

Introduction to QALYs and Preference Measurement in CEA

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Overview

- Brief review of the ICER
- Outcomes in CEA
- Concept of QALYs for a CEA
- Estimating QALYs
- Guidelines on selecting measures

The ICER

- CEA compares the outcomes and costs of two (or more) interventions

$$(Cost_{study} - Cost_{usual\ care})$$

$$(Outcomes_{study} - Outcomes_{usual\ care})$$

Policy Implications

- Who is your audience?
- How will the results be used?
- What perspective should you use?

CEA/CUA review

- CEA compares the outcomes and costs of two (or more) interventions;
 - The outcome is defined by the health benefit achieved with the intervention.
 - The outcome (s) are quantified in a single scale

Scenario

- Intervention to reduce/eliminate post-op infections in patients following hip fracture repair

What costs to include?

What outcomes to use?

Scenario

- Intervention to reduce/eliminate post-op infections in patients following hip fracture repair

Outcomes for CEA

- Perspective – Hospital system (payer)?
 - Natural units present in both groups

Outcomes for CEA

- Perspective – Societal?
 - Quantifies length of illness/life
 - Quality of life
 - Measured in both groups
 - Comparable across programs

The Quality Adjusted Life Year (QALY)

- Describes duration of illness/years of survival, adjusted for quality of life experienced during that survival.

QALYs Overview

- You have 1 year in perfect health = 1 QALY
- I have 1 year in “good” health (.80 QALY)
- 1 year difference = .20 QALYs

Estimation of QALYs

- Requires:
 - Description of the health states experienced by patients/subjects
 - Estimation of the duration of each health state
 - Comparison to or assessment of individual or community preferences for each health state
 - Standardized to 1 year

QALY Example

- Prophylactic antibiotic Rx vs. standard of care
- Weights range from 0-1

	3 mo.	3 mo.	3 mo.	3 mo.	Total QALYs
New Txt.	.50 (.50 x .25) .125	.60 (.60 x .25) .15	.80 (.80 x .25) .20	.80 (.80 x .25) .20	(.125+.15+.20+.20) =.675
UC	.50 (.50 x .25) .125	.35 (.35 x .25) .0875	.50 (.50 x .25) .125	.80 (.80 x .25) .20	(.125+.0875+.125+.20) =.5375

Calculating cost/QALY

- ICER – New Rx vs. standard care
 - *(hypothetical all other costs are equal)*

$$\frac{(\$10,000 - 0)}{(.675 - .5375)} = \frac{\$10,000}{.1375} = \$72,727 / QALY$$

Deriving preferences or utilities for health states

- Basic methodology:
 - Individuals provide a personal reflection on the relative value (preference weight) of different health states experienced or described.
 - Patients
 - Providers
 - Community Sample

Deriving preferences or utilities

- Three methods to derive preferences:
 - Off the shelf
 - Direct:
 - Indirect:

Off-the-shelf values

- Use preference weight determined in another study for health state of interest
 - Not all health states have been characterized
- Useful in decision modeling

Direct methods

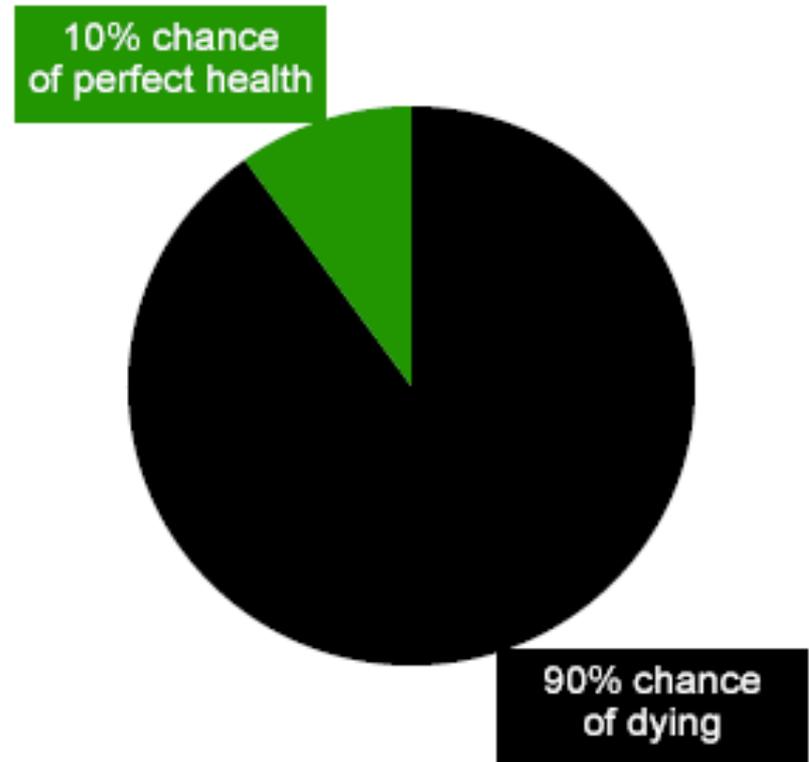
- Individuals asked to choose (declare *preferences*) between their current health state and alternative health status scenarios
- Individuals make these choices based on their own comprehensive health states (at the time of measurement)

How are you today?

- You are able to see, hear and speak normally
- You require the help of another person and a cane to walk or get around.
- You are occasionally angry, irritable, anxious and depressed.
- You are able to learn and remember normally.
- You are able to eat, bathe, dress and use the toilet normally.
- You are free of pain and discomfort.

Direct: Standard Gamble (SG)

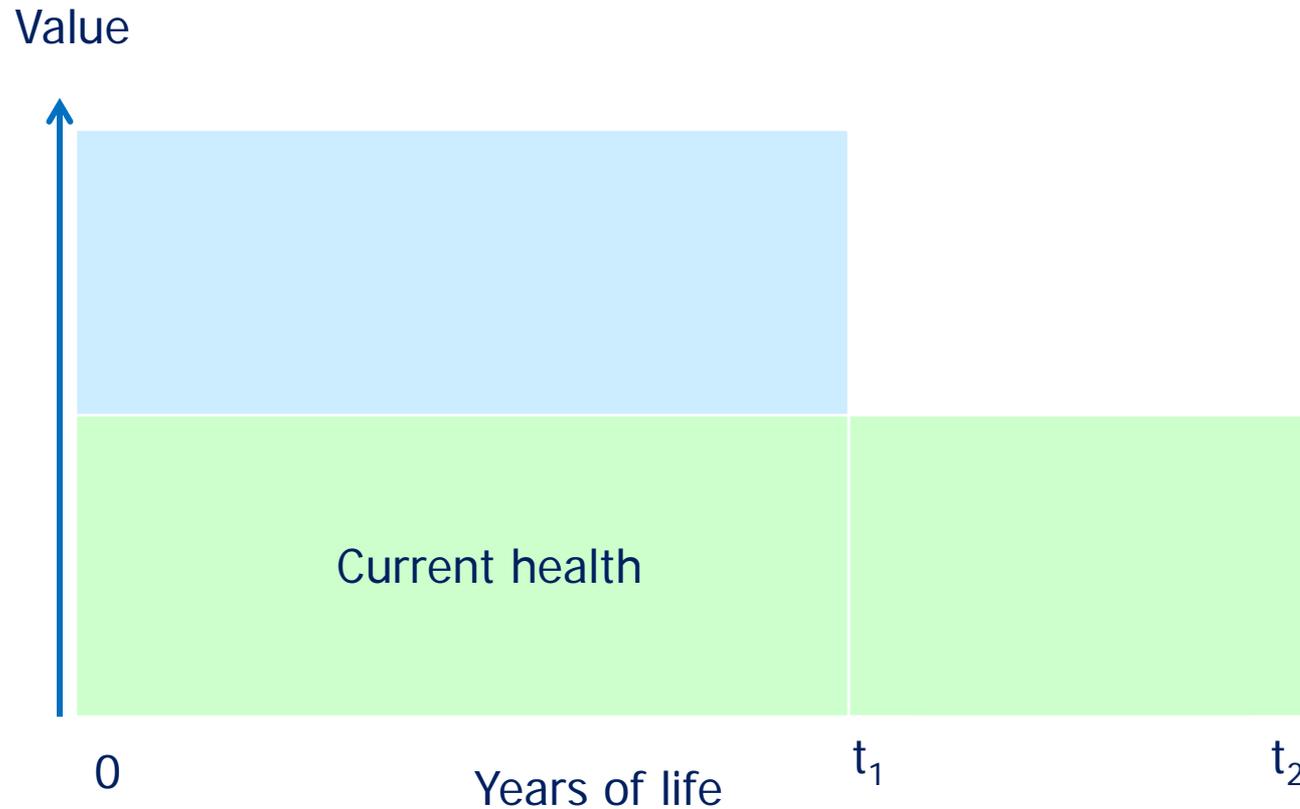
- Live rest of life in current health state; or
- “take a pill (with risks) to be restored to perfect health”
- Scale represents risk of death respondent is willing to bear in order to be restored to full health.



Considering the health state described

- What risk of death would you be willing to take (by taking a pill, etc.) to be restored to (your) perfect health
- 10% ?
- 20%
- 0%

Direct method: time trade-off



Considering the health state described

- How many years of life in your current state would you be willing to give up to live out your life in perfect health?
- 5 years
- 10 years
- Any years?

Direct Methods (SG, TTO)

- May be necessary if effects of intervention are complex:
 - Multiple domains
 - Effects not captured in indirect or disease-specific instruments

Direct Method (SG, TTO)

- High variance in estimates from patients in a trial
 - Reflect risk aversion, feeling about disability
 - High variance = large sample size
- Not the “community value” specified by Gold et al

Indirect Methods

- Study subjects complete surveys at intervals during a study.
- Multiple domains of health
- Composite describes the health status of the respondent at that moment
- Composite state is linked to community results (or “weights”)

How are you today (#2)

- Which statements best describe you today?
 - Mobility:
 - No problems, some problems, extreme problems
 - Pain
 - Anxiety/depression
 - Self-care
 - Usual activity

How many health states?

Indirect Measures

- Health Utility Index (HUI)
- EuroQol (EQ-5D)
- Quality of Well-Being Scale (QWB)
- SF-6D

Indirect measures vary in:

- Dimensions or attributes included;
- The size and nationality of the sample population used to establish the weights;
- Health states defined by the survey; and
- How the summary score is calculated, etc.

Indirect measures

- Standard surveys that are widely used
- Describe generic health states
- May lack “responsiveness”

Health Utility Index (HUI)

- 41 questions (many items can be skipped)
 - can derive both HUI Mark 2 and HUI Mark 3 health utility scores.
- 8 domains of health and 972,000 health states
 - vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain
- Basis of domain weights:
 - Canadian community sample rated hypothetical health states
 - Utility theory

EuroQol EQ-5D

- 5 questions in 5 domains of health
 - Mobility, self-care, usual activity, pain/discomfort, or anxiety/depression
 - 245 health states.
- Basis of domain weights:
 - Past studies based on British community sample
 - New US weights recently published

The QWB

Quality of Well-Being Scale

- Two versions
 - Interviewer or self-administered (QWB-SA)
- QWB-SA is more feasible
 - 76 questions; 1215 health states defined;
 - Includes symptoms, mobility, physical activity, & social activity
- Basis of domain weights:
 - Primary care patients in San Diego, CA

SF-6D*

- Converts SF-36 or SF-12 scores to utilities
 - When based on SF-36, uses 10 items
 - When based on SF-12, uses 7 items
- 6 health domains
 - physical functioning, role limitations, social functioning, pain, mental health, and vitality
- Defines 18,000 health states
- Basis of domain weights
 - British community sample

Disease-specific surveys

- When to use?
- How to use?

Disease-specific surveys

- Key methods issues:
 - Difficult to describe health state to community respondent
 - Difficult to establish values when there are a large number of possible health states
- Expensive, but potentially sensitive to variations in quality of life for this disease
- Often used in addition to generic measure

Which method to use?

- Trade-off between sensitivity and burden
- Start with a literature search re:
 - the condition of interest
 - In the population of interest
 - For the outcomes of interest

Hierarchy of methods

- Off-the-shelf utility values
- Indirect Measures (HUI, EQ-5D, QWB, SF-6D)
- Disease-specific survey during trial and transform later to preferences
- Direct measures (SG, TTO)

Important Resources

- Tufts Center for Risk Assessment
 - <http://research.tufts-nemc.org/cear4>
- National Institute for Health Research, UK
 - <http://www.nets.nihr.ac.uk/>

Important Resources

- Brazier J, Deverill M, Green C, Harper R, Booth A. A Review of the use of health status measures in economic evaluation. Health Technol. Assess 1999;3(9).
 - <http://www.nets.nihr.ac.uk/projects/hta/934708>
- Brazier et al. Developing and testing methods for deriving preference-based measures of health from condition-specific measures (and other patient-based measures of outcome).
<http://www.nets.nihr.ac.uk/projects/hta/069704>

Important Resources

- Table of published utility weights (preferences) for different health states
 - <https://research.tufts-nemc.org/cear4/SearchingtheCEARegistry/SearchtheCEARegistry.aspx>
- Preference Measurement in Economic Analysis. Guidebook. VA Health Economics Resource Center.
 - <http://www.herc.research.va.gov/publications/guidebooks.asp>

QUESTIONS and COMMENTS