EURORDIS
Rare Diseases Europe

HEALTH TECHNOLOGY ASSESSMENT IN 2017

Edmund Jessop

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Why HTA?

The purpose of HTA is:

- **To spend money wisely**

Why HTA?

The purpose of HTA is:

- **To help payers spend money wisely***

***(within a fixed budget allocation)**

What is a ‘technology’?

- Drug
- Device
- Activity (e.g. physiotherapy’)

HTA: two questions

- **How well does it work?**

(compared to what we do now)

- **What does it cost?**

(compared to what we do now)

Does it work? – Quantity

- **Prolongs life:**

‘increases survival by 5 years’

(compared to what we do now)

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Does it work? - quality

- **Improves quality of life**

‘I no longer need to use a wheelchair’

‘I’m not in pain’

‘I can do more’

Aim of session

- **To understand basic concepts in health technology assessment**
- **To know that assessment provides information not a decision: committee judgement is still needed**
- **To understand common terms used in HTA reports:**
  - Different types of cost
  - Health states
  - Disease models

HTA

- **Assess effectS**
- **Assess costS**

ASSESSING COSTS

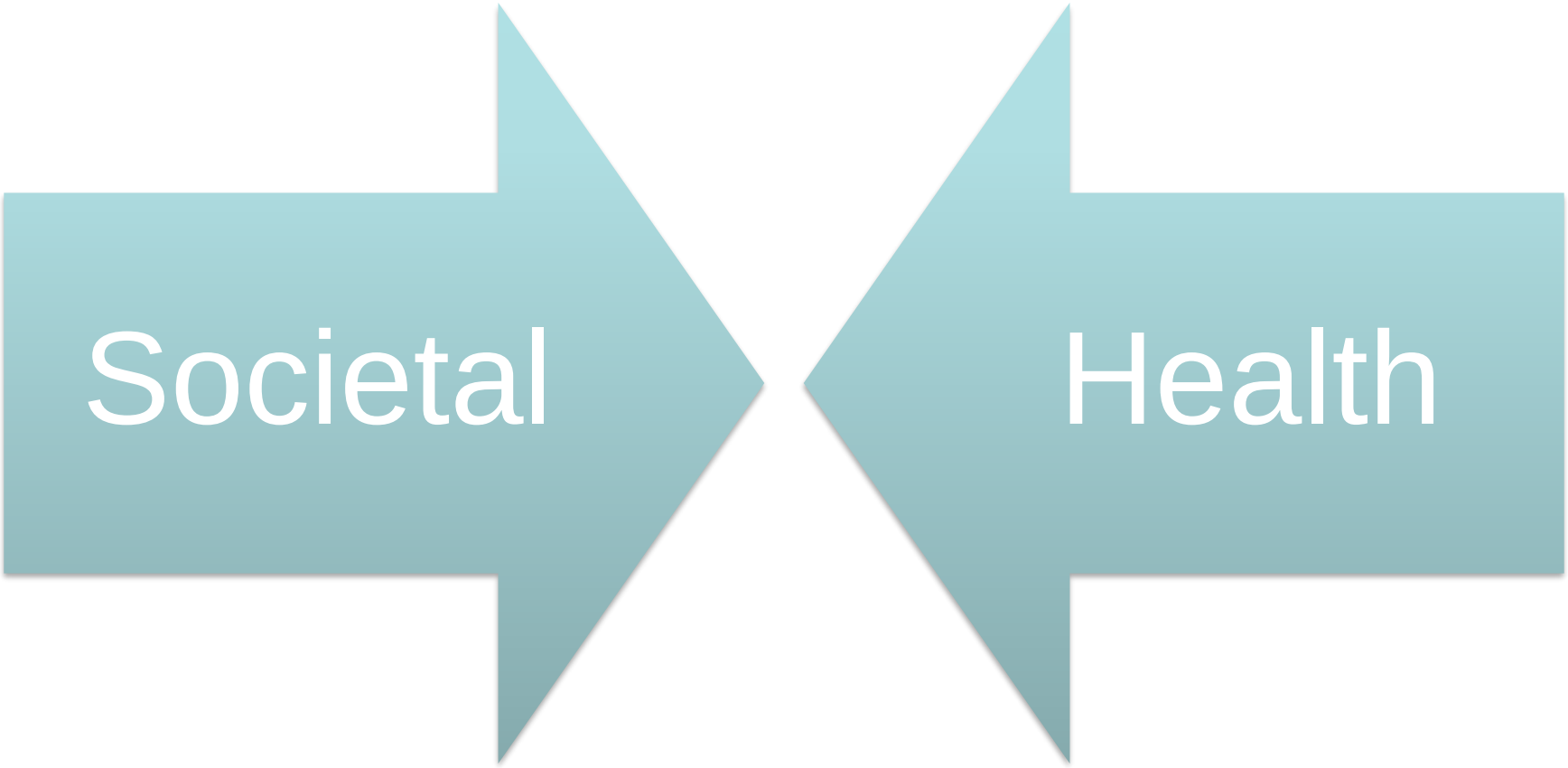
Costs

- **Exercise – estimate the cost of driving by car from Barcelona to Paris and back**

Cost types

- **Direct costs / indirect costs**
- **Tangible costs / intangible costs**

‘Perspective’



More cost types

- **Incremental costs**

- **(Opportunity cost – discussed later)**

Three concepts

- **Cost**
- **Price**
- **Value**

ASSESSING EFFECTS

EFFECTS

- **Survival**
- **Quality of life**

Assessing effects – longer life

- **Treatment X cures a fatal disease of childhood**

- **Extends life by 50 years**

Assessing effects

- **Treatment Y improves survival in a fatal cancer**

- **Extends life by 0.5 years**

Assessing effects

- **Treatment Y improves survival in a fatal cancer**

- **Extends life by 0.5 years on average**

IMPROVED QUALITY OF LIFE

- **Improves quality of life**

‘I no longer need to use a wheelchair’

‘I’m not in pain’

‘I can do more’

Measuring effects on quality of life

- **How to MEASURE improvement in quality of life?**

- **Standard method – describe health state**

Assessing quality of life: the EQ5D

- **Mobility**
- **Self Care – wash and dress**
- **Usual activities**
- **Pain**
- **Anxious or depressed**

Mobility

I have no problems in walking about ❑

I have some problems in walking about ❑

I am confined to bed ❑

Self-Care

I have no problems with self-care ❑

I have some problems washing or dressing myself ❑

I am unable to wash or dress myself ❑

Usual Activities (*e.g. work, study, housework, family or leisure activities)*

I have no problems with performing my usual activities ❑

I have some problems with performing my usual activities ❑

I am unable to perform my usual activities ❑

Pain/Discomfort

I have no pain or discomfort ❑

I have moderate pain or discomfort ❑

I have extreme pain or discomfort ❑

Health state A

- No problems walking about
- No problems washing or dressing

- Some problems with usual activities

- No pain
- Not anxious or depressed

Health state B

- Some problems walking about
- Unable to wash or dress
- Some problems with usual activities

- No pain
- Not anxious or depressed

Health state C

- Some problems walking about
- No problems washing or dressing

- Unable to do usual activities

- No pain
- Moderately depressed

Improvement in health state

- **Health state before:**
- **Extreme pain**
- **Moderately depressed**
- **Some problem with usual activity**

- **Health state after:**
- **No pain**
- **No depression**
- **Some problem with usual activity**

Exercise – score these two health states

- **Health state before:**
- **Extreme pain**
- **Moderately depressed**
- **Some problem with usual activity**

- **Health state after:**
- **No pain**
- **No depression**
- **Some problem with usual activity**

Improvement in health state

- **Health state before:**

0.29

- **Extreme pain**
- **Moderately depressed**
- **Some problem with usual activity**

- **Health state after:**

0.82

- **No pain**
- **No depression**
- **Some problem with usual activity**

Health gain

- 20 years in health state A (without treatment)
- 20 years in health state B (with treatment)

- Gain = 20 x QA gain

Growth hormone (simplified)

- **Extra height as adult: valuation 0.1**
- **Adult life span 50 years**

5 QALY gain

- **Cost = £100 000**
- **£20 000 per QALY – cost is justified**

Health gain

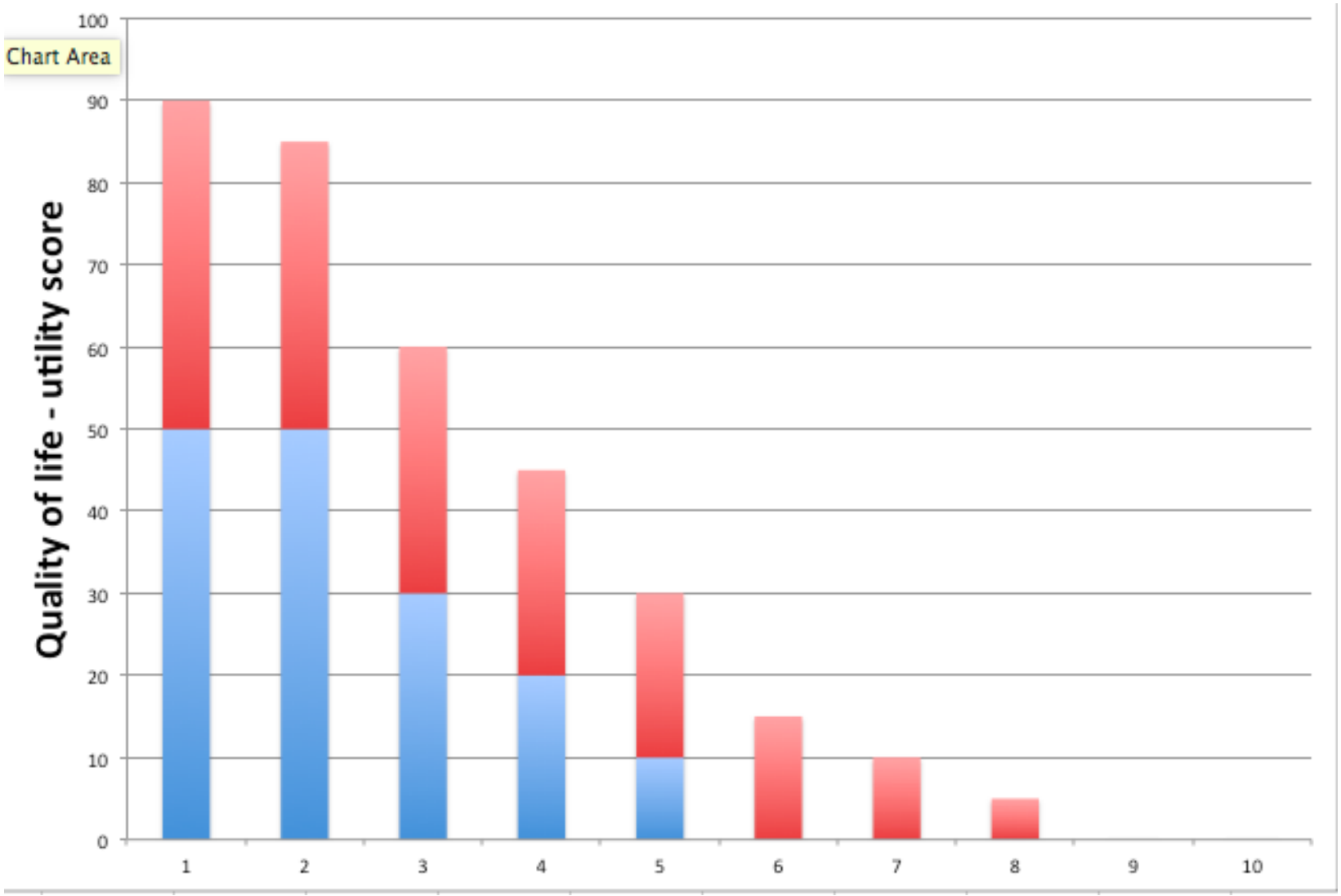


Chart Area
Quality of life - utility score
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10

PUTTING IT TOGETHER: COST & EFFECT

ICER

- **Incremental costs £100 000 more**
- **Incremental effects 5 QALY more**

- **Ratio £20 000 per QALY**

- **Incremental cost effectiveness ratio ICER**

Incremental

- **Incremental cost** **£10 000 more**
- **Incremental effect** **5 QALY more**

- **More than what? – must specify comparator**
  - usually what you're doing now: 'standard of care'
  - May differ from country to country

A note on ‘dominates’

- **If the new treatment is better AND cheaper it is said to ‘dominate’ the comparator ☺**

- **… usually it’s better but costs more ☹**

Utility

‘Utility’ = what it’s worth

An extra year of life is worth having – it is a utility

An extra year of quality-adjusted life – also a utility

REMINDER

- **Incremental costs £100 000 more**
- **Incremental effects 5 QALY more**

- **Ratio £20 000 per QALY**

- **Incremental cost effectiveness ratio ICER**

EXERCISE

NHS England budget for ‘specialised services’

£ 17 000 000 000 per annum

How much of this should we spend on cystic fibrosis?

RULES FOR WISE SPENDING?

SOME QALY THRESHOLDS

- £12k (Claxton)
- £30k (NICE)
- £50k (NICE end of life)
- £90k (WHO)
- £100 – 300k (NICE HST)

ICER

- **Lifetime incremental cost** **£100 000 more**
- **Lifetime incremental effect** **5 QALY more**

- **Ratio** **£20 000 per QALY**

- **Incremental cost effectiveness ratio ICER**

- **Treatment A**

- **£100 000**
- **5 QALY**

- **£20 000 per QALY**

- **Treatment B**

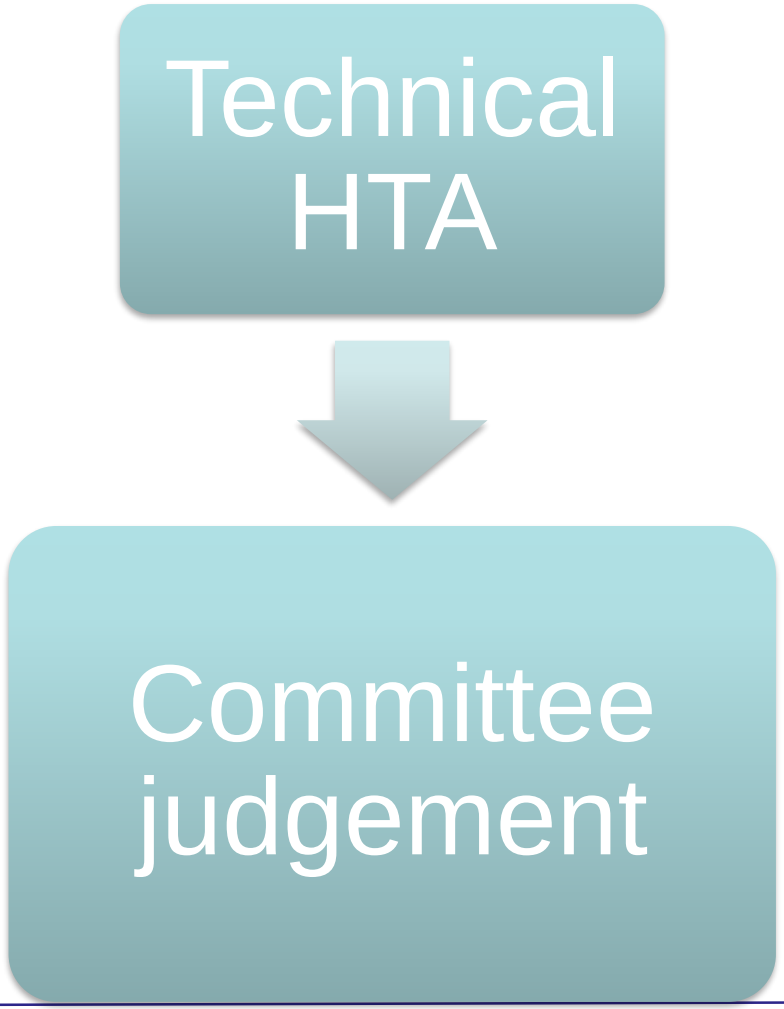
- **£80 000**
- **2 QALY**

- **£40 000 per QALY**

OTHER CONSIDERATIONS

HTA = information, not decision

Specialised Services



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Wise spending?

NHS
Specialised Services

- Hand transplant for bilateral amputees
- Drug to prevent a rare cause of blindness (uveitis)
- Brain implant which gives some hearing for children born deaf
- Treatment for late stage skin cancer (melanoma)

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Possible considerations

- **Increased survival**
- **Better quality of life**
- **Cost per patient**

- **Budget impact (opportunity cost)**

Possible considerations

- **Privilege children**
- **Privilege soldiers who have served their country**
- **Privilege end of life**

- **Privilege severity**
- **Privilege rarity**

- **Privilege scientific advances**

SPECIAL CATEGORIES

SEVERITY

A proposal in Norway:

- **Basic threshold c 30k / QALY**
- **Pay more for severe disease, but only up to x3 the normal limit.**

- **Severity – Absolute QALY shortfall of 30 QALY or more**
- **Rarity – 1 in 100 000 or less**
- **Benefit – minimum 2 QALY**

QALY gains

Ref	Drug	Disease	QALY gain
TAG391	Cabazitaxil	Prostate cancer	0.2
TAG388	Sacubitril	Heart failure	0.4
TAG383	Anti TNF	Ankylosing spondylitis	8
HST2	Elosulfase	MPS IVa	10 - 18
HST1	Eculizumab	aHUS	10 - 25

BUDGET IMPACT

- **COST X NUMBER**
- **OPPORTUNITY COST**

BUDGET IMPACT

- **HIV drugs - £401m**
- **Insulin for diabetes - £296m**
- **Haemophilia drugs - £232m**

- **ERT for LSD - £160m**

- **Viagra for erectile dysfunction - £72m**
- **Laxatives - £64m**

The next slide shows special considerations used by NICE in several assessments

Table 1

Application of 'special circumstances' in the appraisal of some products with incremental cost-effectiveness above £30 000 per quality adjusted life year

Topic	ICER ('000s)	Severity	End of life*	Stakeholder persuasion	Significant innovation	Disadvantaged population	Children
Riluzole (motor neurone disease)	38–42	✓	✓	✓			
Trastuzumab (advanced breast cancer)	37.5	✓			✓		
Imatinib (chronic myeloid leukaemia)	36–65	✓			✓		
Imatinib (gastrointestinal stromal tumour)		✓	✓		✓		
Pemetrexed (malignant mesothelioma)	34.5	✓	✓			✓	
Ranizumab (age-related macular degeneration)	>>30			✓	✓		
Omalizumab (severe asthma)	>30	✓		✓	✓		
Sunitinib (advanced renal cancer)	50	✓	✓	✓	✓		
Lenalidomide (multiple myeloma)	43	✓	✓		✓		
Somatotropin (growth hormone deficiency)	n/a			✓	✓		✓
Chronic subcutaneous insulin infusion (childhood Type 1 diabetes)	n/a			✓			✓

*End-of-life considerations have only been explicitly taken into account since January 2009 on the basis of supplementary advice from the Institute to the Appraisals Committee.
ICER, incremental cost-effectiveness ratio (£ per quality-adjusted life year).

NICE used those ‘considerations’ informally

Could have scored them = Multi Decision Criteria

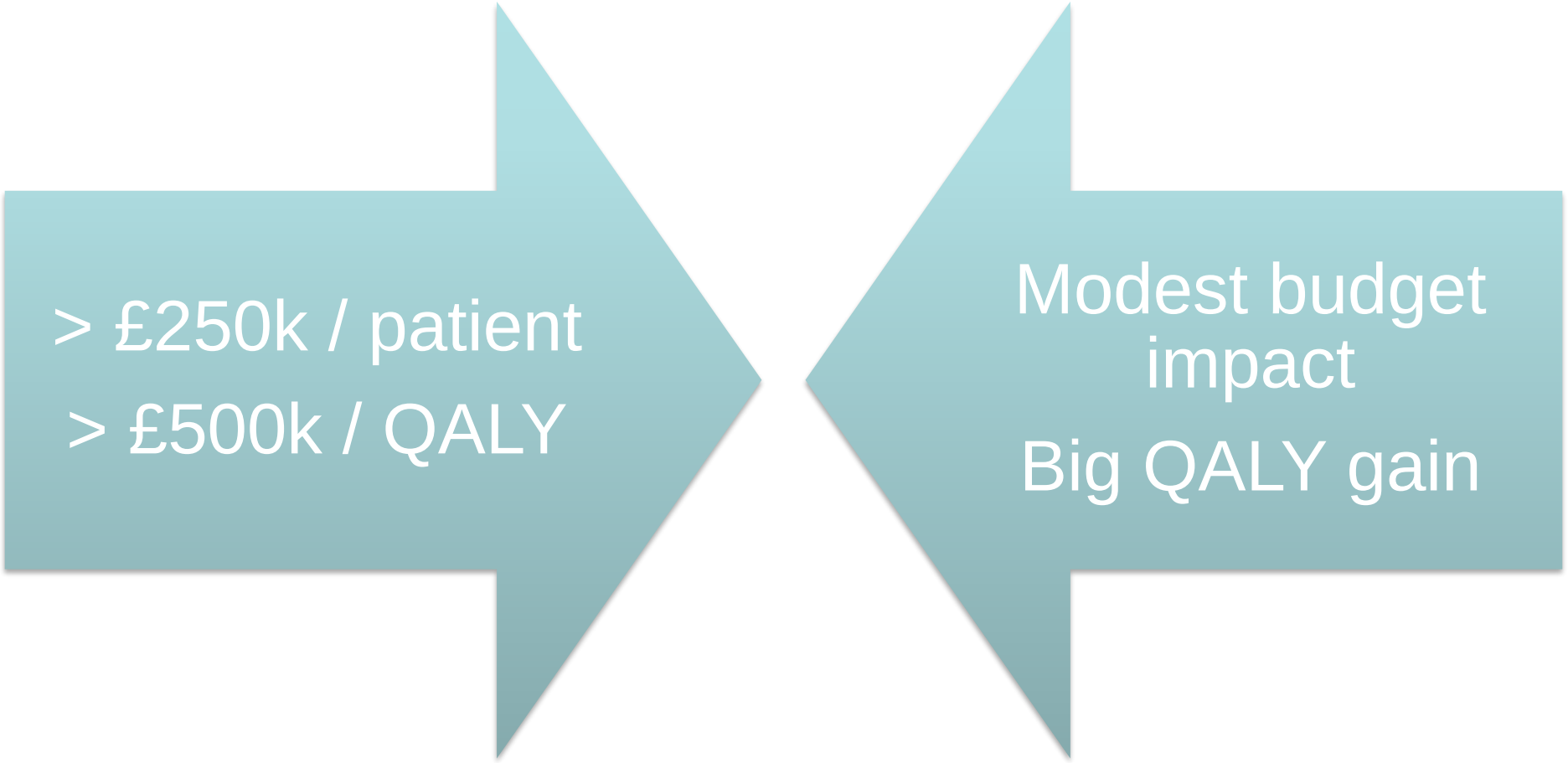
HEALTH BENEFITS	Cure	10
	Life expectancy and quality of life	10
	Life expectancy	6
	Quality of life	7
CLINICAL EFFECTIVENESS	Clinical and statistical significance	9
	Clinical significance	5
	Statistical significance	2
LIFE-SAVING	Yes	11
	No	0
SAFETY	Rare adverse effects	8
	Non-rare adverse effects	5
	Frequent adverse effects	3
	Very frequent adverse effects	1
ALTERNATIVE	No	6
	Yes	0
DISEASE SEVERITY	Chronic life-threatening disorder	15
	Acute disorder	17
	Chronic non-life-threatening disorder	14
DISEASE BURDEN	< BGN 3 000 (€1 538) per year	0
	BGN 3 000 – 17 000 (€ 1 538 – 8 718)	5
	BGN 17 000 – 28 000 (€ 8 718 – 14 359)	10
	> BGN 28 000 (€ 14 359)	15

BUDGET IMPACT	> BGN 4 400 000 (€ 2 256 410) per year	0
	BGN 700 000 – 4 400 000 (€ 358 974 – 2 256 410)	1
	BGN 75 000 – 700 000 (€ 38 462 – 358 974)	2
	< BGN 75 000 (€ 38 462)	5
COST-EFFECTIVENESS	More effects and less costs	6
	More effects and more costs	4
	Fewer effects and less costs	1
STRENGTH OF EVIDENCE	Randomized controlled clinical trials	8
	Non-randomized clinical trials	5
	Cohort and case-control studies	3
	Cross-sectional studies	1
	Case reports and expert opinions	1
VULNERABLE GROUPS	Indication in children and elderly people	5
	Indication in children	4
	Indication in elderly people	3

Ultra orphan

- **Useful category but no legal definition**
- **< 1 in 100 000**
- **Gaucher disease but not cystic fibrosis**
- **(Genetic subtypes)**

Ultra orphans



VALUES AND PHILOSOPHY

A note on ethics

- **Utilitarianism**
- **Other ethics**
  - John Rawls
  - Amartya Sen

Advanced topic

MODELLING DISEASE STATES

Disease states

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Start

Well
100 people

Not well
0 people

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6 months

Well
90 people

Not well
10 people

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12 months

Well
81 people

Not well
19 people

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12 months – with treatment

Well
85 people

Not well
15 people

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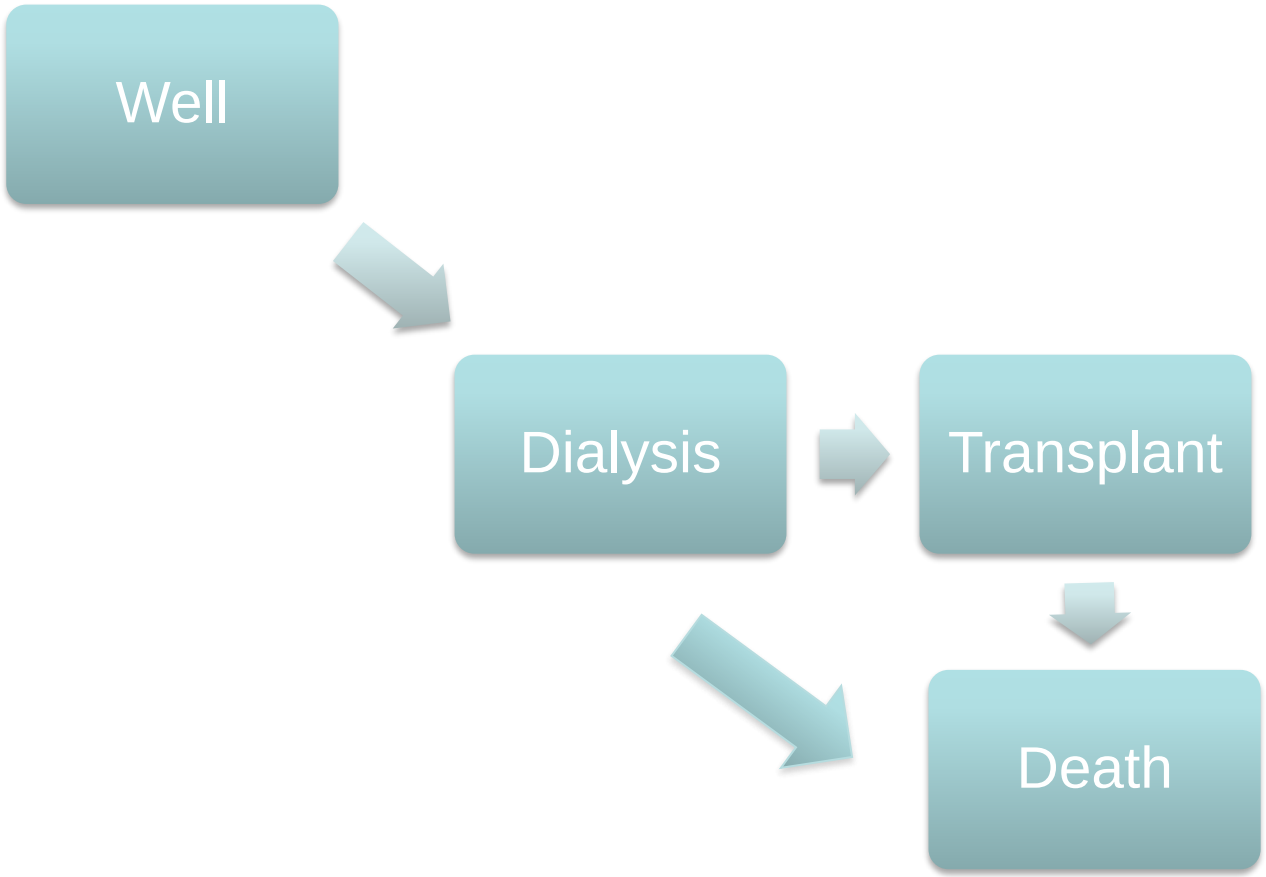
Renal disease



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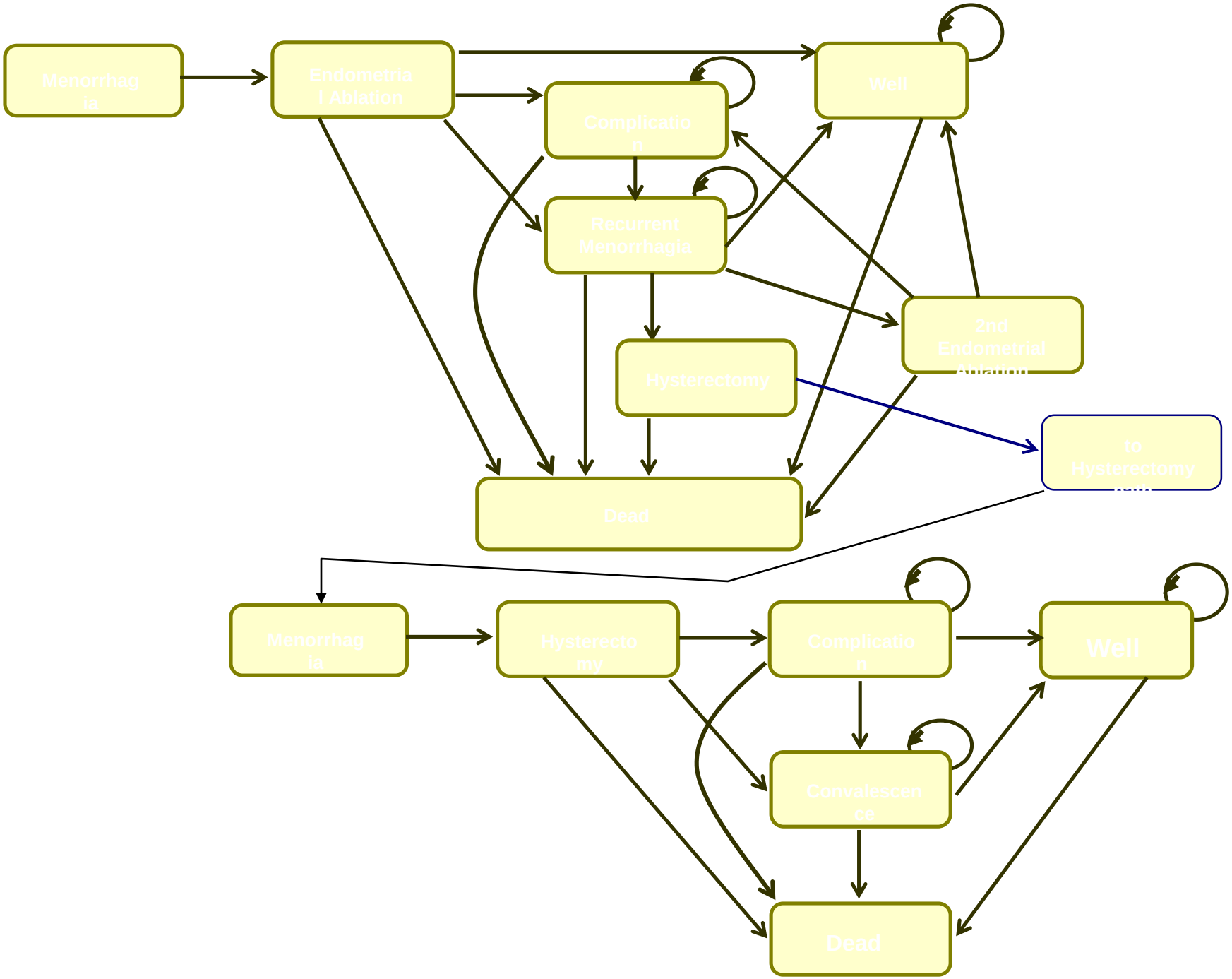

Menorrhagia
Endometrial Ablation
Well
Complication
Recurrent Menorrhagia
2nd Endometrial Ablation
Hysterectomy
to Hysterectomy
Dead
Menorrhagia
Hysterectomy
Complication
Well
Convalescence
Dead

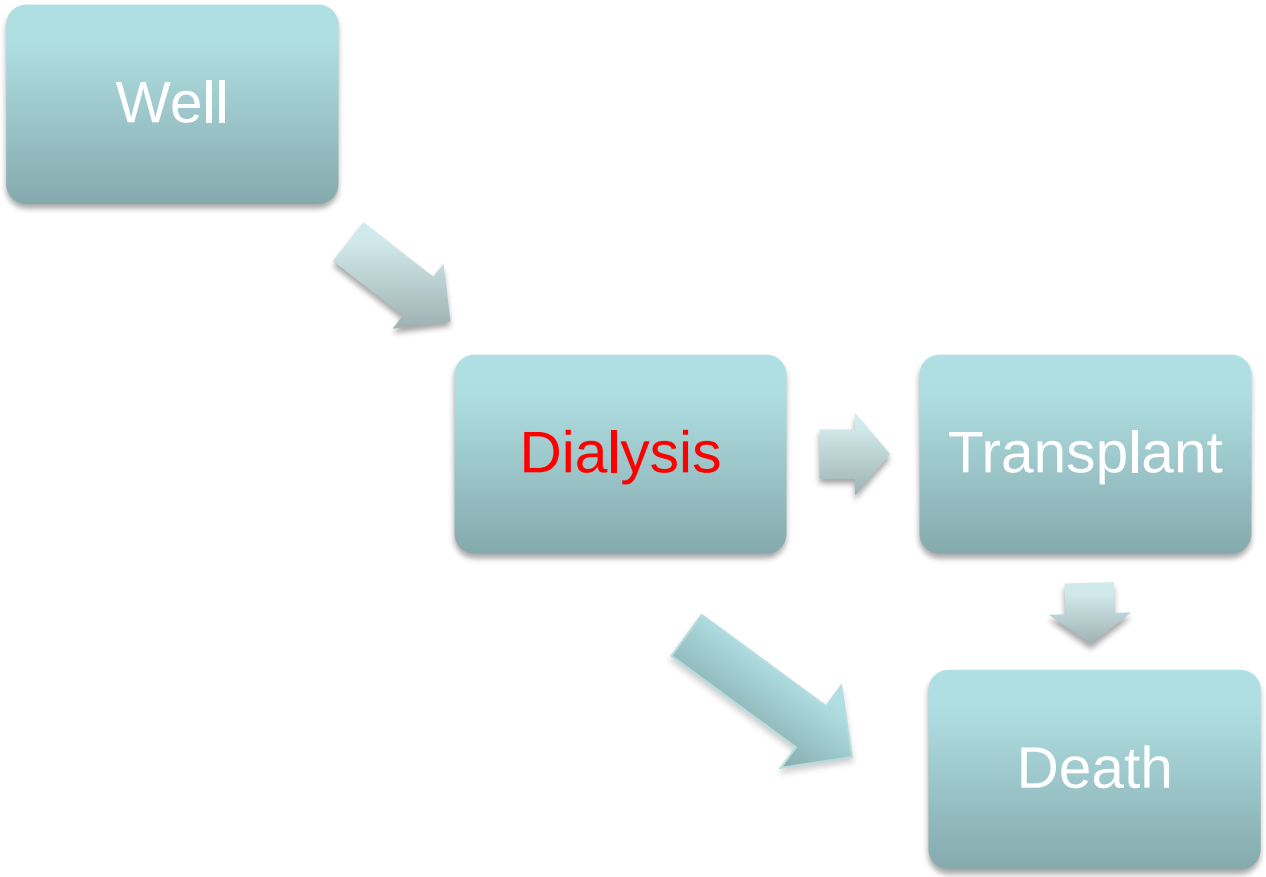
How models are used

- **Patient move from one state to another**
- **Model usually assumes change every six months**
- **Model run for 20 years (or 50 years or…) – the 'time horizon'**

- **Patients move from each state to another with a probability – the 'transition probability' for that transition**
- **Treatments change the transition probability – make it less likely to transition from a healthy state to an ill state**

- **Patients should give the model a common sense check – are all states included? Are the results obviously wrong after 20 years?**

PATIENT ALERT!
Each state must be assigned (given) a utility



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Summary – top tips

In the meeting:

- THE COSTS

- **Argue for societal perspective**

- THE BENEFIT

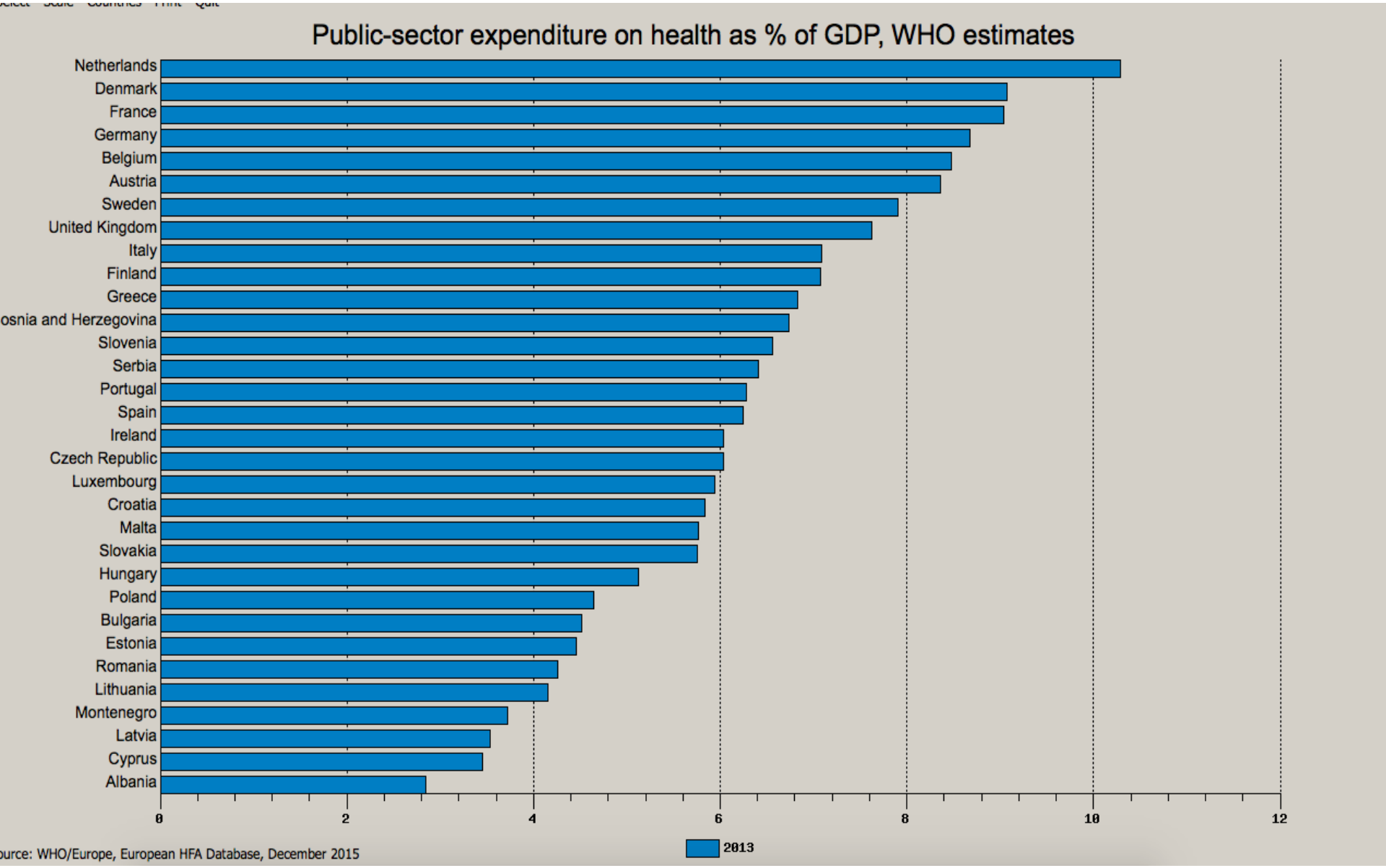
- **Ensure the quality of life measure covers all relevant problems – EQ5D probably doesn't**

- THE MODEL

- **Check all relevant states included**
- **Check utility score for each state**

- THE TIME HORIZON

- **Ask for an analysis with 0% discounting**


Public-sector expenditure on health as % of GDP, WHO estimates
Netherlands
Denmark
France
Germany
Belgium
Austria
Sweden
United Kingdom
Italy
Finland
Greece
osnia and Herzegovina
Slovenia
Serbia
Portugal
Spain
Ireland
Czech Republic
Luxembourg
Croatia
Malta
Slovakia
Hungary
Poland
Bulgaria
Estonia
Romania
Lithuania
Montenegro
Latvia
Cyprus
Albania
0
2
4
6
8
10
12
2013
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