0.5 QALYs

Similarly, half a year lived in perfect health is equivalent to 0.5 QALYs

(0.5 years × 1 Utility)

Death is assigned a value of **0 QALYs**, and in some circumstances it is possible to accrue negative QALYs to reflect health states deemed "**worse than dead**."

QUALITY-ADJUSTED LIFE YEARS

A treatment that moves a patient utility from 0.5 to 0.75 produces the equivalents of incremental 0.25 QALY if it is maintained for 1 year.

(1 years × 0.25 Utility)

If applied to 4 individuals, and duration of the treatment effect is 1 year, the effect of the treatment would be equivalent to ***1 completely well-year life***.

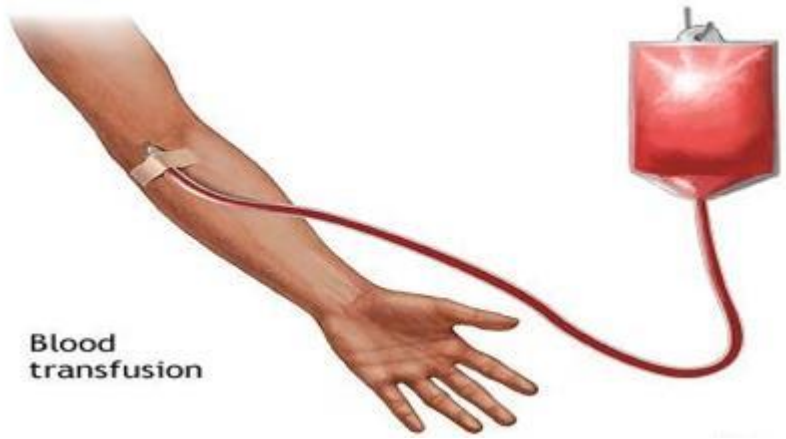
If you value health states using QALYs, you can compare different treatments.

QUALITY-ADJUSTED LIFE YEARS

This method would let you compare the health gain from hip replacements with those due to antidepressant treatment, even though the clinical indicators for these conditions are very different.

A THEORETICAL WORKED EXAMPLE USING QALYS

Utility data for the two alternatives available from the literature suggest that patients maintained on erythropoietin value their health states at a higher level than those maintained on blood transfusions.



A THEORETICAL WORKED EXAMPLE USING QALYS

In a study 100 patients stated their utility for a treatment period of 10 years.

The utility value for each year

(**valued from 0 to 1**)

on erythropoietin was 0.80

on blood transfusions was 0.62

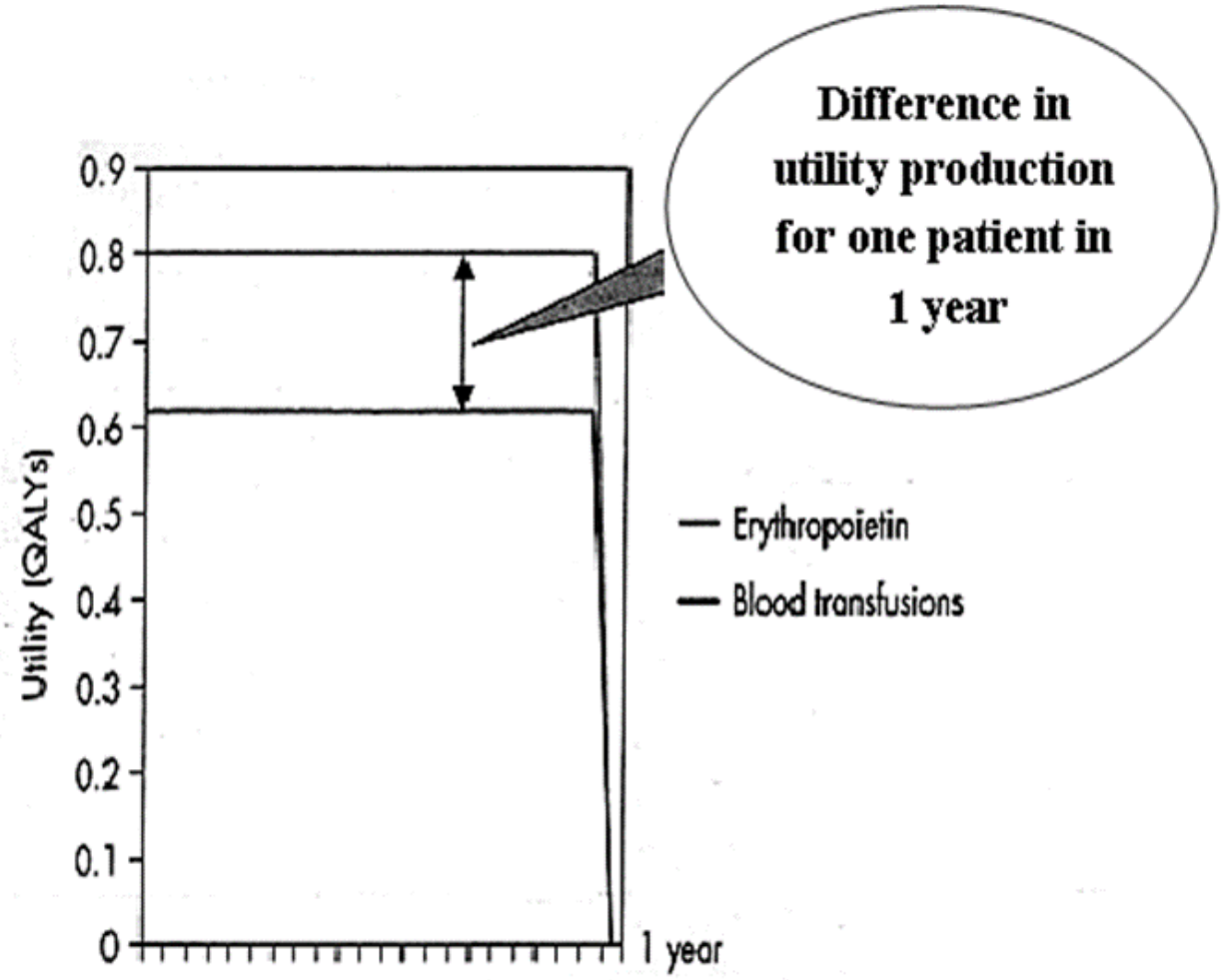


Figure 4.4 Illustration of QALYs produced by erythropoietin and blood transfusions

A THEORETICAL WORKED EXAMPLE USING QALYS

What is the difference in utility production of the two alternatives?

How many extra QALYs are produced by erythropoietin per year of treatment, for 1000 patients?

Incremental difference in utility = 0.80 - 0.62

= 0.18 QALYs per patient per annum

= 180 QALYs per 1000 patients per annum

WHOSE UTILITY VALUES SHOULD BE USED?

Utility values can be obtained from

- healthcare professionals
- patients
- general public

WHOSE UTILITY VALUES SHOULD BE USED?

There are advantages and disadvantages associated with each group.

Healthcare professionals are more informed about the health states and interventions but may provide a biased value owing to their continued exposure to that illness or intervention.

Healthcare professionals have been shown to assign lower ratings than patients or the general public.

WHOSE UTILITY VALUES SHOULD BE USED?

Patients are informed about the health states and interventions they have experienced.

They will not be informed about interventions they have not experienced.

Patients tend to attach **higher value health** states than do healthcare professionals and the general public.

WHOSE UTILITY VALUES SHOULD BE USED?

This may be because people in a health state gradually develop ways of dealing or coping with that health state, whereas the general public are less informed or are valuing their fear of experiencing that he state.

Sometimes the health state has to be valued by proxy, such as the health state of a newborn baby or a person with advanced Alzheimer's disease.

Therefore, it is important to remember proxy values may be lower than the patient's values would have.

EXPRESSING BENEFITS AS MONETARY VALUES

EXPRESSING BENEFITS AS MONETARY VALUES

Another method of measuring outcome is to convert these benefits to a monetary value.

The '**willingness to pay**' (WTP) method, elicits monetary values for items **not** typically traded in private markets, such as **health**.

WTP: is the use of survey to find the maximum a person is prepared to pay for a service that has been described using hypothetical (imaginary) scenario.

EXPRESSING BENEFITS AS MONETARY VALUES

In simple terms, this method seeks to elicit how much an individual would be willing to pay to avoid an illness or obtain the benefits of a treatment.

WTP is increasingly being applied to elicit **preferences** regarding the use of medicines, for example in hypertension, lipid-lowering, and depression.

EXPRESSING BENEFITS AS MONETARY VALUES

WTP has been used to elicit preferences for the avoidance of side effects with antidepressants, identifying those '**most troublesome**' to patients.

Blurred vision and tremor were the side effects considered most troublesome and were associated with the highest WTP values to avoid them.

EXAMPLE OF WILLINGNESS TO PAY

Imagine you have a headache. You can have medicine A or medicine B. You are given the following information:

Medicine A and medicine B are equally effective for alleviating headache.

Medicine A makes 1 in 10 people feel sick.

Medicine B makes 3 in 10 people feel sick.

Which medicine do you prefer?

EXAMPLE OF WILLINGNESS TO PAY

How much would you be 'willing to pay' to have medicine A?

This exercise is not asking you to guess how much medicine A or medicine B costs: it is asking you to put yourself into the situation (health state) resulting from taking one of the two medicines.

Both will cure your headache, but medicine B has a higher risk of nausea associated with it. What value, in dollars, do you attach to the reduced risk of feeling sick?

EXAMPLE OF WILLINGNESS TO PAY

How would your selection and willingness to pay change if you were told that **medicine A cures 50%** of headaches and **medicine B cures 90%** of headaches?

Now you will have to decide whether you are willing to risk an increased chance of nausea for an increased chance of cure (make a trade-off) (see Worked example 4.4).

WORKED EXAMPLE 4.4 USING WTP

Let us go back to the erythropoietin example we looked at earlier.

A willingness-to-pay study for the two alternatives available from the literature suggests that patients maintained on erythropoietin are 'willing to pay' for the extra perceived health benefits over blood transfusions.

Fifty patients in a study stated that they would be willing to pay a mean of £2,000 a year for the extra health benefits associated with erythropoietin.

WORKED EXAMPLE 4.4 USING WTP

What is the difference in benefit between the two alternatives, expressed in monetary terms?

How much are patients willing to pay for the health benefits of erythropoietin per year of treatment, for the 1000 patients?

Change in benefit = £2,000 more benefit per annum per patient when given erythropoietin

Change in benefit = £2,000,000 more benefit per annum per 1000 patients when given erythropoietin.

HYPOTHETICAL NATURE OF WTP

The primary concern for both advocates and critics of WTP is the hypothetical nature of the scenarios, and hence the valuations elicited.

Great efforts are made in studies to develop realistic scenarios with understandable language and minimum bias.

HYPOTHETICAL NATURE OF WTP

However, there is concern that respondents have difficulty responding because of the hypothetical nature of the questions.

At present there is no healthcare study that has compared hypothetical WTP responses with actual market rates, and so the debate must remain unresolved.

Are you willing to pay the price for success