Health Outcomes

Measuring and Valuing Health

Economic Evaluation

Economic Evaluation

Choice

Costs A

Costs B

Treatment A

Treatment B

Consequences A

Consequences B

Health Outcomes in Economic Evaluation

Cost Effectiveness Analysis

- **Clinical end points**
- **Mortality**
- **Years of life saved**
- **Condition specific outcome measures**

Cost Utility Analysis

- **Utility based quality of life scales**

Cost Benefit Analysis

- **Willingness to pay**

Summary Measures of Disease Burden

- To simultaneously describe morbidity and mortality within a single number

- **QALYs (Quality Adjusted Life Years):** Number of years lived in perfect health.

- **DALYs (Disability Adjusted Life Years):** Number of years lost due to ill-health, disability or early death.

Summary Measures of Disease Burden

- **QALYs (Quality Adjusted Life Years):** Years of perfect health gained

- **DALYs (Disability Adjusted Life Years):** Years of perfect health lost

DALYs

- One DALY can be thought as one **lost** year of healthy life.

- [One QALY= One year **lived** in perfect health.]

- DALY= (Years of Life Lost) + (Years Lived with Disability)

- YLL= (Number of Deaths) x (LE at age of death in years)

- YLD= (Prevalence) x (Disability Weight)

- Disability Weight
    - 0= Perfect Health 1= Death

DALYs

- Life expectancy= 75 years

DALYs

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- A person dies at the age of 50 years

- YLL= 75-50 = 25

DALYs

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- YLD=

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- YLD=

- The person turns blind at the age of 45 years

- YLD= Duration x Disability Weight

- YLD= 5 x 0.6 = 3

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- A person dies at the age of 50 years

- YLL= 75-50 = 25

- YLD=

- The person turns blind at the age of 45 years

- YLD= Duration x Disability Weight

- YLD= 5 x 0.6 = 3

DALYs lost= YLL + YLD= 25 + 3 = 28

Disease or sequelae	Mean disability weight (untreated form)
AIDS	0.50
Infertility	0.18
Diarrhoea disease, episodes	0.11
Measles episode	0.15
Tuberculosis	0.27
Malaria, episodes	0.20
Trachoma, blindness	0.60
Trachoma, low vision	0.24
Lower respiratory tract infection, episodes	0.28
Lower respiratory tract infection, chronic sequelae	0.01
Cancers, terminal stage	0.81
Diabetes mellitus cases (uncomplicated)	0.01
Unipolar major depression, episodes	0.60
Alcohol dependence syndrome	0.18
Parkinson disease cases	0.39
Alzheimer disease cases	0.64
Post-traumatic stress disorder	0.11
Angina pectoris	0.23
Congestive heart failure	0.32
Chronic obstructive lung disease, symptomatic cases	0.43
Asthma, cases	0.10
Deafness	0.22
Benign prostatic hypertrophy	0.04
Osteoarthritis, symptomatic hip or knee	0.16
Brain injury, long-term sequelae	0.41
Spinal cord injury	0.73
Sprains	0.06
Burns (>60%) – long term	0.25

[a] Adapted from Murray & Lopez (1996).

Measuring QALYs in Economic Evaluations

- Key outcomes for a patient:

  – Length of life

  – Quality of life

- QALY: A measure which combines quantity and quality of life (How long a person lives and how well)

- QALYs= Survival x Utility Score

Measuring QALYs in Economic Evaluations

- Utility score is measured between 0 and 1

  - 0= Death

  - 1= Perfect Health

- QALYs gained= (Survival$_A$ x Utility$_A$) – (Survival$_B$ x Utility$_B$)

Measuring QALYs in Economic Evaluations

- A person is living for 70 Years

  – Life years lived= 70

Measuring QALYs in Economic Evaluations

- A person is living for 70 Years

    – Life years lived= 70

    – He has perfect health for 70 years (Utility Score=1)
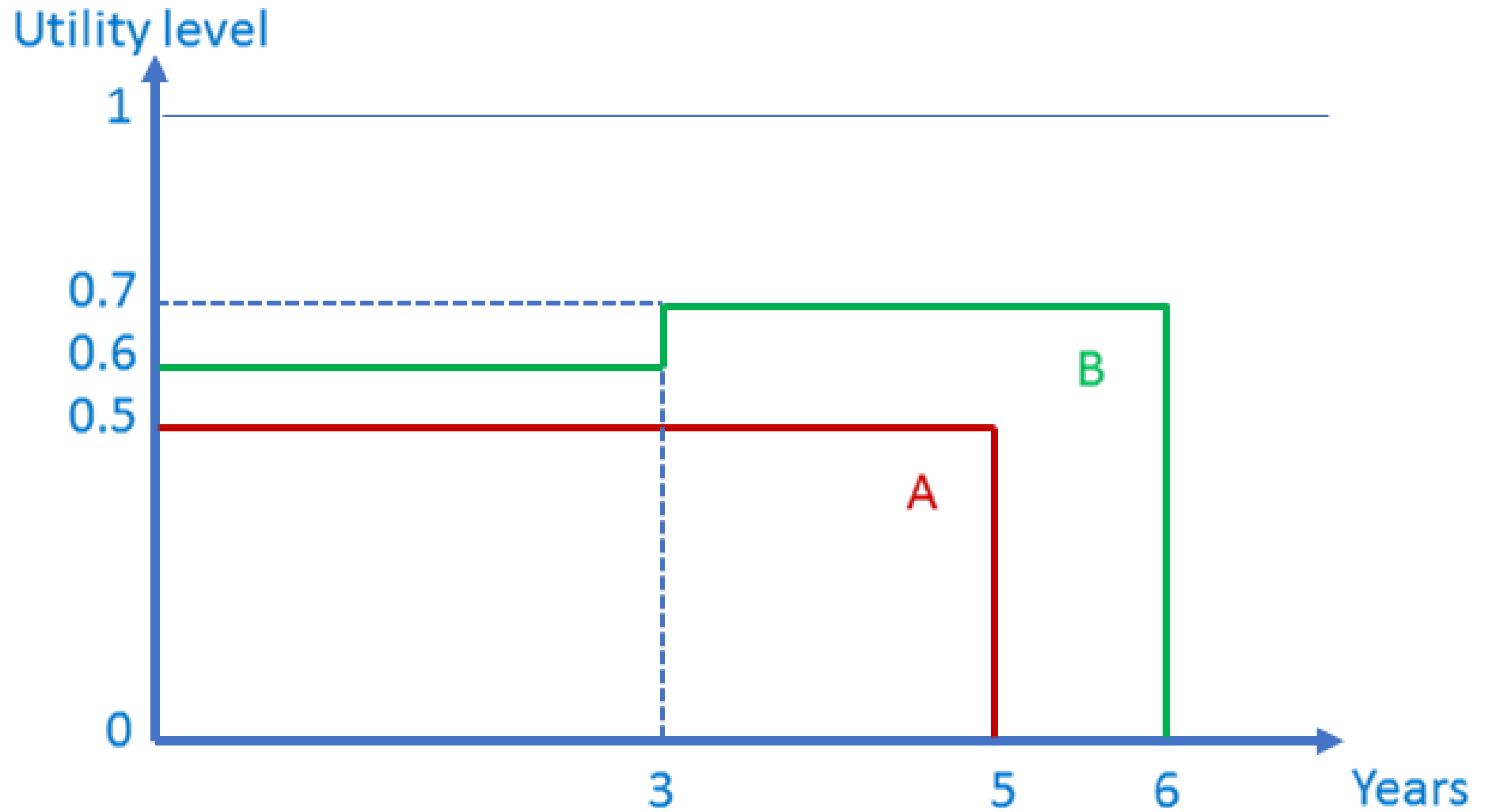
QALYs Lived= 70 x 1= 70

Measuring QALYs in Economic Evaluations

- A person is living for 70 Years

  – Life years lived= 70

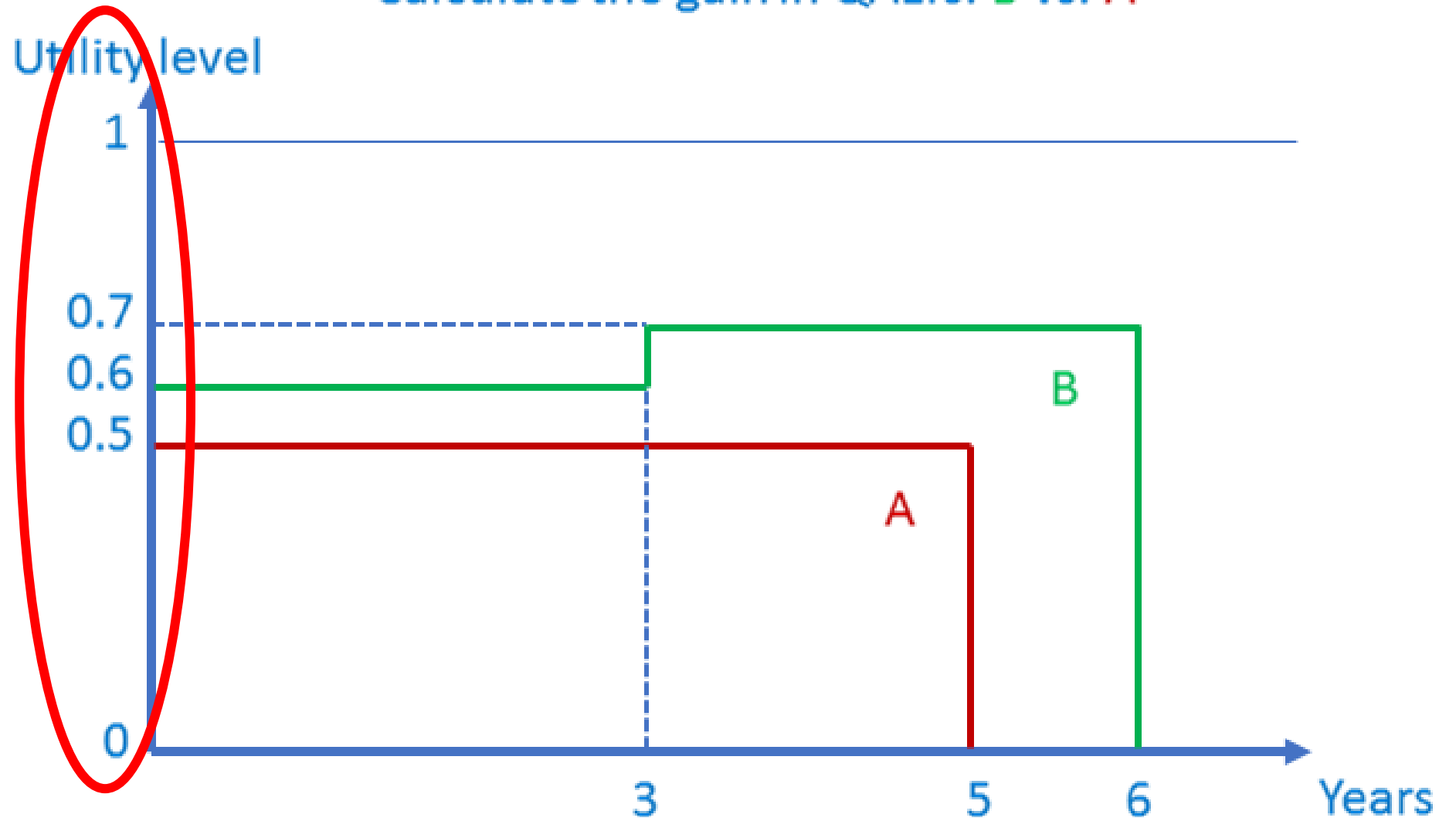 – His HRQoL was 60% (Utility Score=0.6)

QALYs Lived= 70 x 0.6= 42

Calculate the gain in QALYs: B vs. A

Calculate the gain in QALYs: B vs. A

Measuring QALYs in Economic Evaluations

1. EQ-VAS

2. EQ-5D-5L
   i.   Descriptive System
   ii. Value Set

Measuring Health

- Visual Analogue Scale (EQ-VAS)

The best health
you can imagine

The worst health
you can imagine

100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
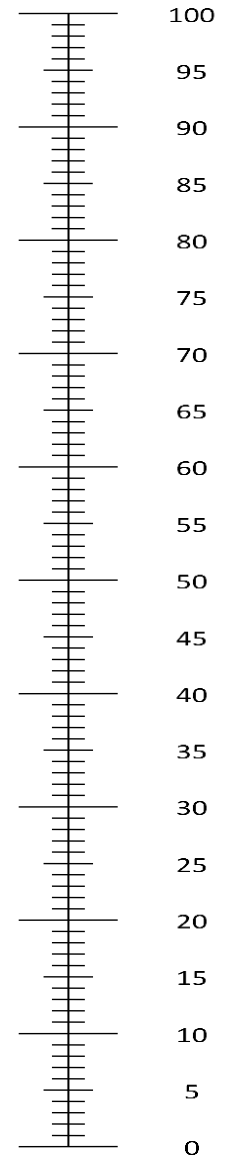
- We would like to know how good or bad your health is TODAY.

- This scale is numbered from 0 to 100.

- 100 means the best health you can imagine.
  0 means the worst health you can imagine.

- Mark an X on the scale to indicate how your health is TODAY.

- Now, please write the number you marked on the scale in the box below.
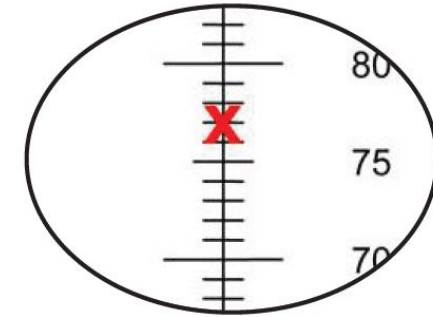
YOUR HEALTH TODAY = **77**

The best health you can imagine

100
95
90
85
80
X
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
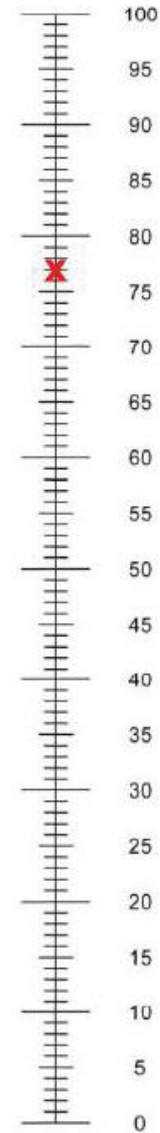
The worst health you can imagine

For example,
the response above
should be coded as 77

EQ-5D-5L
Descriptive System

- Level 1: I have no problem

- Level 2: I have slight problem

- Level 3: I have moderate problem

- Level 4: I have severe problem

- Level 5: I have extreme problem

MOBILITY

I have no problems in walking about ☐

I have slight problems in walking about ☐

I have moderate problems in walking about ☐

I have severe problems in walking about ☐

I am unable to walk about ☐

SELF-CARE

I have no problems in bathing or dressing myself ☐

I have slight problems in bathing or dressing myself ☐

I have moderate problems in bathing or dressing myself ☐

I have severe problems in bathing or dressing myself ☐

I am unable to bathe or dress myself ☐

USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

I have no problems doing my usual activities ☐

I have slight problems doing my usual activities ☐

I have moderate problems doing my usual activities ☐

I have severe problems doing my usual activities ☐

I am unable to do my usual activities ☐

PAIN / DISCOMFORT

I have no pain or discomfort ☐

I have slight pain or discomfort ☐

I have moderate pain or discomfort ☐

I have severe pain or discomfort ☐

I have extreme pain or discomfort ☐

ANXIETY / DEPRESSION

I am not anxious or depressed ☐

I am slightly anxious or depressed ☐

I am moderately anxious or depressed ☐

I am severely anxious or depressed ☐

I am extremely anxious or depressed ☐

Under each heading, please tick the ONE box that best describes your health TODAY.

MOBILITY
I have no problems in walking about ✔
I have slight problems in walking about ☐
I have moderate problems in walking about ☐
I have severe problems in walking about ☐
I am unable to walk about ☐

SELF-CARE
I have no problems washing or dressing myself ☐
I have slight problems washing or dressing myself ✔
I have moderate problems washing or dressing myself ☐
I have severe 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 doing my usual activities ☐
I have slight problems doing my usual activities ☐
I have moderate problems doing my usual activities ✔
I have severe problems doing my usual activities ☐
I am unable to do my usual activities ☐

PAIN / DISCOMFORT
I have no pain or discomfort ☐
I have slight pain or discomfort ☐
I have moderate pain or discomfort ☐
I have severe pain or discomfort ✔
I have extreme pain or discomfort ☐

ANXIETY / DEPRESSION
I am not anxious or depressed ☐
I am slightly anxious or depressed ☐
I am moderately anxious or depressed ☐
I am severely anxious or depressed ☐
I am extremely anxious or depressed ✔

Levels of perceived problems are coded as follows:

✔ Level 1 is coded as a '1'

✔ Level 2 is coded as a '2'

✔ Level 3 is coded as a '3'

✔ Level 4 is coded as a '4'

✔ Level 5 is coded as a '5'

Under each heading, please tick the ONE box that best describes your health TODAY.

MOBILITY
I have no problems in walking about ✔
I have slight problems in walking about ☐
I have moderate problems in walking about ☐
I have severe problems in walking about ☐
I am unable to walk about ☐

SELF-CARE
I have no problems washing or dressing myself ☐
I have slight problems washing or dressing myself ✔
I have moderate problems washing or dressing myself ☐
I have severe 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 doing my usual activities ☐
I have slight problems doing my usual activities ☐
I have moderate problems doing my usual activities ✔
I have severe problems doing my usual activities ☐
I am unable to do my usual activities ☐

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I have slight pain or discomfort ☐
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I have extreme pain or discomfort ☐

ANXIETY / DEPRESSION
I am not anxious or depressed ☐
I am slightly anxious or depressed ☐
I am moderately anxious or depressed ☐
I am severely anxious or depressed ☐
I am extremely anxious or depressed ✔

Levels of perceived problems are coded as follows:

✔ Level 1 is coded as a '1'

✔ Level 2 is coded as a '2'

✔ Level 3 is coded as a '3'

✔ Level 4 is coded as a '4'

✔ Level 5 is coded as a '5'

A unique health state is defined by combining one level from each dimension.

Health state: **12345**

Value Set

- Used to assign a numerical value to a particular health state

Health State	Utility Score / Quality of Life Score
12111	0.96
21334	0.43
43455	0.09

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Health State	Utility Score / Quality of Life Score
12111	0.96
21334	0.43
43455	0.09

QALYs= Survival x Utility Score

BMJ Open

Valuing health-related quality of life among the Indian population: a protocol for the Development of an EQ-5D Value set for India using an Extended design (DEVINE) Study

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ABSTRACT

Introduction Quality-adjusted life year (QALY) has been recommended by the government as preferred outcome measure for Health Technology Assessment (HTA) in India. As country-specific health-related quality of life tariff values are essential for accurate measurement of QALYs, the government of India has commissioned the present study. The aim of this paper is to describe the methods for the Development of an EQ-5D Value set for India using an Extended design (DEVINE) Study. Additionally, this study aspires to establish if the design of 10-time trade-off (TTO) blocks is enough to generate valid value sets.

Methods and analysis A cross-sectional survey using the EuroQol Group's Valuation Technology (EQ-VT) will be undertaken in a sample of 2700 respondents selected from six different states of India using a multistage stratified random sampling technique. The participants will be interviewed using computer-assisted personal interviewing technique. The TTO valuation will be done using 10 composite TTO (c-TTO) tasks and 7 discrete choice experiment (DCE) tasks. Hybrid modelling approach using both c-TTO and DCE data to estimate the potential value set will be applied. Values of all 3125 health states will be predicted using both the conventional EQ-VT design of 10 blocks of 10 TTO tasks, and an extended design of 18 blocks of 10 TTO tasks. The potential added value of the eight additional blocks in overall validity will be tested. The study will deliver value set for India and assess the adequacy of existing 10-blocks design to be able to correctly predict the values of all 3125 health states.

Ethics and dissemination The ethical approval has been obtained from Institutional Ethics Committee of PGIMER, Chandigarh, India. The anonymised EQ-5D-5L value set will be available for general use and in the HTAs commissioned by India's central HTA Agency.

Strengths and limitations of this study

► This is the largest EQ-5D-5L valuation study of the world, and the first preference-based valuation study in the South Asia.

► Generation of the value set will facilitate effective conduct of health technology assessments in India, thereby generating transparent and robust evidence for efficient resource use in healthcare.

► The study will present a useful insight on testing the sensitivity of the current design of the EuroQol Valuation Technology and will present an empirically tested design to generate valid country-specific value sets.

► Due to the exhaustive and lengthy process of interviewing, the respondent fatigue may set in, which may adversely impact the valuation of health states during the latter part of the interview.

► The study aspires to capture health state preferences of the Indian population on the original five dimensions included in the EQ-5D-5L, which was developed in European context, hence there are chances of certain aspects of health being missed, which are important in Indian culture but missing in EQ-5D tool.
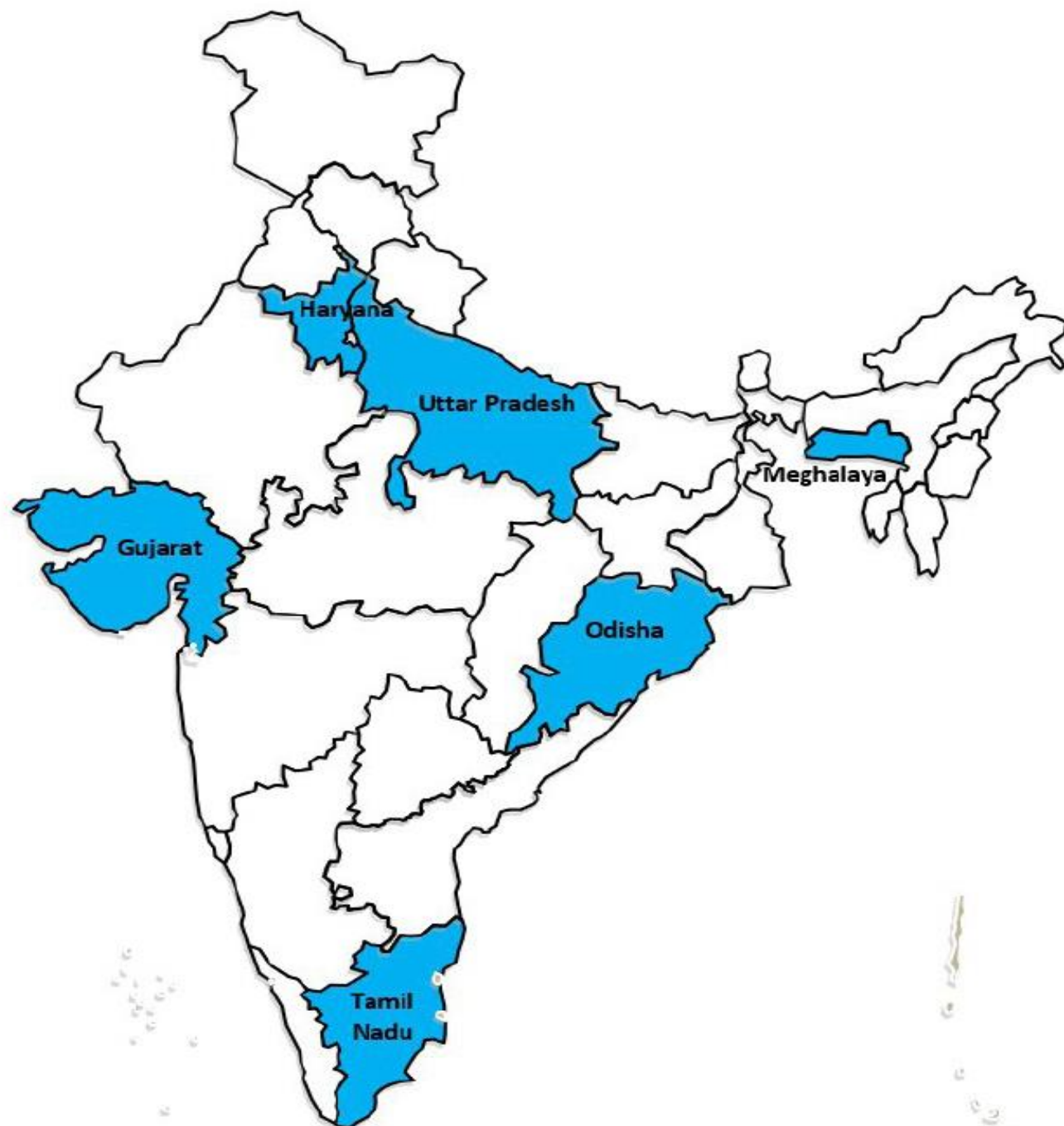
INTRODUCTION

Judicious allocation of monetary resources in healthcare is imperative for low/middle-income countries, as they face the problem of large disease burdens and resource scarcity at the same time.[1 2] Health Technology Assessment (HTA) provides valuable evidence for rational allocation of resources for maximising health and enhancing equity.[3–5] HTA refers to the systematic evaluation of properties, effects and/or impacts of healthcare interventions.[6] Economic evaluation is the tool used in HTA to support decision-making in health, where the costs and the consequences of competing interventions are compared.[7] Among the different methods for economic evaluation, cost-utility analysis is preferred to aid in a comparative assessment of several interventions. For such

Valuation of Health States

- Visual Analogue Scale
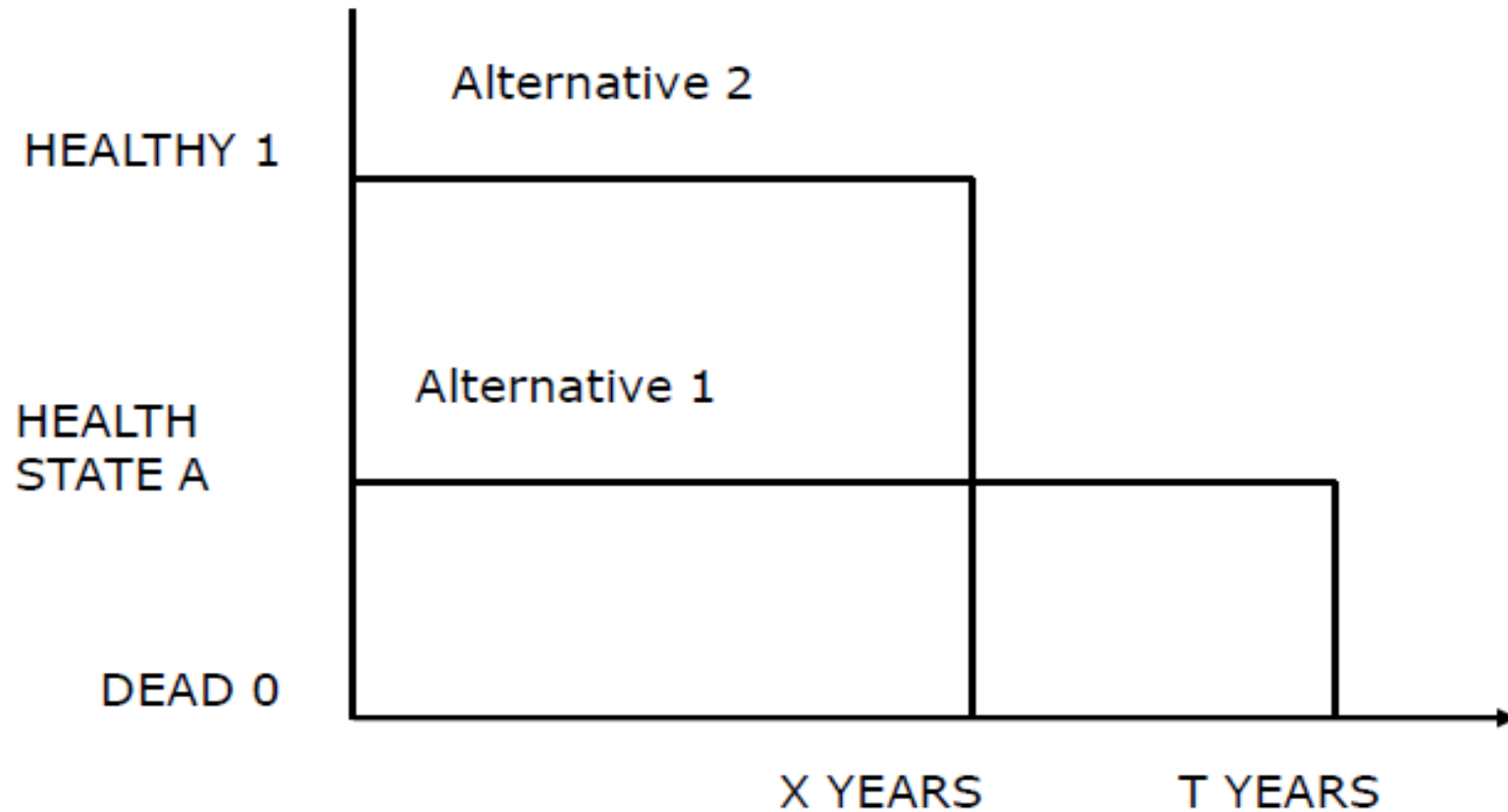
- Time Trade Off

- Standard Gamble

Valuation of Health States

- Time Trade Off

  – Respondent is asked to indicate the amount of time he/ she is willing to give up to attain perfect health.
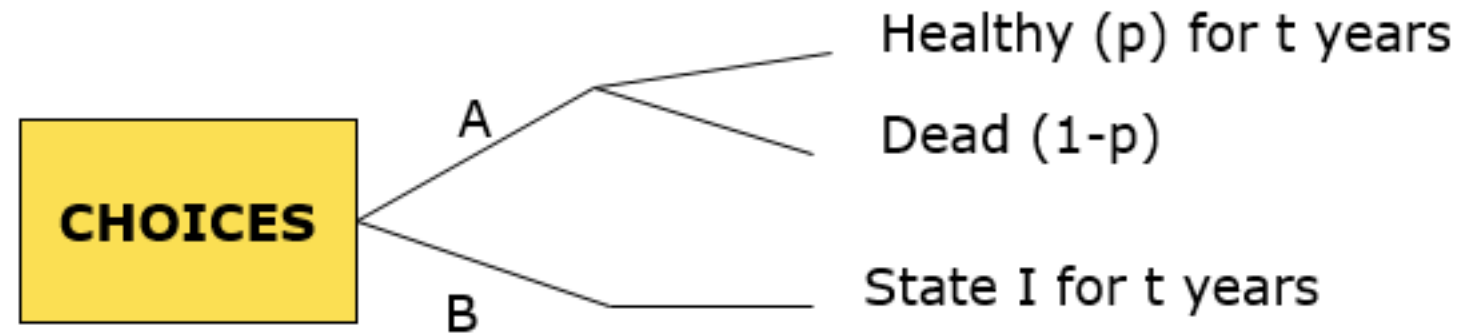
Time Trade Off

Value given to the health state= X/T

Standard Gamble

- Patient is offered a choice between two alternatives
  - Living with disease with certainty **(B)**
  - Taking a gamble on a new treatment with an uncertain outcome **(A)**

If the patient is indifferent between choices A and B when p=0.65, then utility of state I =0.65

Valuing Health in Monetary Terms

- Human Capital Approach

- Contingent Valuation (Willingness to Pay Approach)

Issues with Valuation of Health

- No method is perfect

- WTP: Influenced by ability to pay

- QALY: Inequitable for elderly

- DALY: Whose judgment ? Age-weighting? Social Preference Weighting?
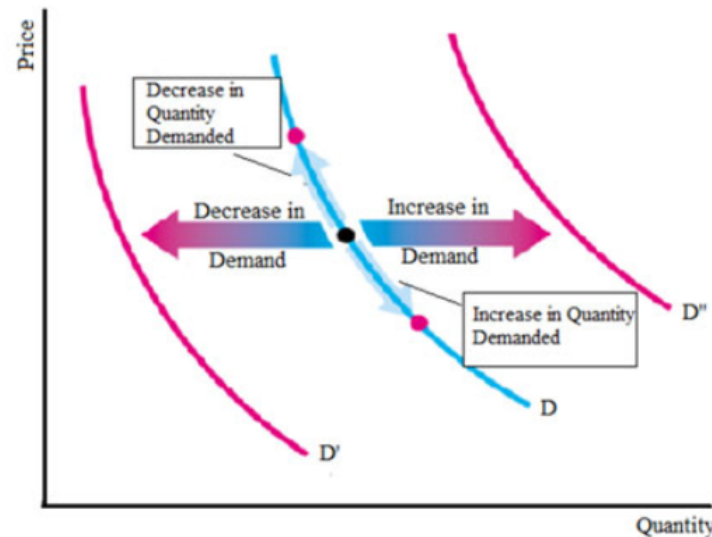
- Adjustment for co-morbidities

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Thank You