The development and current status of EQ-5D

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Objectives

• To describe the origins and development of EQ-5D over the past 25 years
• To review the current status of the EQ-5D “technology”
• To demonstrate the practical potential of EQ-5D in different decision-making situations
• To consider issues in establishing national value sets for EQ-5D health states
The EuroQoL Group

- **Founders**
  - Finland
  - Netherlands
  - (Norway)
  - Sweden
  - UK

- **Extended network**
  - Argentina
  - Canada
  - Chile
  - China
  - Denmark
  - France
  - Germany
  - Greece
  - Hungary
  - Italy
  - Japan
  - Korea
  - New Zealand
  - Portugal
  - Poland
  - Slovenia
  - Spain
  - Taiwan
  - Thailand
  - USA
EQ-5D

• A generic measure of health status (health-related quality of life) capable of being represented as a single index

• Health is defined in terms of 5 dimensions
  - mobility
  - self care
  - usual activity
  - pain / discomfort
  - anxiety / depression

• Each dimension is divided into 3 levels
  - none
  - some
  - extreme
EQ-5D descriptive system

• 243 unique combinations formed from 5 dimensions / 3 levels
• 2 additional states (unconscious and dead)
• Total of 245 states

State 1 2 2 1 3
Mobility (1)
no problems in walking about

Self care (2)
some problems washing self

Usual activities (2)
some problems with usual activity

Pain / discomfort (1)
no pain or discomfort

Anxiety / depression (3)
极端 anxiety or depression
• Tick one box for each group of statements.

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
- I have no problems with performing my usual activities (e.g. work, study, housework, family or leisure 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

Anxiety/Depression
- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed

This state 12223

Logically best state 11111

Logically worst state 33333
Think about how good or bad your own health is today.

- This scale may help. The best health you can imagine is marked 100 and the worst health you can imagine is marked 0.

- Please write in the box below, the number between 0 and 100 that you feel best shows how good your health is today.
How are EQ-5D data presented?

• As a profile
  – based on reported level of problem on each dimension

• As a health state

• As a weighted index
  – based on values of the general public

• As self-rated health status

EQ-5D profile health state weighted index

page 2

self-rated health status

page 3
Does moving from A to B benefit a patient?
*If so, then by how much?*

**Profile A:** 1 1 2 2 2 3

**Profile B:** 1 1 3 2 2 2
EQ-5D valuation

• The standard valuation methodology adopted by the EuroQoL Group and used in all countries is based on a valuation questionnaire distributed by postal survey.
• 2-part questionnaire captures
  – Self-rated health status (EQ-5D)
  – VAS ratings of 16 health states presented as 2 pages of 8 states per page
VAS rating of EQ-5D health states

Health state A

Health state E

Health state C

Health state D

Health state E

Health state F
Measurement and Valuation of Health (MVH) Project

• Important milestone research (1989-93)
• Funded by UK Department of Health
• Comparative study of several valuation methods
  – Standard gamble (SG)
  – Time Trade-Off (TTO)
  – Magnitude estimation
  – Ranking / paired comparisons
  – Visual analogue scale (VAS) rating
MVH final protocol

- **SURVEY METHOD**
  - National representative sample
  - $N \approx 3,400$
  - Face:face interviews ($n \approx 80$ interviewers)
  - Conducted at home

- **VALUATION TASKS**
  - Selected subset of $43/243$ EQ-5D states
  - Each respondent handled 15 tasks
    - Ranking
    - Rating (0-100 VAS)
    - TTO
TIME TRADE-OFF BOARD

Life “A”

No problems with mobility
No problems with self care
No problems with usual activities
No problems with pain / discomfort
No problems with anxiety / depression

Life “B”

Less than full health as defined by EQ-5D descriptive system
Valuation studies based on MVH

- Germany
- Netherlands
- Denmark
- Spain
- United States
- Japan
- South Korea
- Thailand
- Taiwan
- Singapore
- Slovenia
- Zimbabwe
- France
- Poland
- Argentina
- Chile
- Nigeria
- Brazil
- (Russia)
- (Italy)
- (Hungary)
- (Canada)
- (Trinidad & Tobago)
- Colombia?
Population preference weights

Profile A: 1 1 2 2 3

Profile B: 1 1 3 2 2
Population “norms”

mean EQ-5D index

Source: Health Survey for England, 1996
Health inequalities by education

*mean* EQ-5Dindex

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Basic</th>
<th>Intermediate</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>*</td>
<td>***</td>
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<tr>
<td>30-39</td>
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<td>40-49</td>
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<td>50-59</td>
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<td>60-69</td>
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<tr>
<td>70-79</td>
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<tr>
<td>80+</td>
<td>ns</td>
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</table>

*ns* indicates non-significant differences.
EQ-5D health status
by age / smoking behaviour

![Graph showing EQ-5D index by age group for non-smokers and smokers.](image)
Health status in GP clinic patients

![Graph showing health status in GP clinic patients]

- Mean EQ-5D index across different age groups.
- Two lines represent:
  - Blue line: 0 visits
  - Red line: 3 or more visits

Age groups:
- Under 20
- 20 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60 - 69
- 70 - 79
- 80 +
Attenders at primary care clinic

*EQ-5D* profile by diagnostic group

% of patients reporting ANY problem

- mobility
- self care
- usual activity
- pain / discomfort
- anxiety / depression

- mental disorder
- circulatory
- musculoskeletal
- pregnancy
- all patients
EQ-5D in Rheumatoid Arthritis

by disease severity
Choice of provider

mean change in EQ-5D vas

-3.62
2.5
5.2

mean change from pre-op score

NHS - A
private sector
NHS - B
Outcomes in surgery

*EQ-5Dvas*

- cholycystectomy
- hysterectomy
- TURPS
Change in EQ-5DVAS in hysterectomy

Std. Dev = 22.25
Mean = 8.1
N = 57.00
EQ-5D in treatment of HIV/AIDS

weighted index for 2 treatment groups

![Graph showing EQ-5D weighted index for 2 treatment groups, with visits from 1 to 11 and mean weighted index values ranging from 0.70 to 0.86. The graph compares Ritonavir and Usual therapy treatment groups.]
### Examples of clinical areas in which EQ-5D has been applied

<table>
<thead>
<tr>
<th>Acne</th>
<th>Dyspepsia</th>
<th>Low back pain</th>
<th>Population health surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td>Dystonia</td>
<td>Lung cancer</td>
<td>Prostatic hypertrophy</td>
</tr>
<tr>
<td>Alcohol dependency</td>
<td>Endometriosis</td>
<td>Lung embolism</td>
<td>Prostate cancer</td>
</tr>
<tr>
<td>Angioplasty</td>
<td>Enteral nutrition</td>
<td>Lung transplantation</td>
<td>Psoriasis</td>
</tr>
<tr>
<td>Angina (treatment options)</td>
<td>Epilepsy</td>
<td>Lymphoedema</td>
<td>Psychiatric problems in GP practice</td>
</tr>
<tr>
<td>Anorectal reconstruction</td>
<td>Erectile dysfunction</td>
<td>Magnetic Resonance Imaging</td>
<td>Redundancy (impact of)</td>
</tr>
<tr>
<td>Asthma</td>
<td>Fabry’s disease</td>
<td>Melanoma (stage III)</td>
<td>Rehabilitation (effects of)</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>Gastro-enteritis</td>
<td>Menorrhagia</td>
<td>Renal disease (end-stage)</td>
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<tr>
<td>Bone marrow transplant</td>
<td>General practice</td>
<td>Migraine</td>
<td>Renal oncology</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>Geriatrics</td>
<td>Multiple Sclerosis</td>
<td>Renal (kidney stone disease)</td>
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<td>Breast cancer screening</td>
<td>Gillies de la Tourette</td>
<td>Myeloid Leukaemia</td>
<td>Respiratory illness</td>
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<tr>
<td>Bronchitis</td>
<td>Graves eye disease</td>
<td>Myocardial infarction</td>
<td>Rheumatoid arthritis</td>
</tr>
<tr>
<td>Cardiac surgery</td>
<td>Growth Hormone</td>
<td>Neonatal surgery</td>
<td>Rhinitis</td>
</tr>
<tr>
<td>Cardiology</td>
<td>Haemophilia</td>
<td>Neural tube defects</td>
<td>Road accidents (non-fatal)</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>Hip fracture/replacement</td>
<td>Neurosurgery</td>
<td>Schizophrenia</td>
</tr>
<tr>
<td>Cataract surgery</td>
<td>HIV infection</td>
<td>Non-Hodgkin’s disease</td>
<td>Sepsis</td>
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<tr>
<td>Chemotherapy (impact)</td>
<td>Hodgkin’s dis.</td>
<td>Lupus</td>
<td>Sinusitis</td>
</tr>
<tr>
<td>Chronic fatigue</td>
<td>Homeopathy</td>
<td>Lymphoma</td>
<td>Smoking (impact of)</td>
</tr>
<tr>
<td>Chronic illness</td>
<td>Hormone replacement therapy</td>
<td>Nutrition</td>
<td>Stent</td>
</tr>
<tr>
<td>Cochlear implantation</td>
<td>Hospital waiting lists</td>
<td>Obstructive sleep apnoea</td>
<td>Stroke</td>
</tr>
<tr>
<td>Colles fracture</td>
<td>Hysterectomy</td>
<td>Orthopaedic medicine</td>
<td>Trauma</td>
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<tr>
<td>Colorectal carcinoma</td>
<td>Imperforate anus</td>
<td>Osteoarthritis</td>
<td>Tuberculosis (prevention in HIV)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>Inguinal hernia</td>
<td>Pain</td>
<td>Turner’s syndrome</td>
</tr>
<tr>
<td>Conservation work (benefits of)</td>
<td>Incontinence</td>
<td>Pancreatic cancer</td>
<td>Urology</td>
</tr>
<tr>
<td>Cosmetic surgery</td>
<td>Intensive care</td>
<td>Parenteral nutrition</td>
<td>Vascular surgery</td>
</tr>
<tr>
<td>Cystic fibrosis</td>
<td>Intestinal failure</td>
<td>Peripheral arterial disease</td>
<td>Venous leg ulcers</td>
</tr>
<tr>
<td>Dementia</td>
<td>Ischaemic heart disease</td>
<td>Peripheral vascular disease</td>
<td>Visual impairment</td>
</tr>
<tr>
<td>Detoxification</td>
<td>Joint replacement</td>
<td>Physiotherapy</td>
<td>Weight impairment</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Leg ulcer clinics</td>
<td>Picture archiving and Communication systems (PACS)</td>
<td>Women’s surgery</td>
</tr>
<tr>
<td>Drug monitoring (nursing home residents)</td>
<td>Liver disease</td>
<td></td>
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</tbody>
</table>
### MOBILITY
- I have no problems walking
- I have slight problems walking
- I have moderate problems walking
- I have severe problems walking
- I am unable to walk

### 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
EQ-5D-Y

**Describing your health TODAY**

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

**Mobility (walking about)**
- I have **no** problems walking about
- I have **some** problems walking about
- I have a **lot** of problems walking about

**Looking after myself**
- I have **no** problems washing or dressing myself
- I have **some** problems washing or dressing myself
- I have a **lot** of problems washing or dressing myself

**Doing usual activities** (for example, going to school, hobbies, sports, playing, doing things with family or friends)
- I have **no** problems doing my usual activities
- I have **some** problems doing my usual activities
- I have a **lot** of problems doing my usual activities

**Having pain or discomfort**
- I have **no** pain or discomfort
- I have **some** pain or discomfort
- I have a **lot** of pain or discomfort

**Feeling worried, sad or unhappy**
- I am **not** worried, sad or unhappy
- I am **a bit** worried, sad or unhappy
- I am very worried, sad or unhappy

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**How good is your health TODAY**

The best 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

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*We would like to know how good or bad your health is TODAY*

*This line is numbered from 0 to 100*

*100 means the best health you can imagine*

*0 means the worst health you can imagine*

*Please, mark an X on the line that shows how good or bad your health is TODAY*
Practical issues in valuation of EQ-5D

• Sampling frame
  – Social preferences ?
  – Patient preferences ?

• Preference elicitation method
  – TTO
  – Other ?

• Mode of administration
  – Interviewer
  – Computer / web based

Descriptive classification
  3 level

5 level

Selection of states
Factorial block design

Number / choice of states

Form of analysis
Individual

Aggregate (mean / median)