Economic Evaluation

INGER SMITH – WHITE BOX HEALTH ECONOMICS

Agenda

- Need for economic evaluation

- Economic evaluation methods

- Clinical trial vs. reality

- Other considerations

Need for Economic Evaluation

- Gain Reimbursement

- Expand usage

- Defend price

In 2017, the most expensive Model X, was the P100D, at $160,000. Now that same model is around $100,000. Thanks Tesla for the great deals

July 2019

Economic evaluation methods

A health economic analysis is a <u>comparative analysis</u> of alternative courses of action in terms of both their <u>costs</u> and <u>consequences</u>

How do we measure consequences?

How is this measured?

The incremental cost effectiveness ratio is expressed as:

$$\frac{\text{Total costs of therapy A} - \text{Total costs of therapy B}}{\text{Effectiveness of therapy A} - \text{Effectiveness of therapy B}}$$

= The 'ICER'
(Incremental Cost Effectiveness Ratio)

[1] Drummond MF *et al*. Methods for the Economic Evaluation of Health Care Programmes. Third Edition. New York: Oxford University Press Inc.; 2005 .

An example with two treatment alternatives:

Treatment A: Costs £20,000 and provides 10 years in life expectancy

Treatment B: Costs £10,000 and provides 8 years in life expectancy

- ICER: $$\frac{£\,20,000 - £\,10,000}{10\ \text{years} - 8\ \text{years}} = £\,5,000 \text{ per life-year gained}$$

Interpretation:

If the payer is willing to pay £5,000 or more per additional life-year gained => treatment A is considered "good value for money"

What about quality of life?

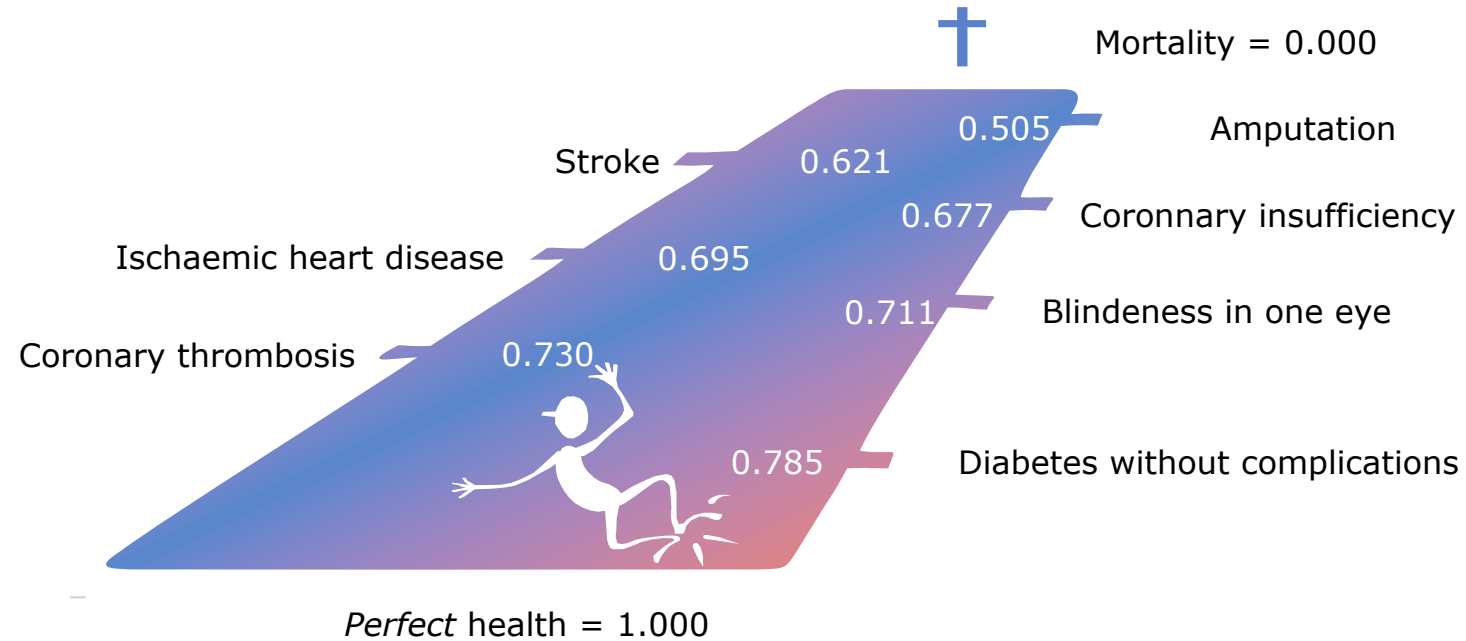Need to measure of health-related quality of life

Quality Adjusted Life Year - Accounts for both *quality* <u>and</u> *quantity* of life

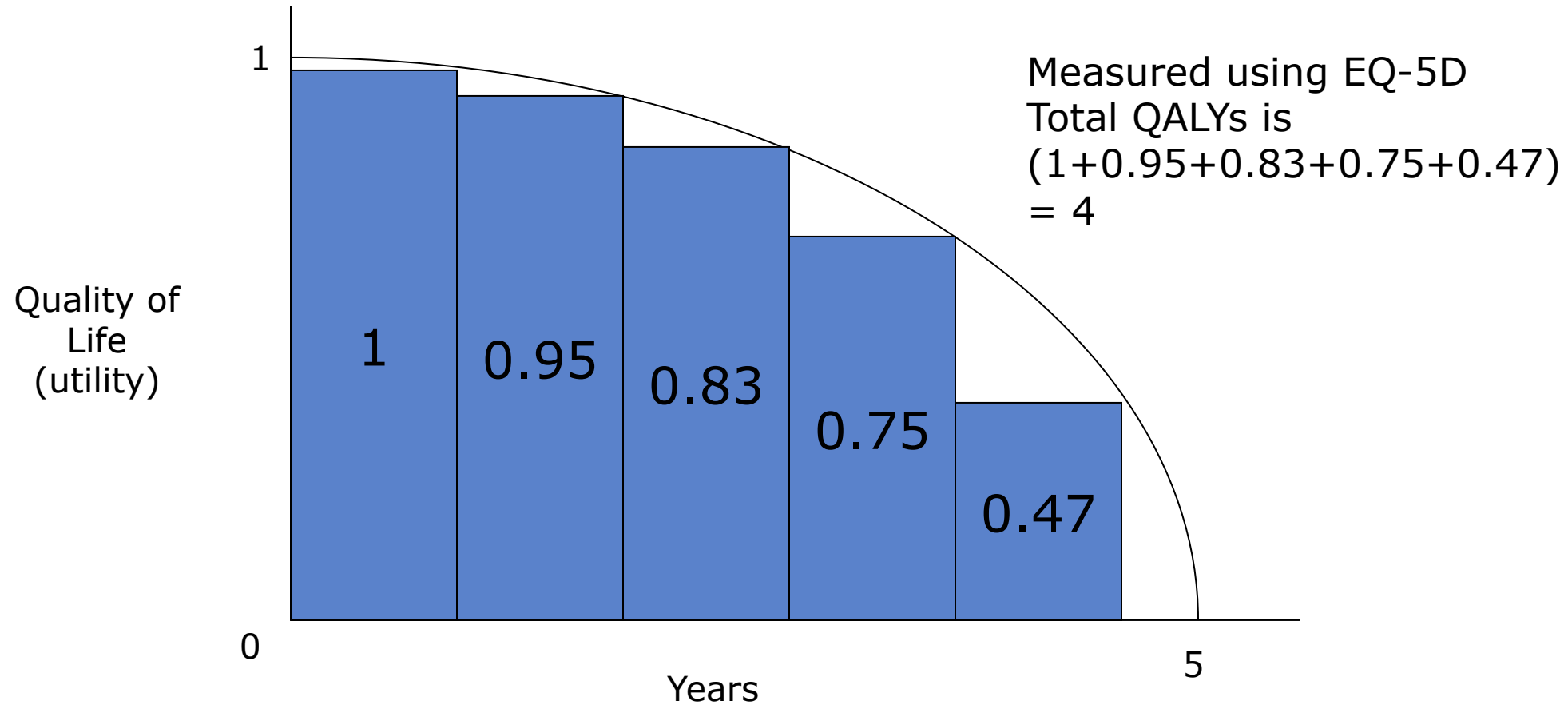Uses a scale where 'full health' = 1 and 'dead' = 0 to give a utility score

- ◦ If an intervention provides one additional year of life at a utility score of 0.8, then the intervention provides 0.8 QALYs.

Favoured by NICE as it allows cost-effectiveness of different treatments to be compared across therapeutic areas

Use of utility scores to calculate QALYs

Mortality = 0.000

0.505 — Amputation

Stroke — 0.621

0.677 — Coronnary insufficiency

Ischaemic heart disease — 0.695

0.711 — Blindeness in one eye

Coronary thrombosis — 0.730

0.785 — Diabetes without complications

Perfect health = 1.000

Calculating QALYs

Quality of Life (utility)

Years

Measured using EQ-5D
Total QALYs is
(1+0.95+0.83+0.75+0.47)
= 4

An example with two treatment alternatives:

**Treatment A: Costs £20,000 and provides an estimated 4.0 QALYs**

Treatment B: Costs £10,000 and provides an estimated 3.8 QALYs

$$\text{ICER:} \quad \frac{£\,20,000 - £\,10,000}{4.0\ \text{QALYs} - 3.8\ \text{QALYs}} \qquad = £\,50,000\ \text{QALY gained}$$

Is this still good value for money?

How certain can we be our cost/QALY is correct?

- What was measured in the trial?

- Were all the patients dead or 'cured' at the end of the study?

- Are there any long term implications with those that are 'cured'?
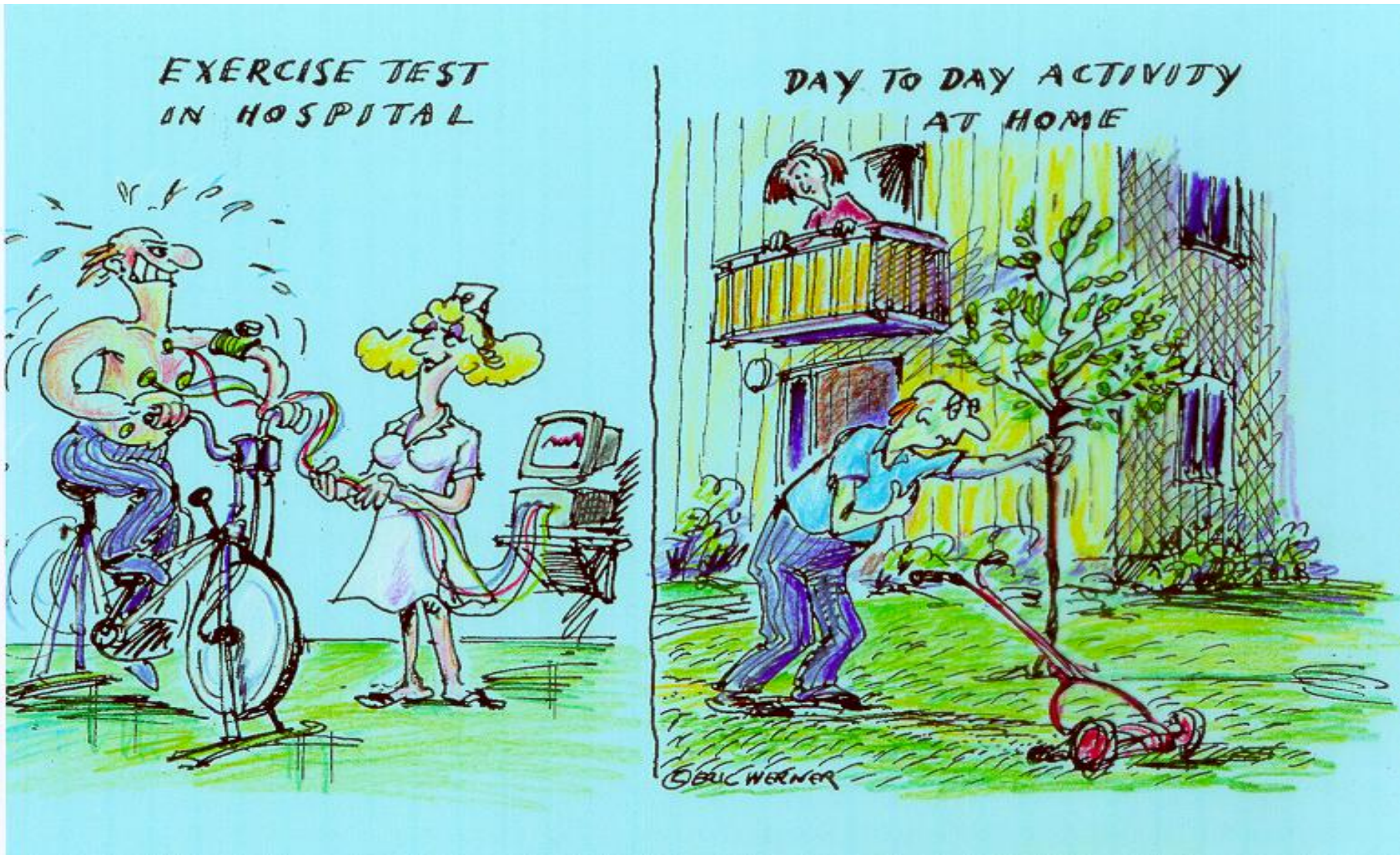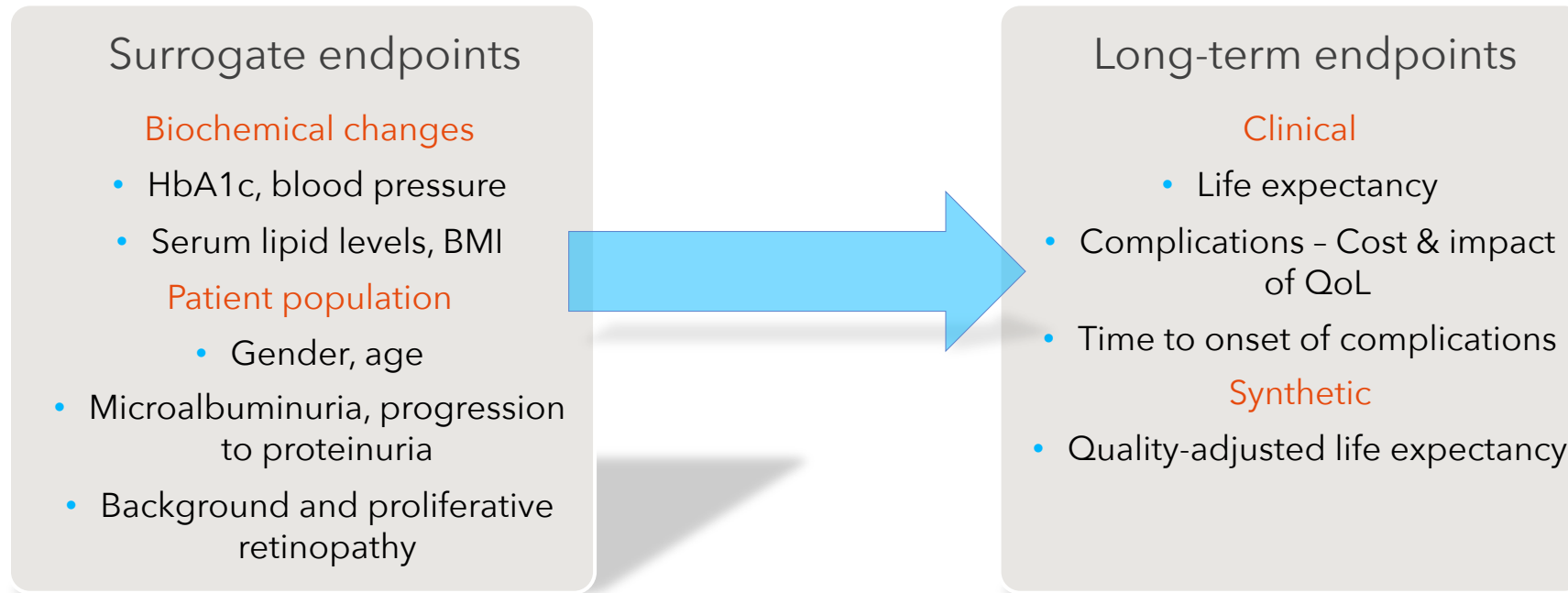
'Objective'   'Subjective'

Exercise test versus physical functioning, r = 0.40

How certain can we be our cost/QALY is correct?

- What was measured in the trial?

- Were all the patients dead or 'cured' at the end of the study?

- Are there any long term implications with those that are 'cured'?

- What about conditions that are treated by not cured, e.g. Type 1 diabetes?

- What costs might be incurred?

Did we measure QALYs or did we model expected QALYs?

Diabetes example

Surrogate endpoints

Biochemical changes
- HbA1c, blood pressure
- Serum lipid levels, BMI

Patient population
- Gender, age
- Microalbuminuria, progression to proteinuria
- Background and proliferative retinopathy

Long-term endpoints

Clinical
- Life expectancy
- Complications – Cost & impact of QoL
- Time to onset of complications

Synthetic
- Quality-adjusted life expectancy

Health Technology Assessment

- Health Technology Assessment using QALYs well accepted in UK (NICE, SMC & AWMSG), Australia, Sweden…
- Cost effectiveness threshold (£20k - £30k per QALY vs. current standard of care)
- Post approval assessment, re-assess every 3 to 5 years
- Incorporation into clinical guidelines

Payer questions about clinical trials

- Are the trials in the 'right' patient population?
  - What is the background/previous therapy?
  - Are patients diagnosed at the appropriate stage to be treated?

- Will treatment be as per the protocol?
  - How long will patients be treated?
  - Will patients continue on therapy?
  - What happens when patients stop therapy?

- Will the therapy have the same effectiveness in clinical practise?
  - Specialist versus general setting?

Other considerations

- Patient preference

- Budget impact

- Newer therapies

- Equality

- Patient acceptability

Questions?