Introduction to QALYs and Preference Measurement in CEA

Patsi Sinnott, PT, PhD, MPH

HERC Economics Course

Oct. 31, 2012

Overview

- Brief review of CEA
- 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

$$\frac{(Cost_{study} - Cost_{usual\,care})}{(Outcomes_{study} - Outcomes_{usualcare})}$$

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

Outcomes for CEA

- Perspective – Societal?
  - Quantifies length of illness/life
  - Quality of life
  - 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

QALY Example

- New cancer treatment vs. standard of care
- Weights range from 0-1

	6 mo.	6 mo.	6 mo.	6 mo.	Total QALYs
New Txt.	.90 (.90 x .50)	.30 (.30 x .50)	.50 (.70 x .50)	.25 (.25 x .50)	(.45+.15+.35+.13) = .5375/2 years = *.268/year*
UC	.90 (.90 x .50)	.50 (.50 x .50)	.25 (.25 x .50)	-	(.45+.25+.25+0) = .4125/2 years = *.2065/year*

Calculating cost/QALY

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

$$(\$10{,}000 - \$0 / (.268 - .2065) = \$162{,}602 / QALY$$

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

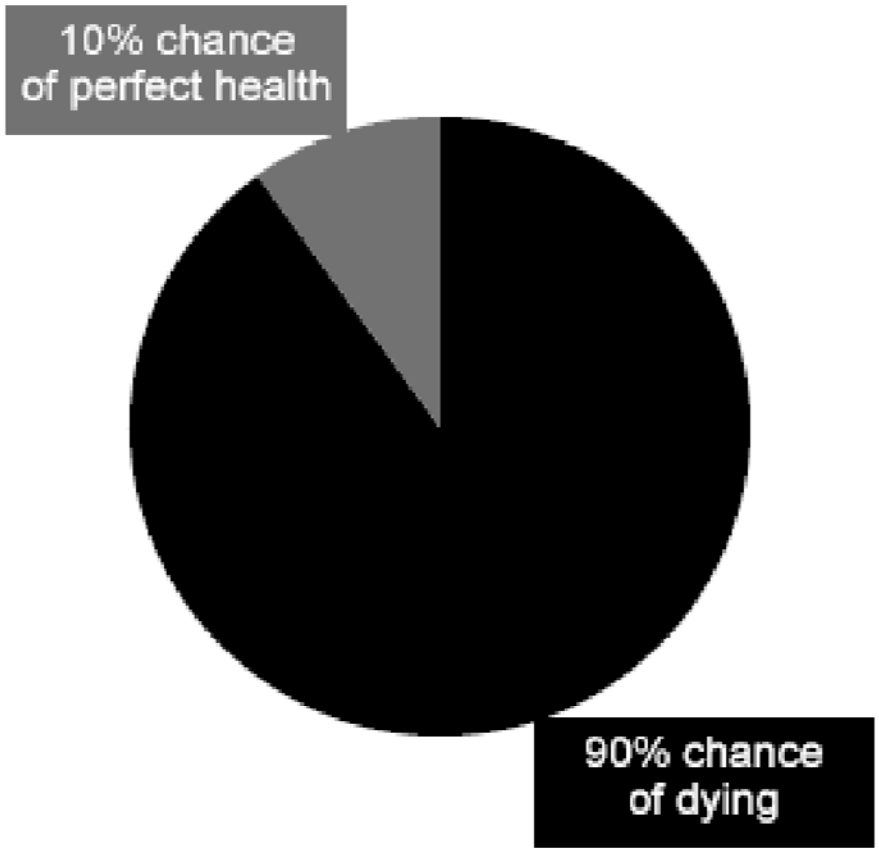
- Individuals asked to choose (declare *preferences*) between their current health state and alternative health status scenarios
- Individuals make these choices based on their own comprehensive health states (at the time of measurement)

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)

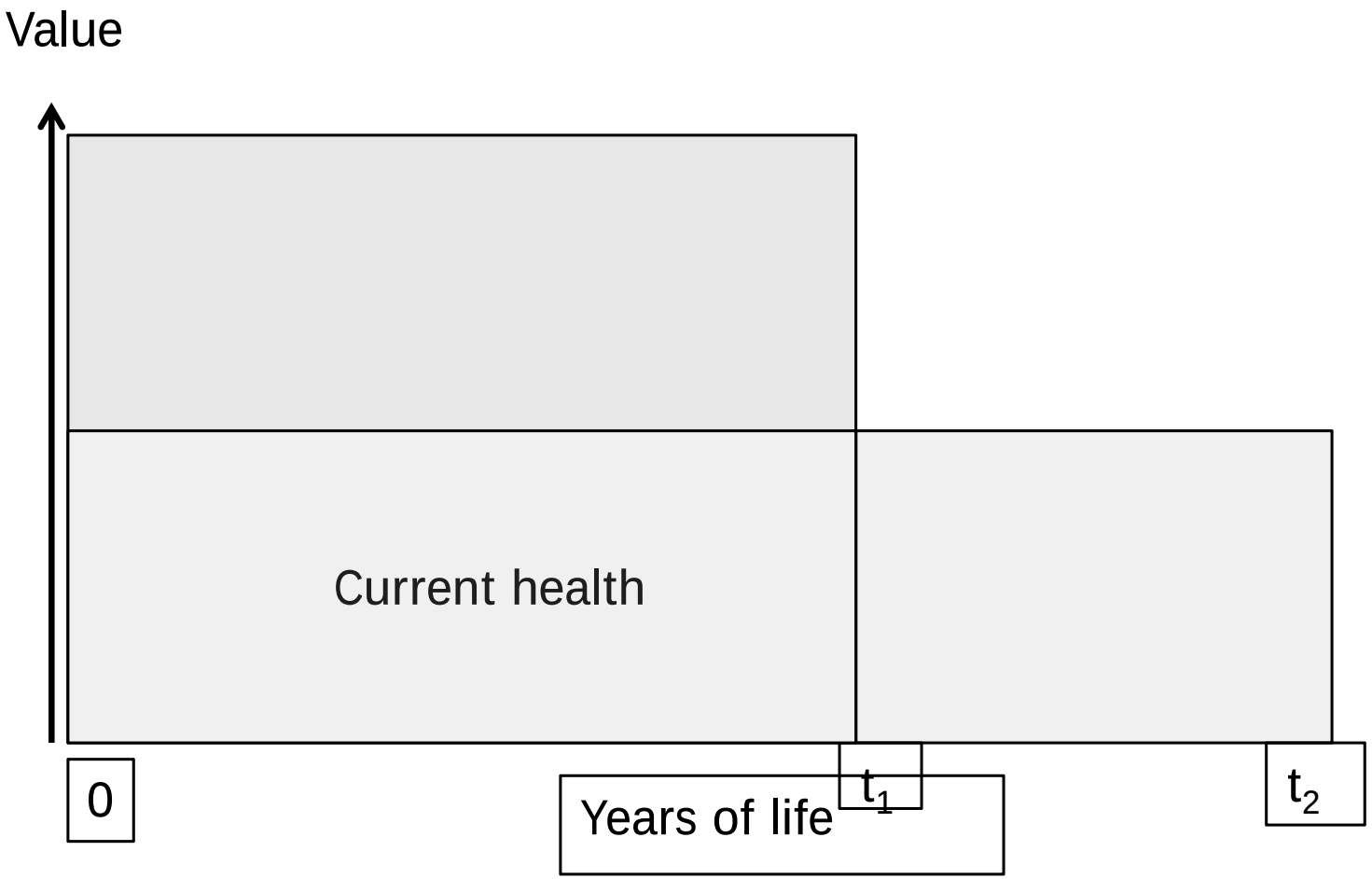
- Live rest of life in current health state; or
- "take a pill (with risks) to be restored to perfect health"
- Scale represents risk of death respondent is willing to bear in order to be restored to full health.



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 several surveys during a study.
- Multiple domains of health
- Composite describes the health status of the respondent at that moment
- Composite state is linked to results from previously studied community samples.

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
- Review published studies on psychometric properties *in the population of interest*
- 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

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
- 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.hta.ac.uk/project/2481.asp

Important Resources

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

QUESTIONS and COMMENTS