Use of Preference-Based Health-Related Quality of Life Measures in Cost-Effectiveness Studies (HLT POL 239B)

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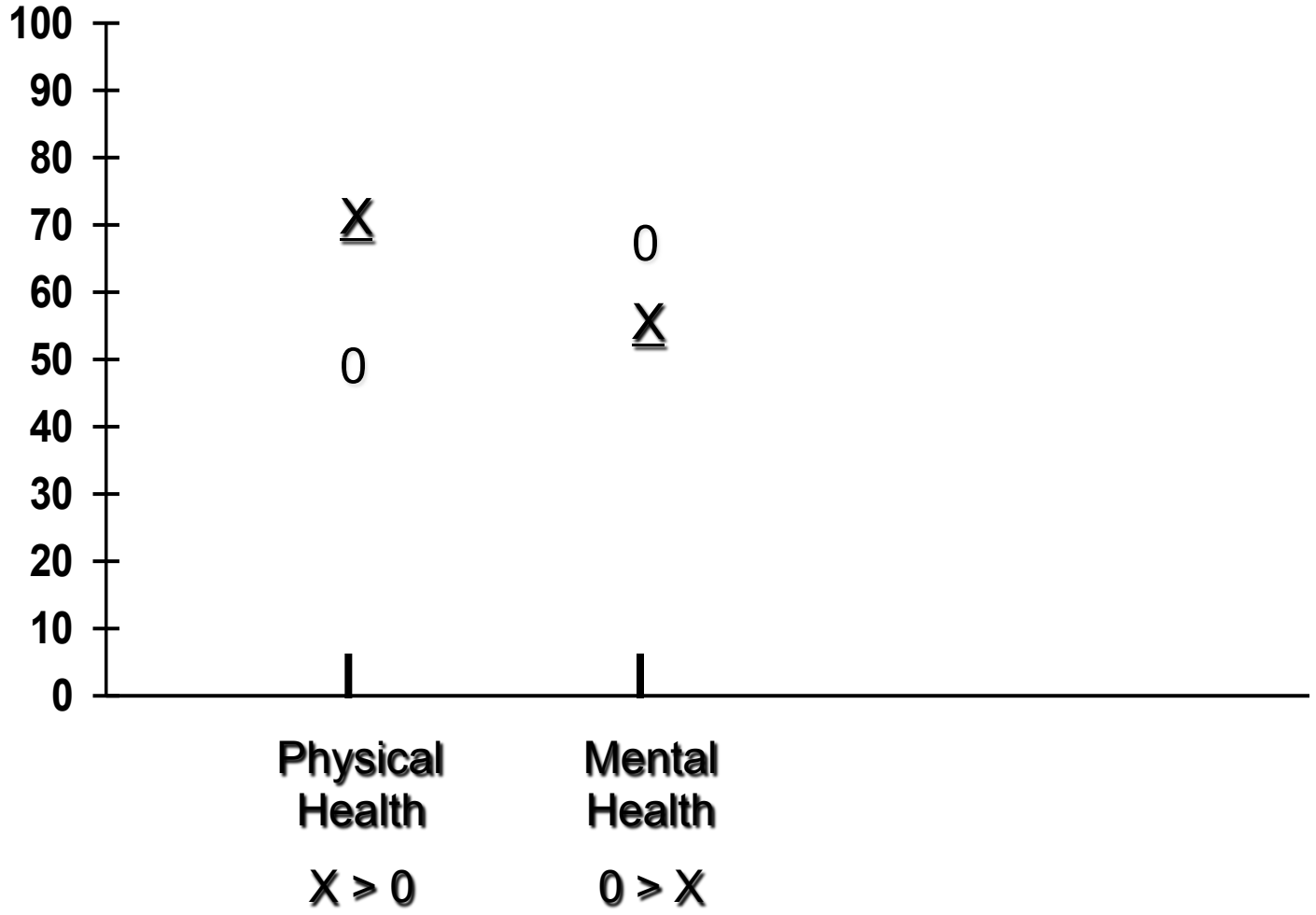
http://gim.med.ucla.edu/FacultyPages/Hays/

Access to Cost-Effective Care

Cost ↓

Effectiveness ↑

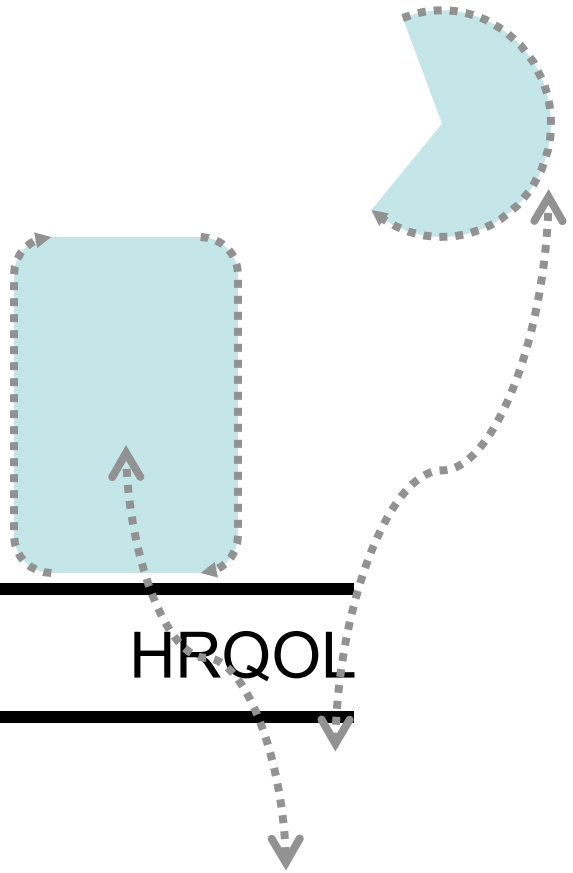
Is New Treatment (X) Better Than Standard Care (O)?



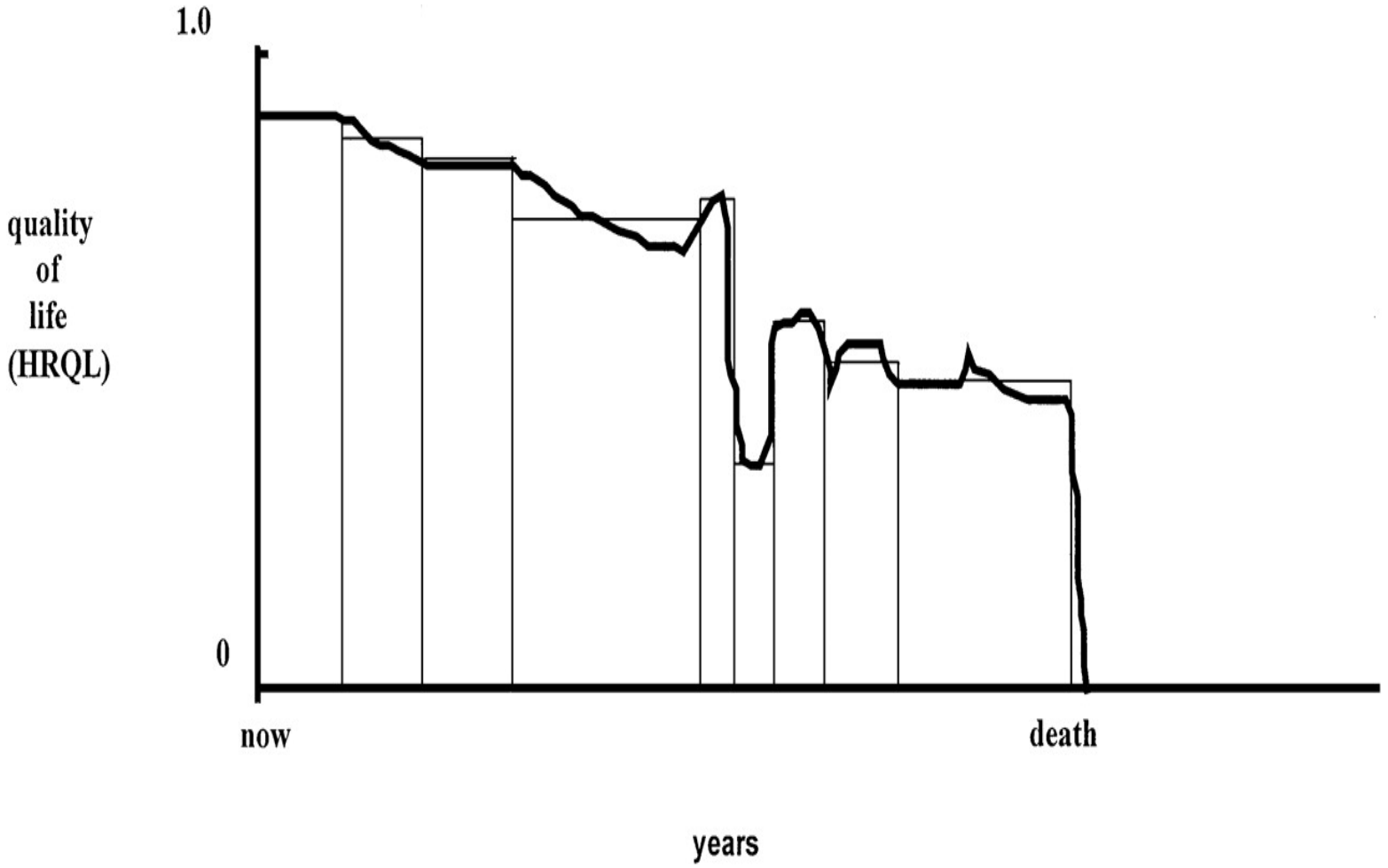
Is Medicine Related to Worse HRQOL?

Person	Medication Use	HRQOL (0-100)
	1	Nodead
	2	Nodead
	3 No	50
	4 No	75
	5 No	100
	6 Yes	0
	7 Yes	25
	8 Yes	50
	9 Yes	75
	10 Yes	100

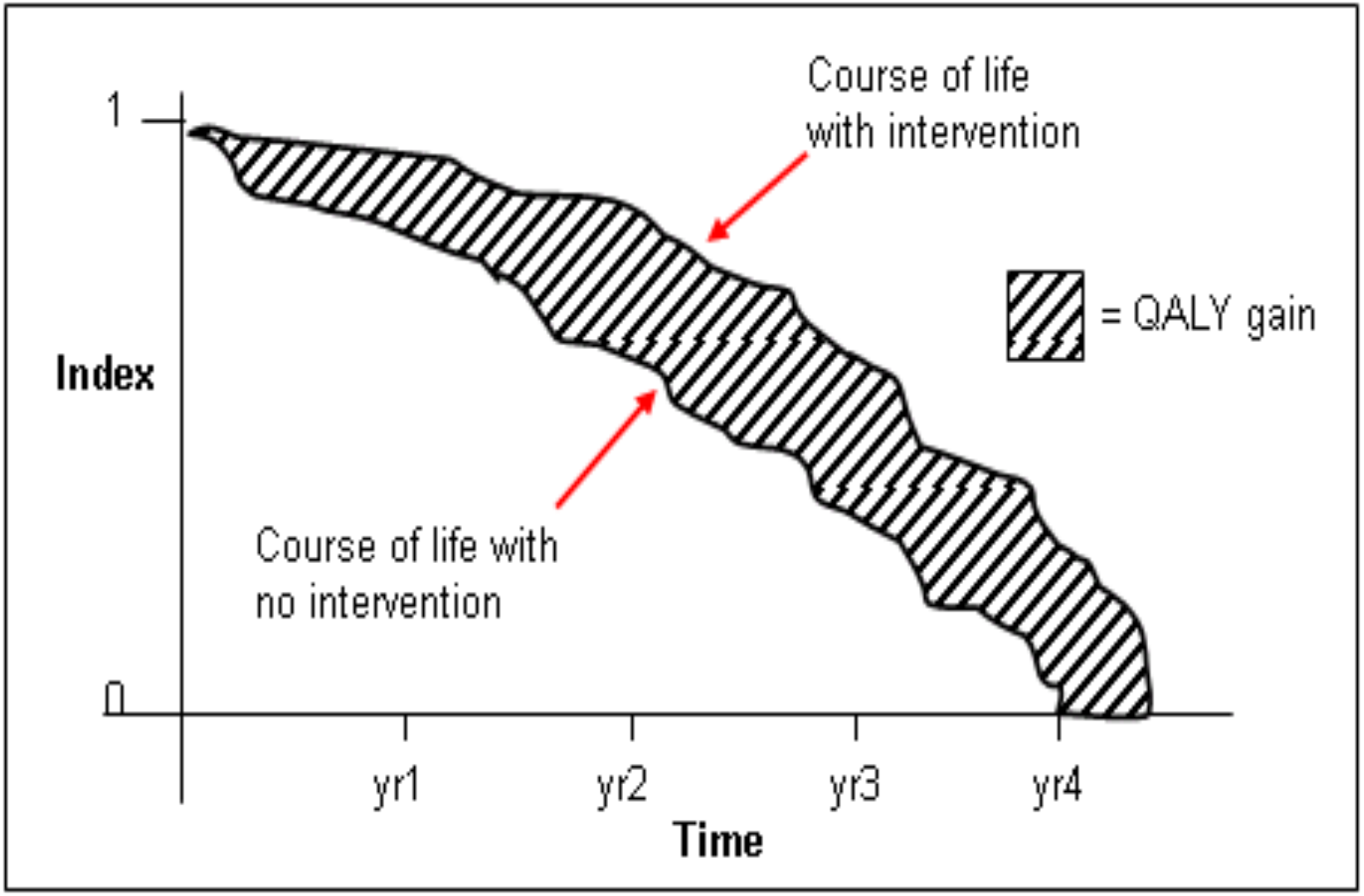
Group	n	HRQOL
No Medicine	3	75
Yes Medicine	5	50



Quality of Life for Individual Over Time



http://www.ukmi.nhs.uk/Research/pharma_res.asp



"QALYs: The Basics"

Milton Weinstein, George Torrance, Alistair McGuire
(Value in Health, 2009, vol. 12 Supplement 1)

- What is value?
  - Preference or desirability of health states
- How are QALYs used?
  - Societal resource allocation
  - Personal decisions such as decision about whether to have a treatment
  - Societal or program audit
    - Evaluate programs in terms of health of the population.

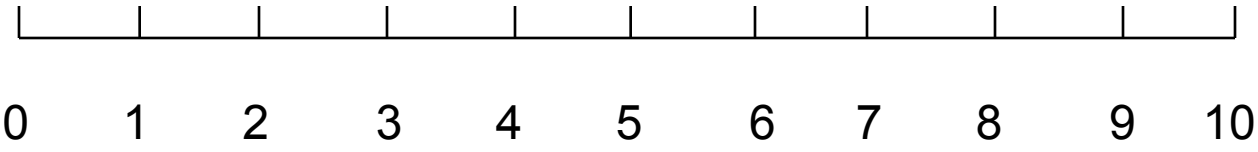
Direct Preference Measures

- Underlying attributes unknown
  - Rating Scale
  - Standard gamble
  - Time tradeoff

Rating Scale

Overall, how would you rate your current health?

(Circle One Number)



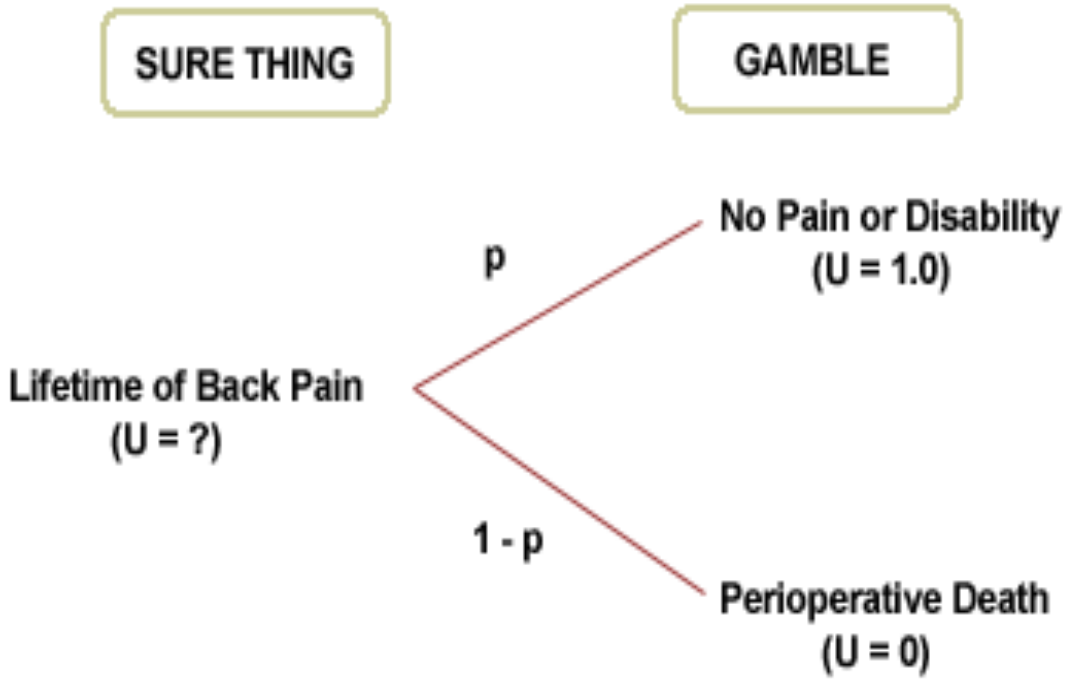
0 1 2 3 4 5 6 7 8 9 10

Worst possible health (as bad or worse than being dead)

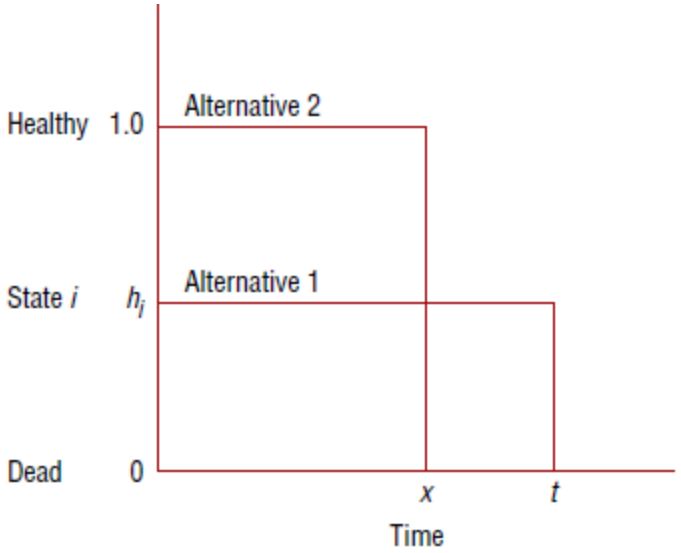
Half-way between worst and best

Best possible health

Standard Gamble

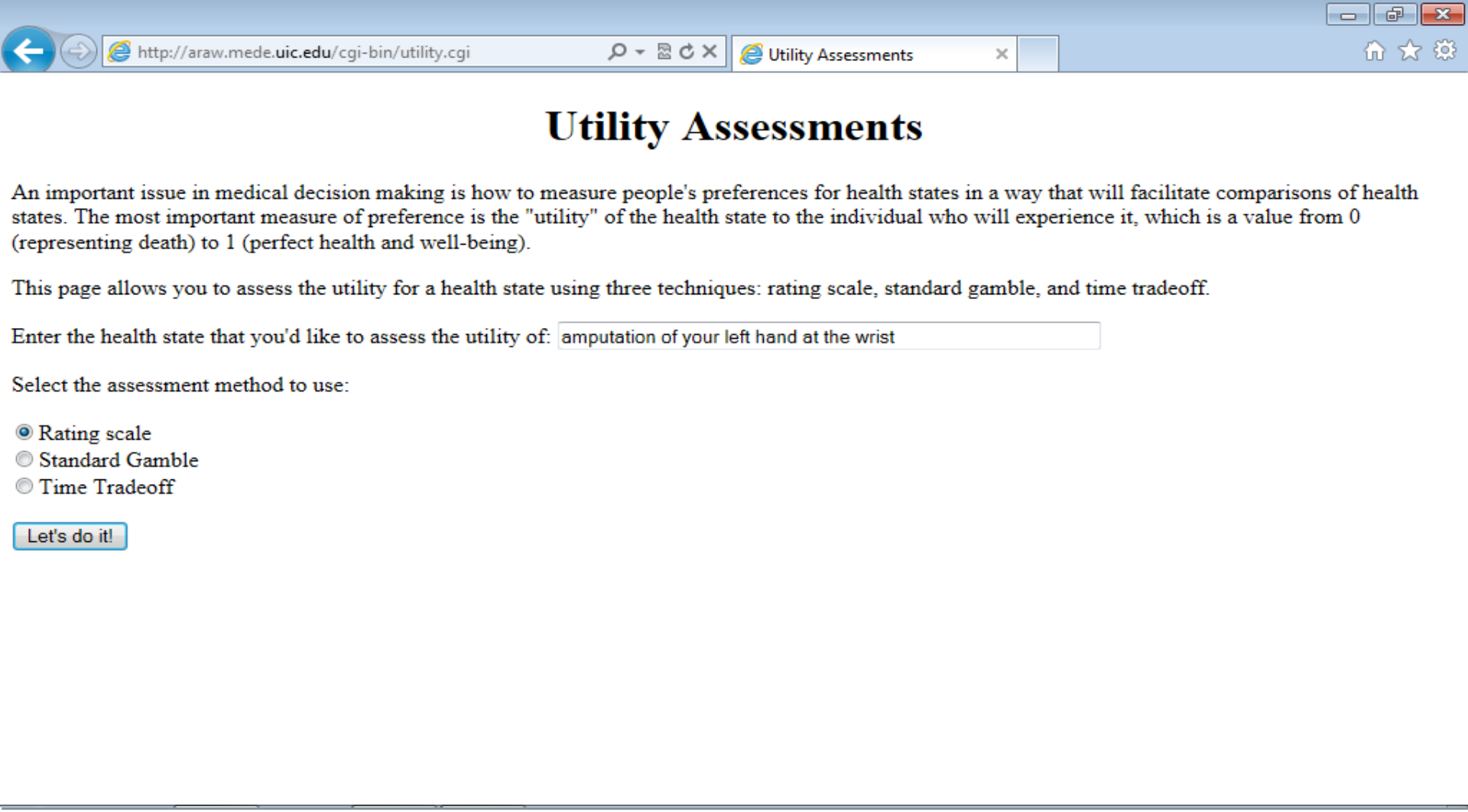


Time Tradeoff



Source: DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM: *Pharmacotherapy: A Pathophysiologic Approach, 8th Edition*: www.accesspharmacy.com

Alternative 1 is current health for time “t” (given), followed by death.
Alternative 2 is full health for time “x” (elicited), followed by death.
x/t = preference for current health



http://araw.mede.uic.edu/cgi-bin/utility.cgi

SG>TTO>RS

- $SG = TTO^{a}$
- $SG = RS^{b}$

Where a and b are less than 1

Indirect Preference Measures

- Attributes know and used to estimate societal preferences
  - Quality of Well-Being (QWB) Scale
  - EQ-5D
  - HUI2 and HUI3
  - SF-6D

Quality of Well-Being (QWB) Scale

- Summarize HRQOL in QALYs
  - Mobility (MOB)
  - Physical activity (PAC)
  - Social activity (SAC)
  - Symptom/problem complexes (SPC)

- Well-Being Formula: $w = 1 + MOB + PAC + SAC + SPC$

Quality of Well-Being Weighting Procedure

Each page in this booklet tells how an imaginary person is affected by a health problem on one day of his or her life. I want you to look at each health situation and rate it on a ladder with steps numbered from zero to ten.

The information on each page tells 1) the person's age group, 2) whether the person could drive or use public transportation, 3) how well the person could walk, 4) how well the person could perform the activities usual for his or her age, and 5) what symptom or problem was bothering the person.

Adult (18-65)
Drove car or used public transportation without help (MOB)
Walked without physical problems (PAC)
Limited in amount or kind of work, school, or housework (SAC)
Problem with being overweight or underweight (SYM)

Your own health state today

By placing a tick in one box in each group below, please indicate which statement best describes your own health state today.

Do not tick more than one box in each group.

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 and dressing myself ☐
- I am unable to wash or dress myself ☐

Usual Activities (eg. 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 ☐

Anxiety/Depression

- I am not anxious or depressed ☐
- I am moderately anxious or depressed ☐
- I am extremely anxious or depressed ☐

Correlations Among Indirect Measures

	EQ-5D	HUI2	HUI3	QWB-SA	SF-6D
EQ-5D	1.00				
HUI2	0.71	1.00			
HUI3	0.68	0.89	1.00		
QWB	0.64	0.66	0.66	1.00	
SF-6D	0.70	0.71	0.69	0.65	1.00

Fryback, D. G. et al., (2007). US Norms for Six Generic Health-Related Quality-of-Life Indexes from the National Health Measurement Study. Medical Care, 45, 1162- 1170.

Change in Indirect Preference Measures Over Time

	Cataract (1 mon. – B)	Heart F (6 mons. – B)
HUI3	0.05	0.02
HUI2	0.03	0.00
QWB-SA	0.02	0.03
EQ-5D	0.02	0.00
SF-6D	0.00	0.01

Kaplan, R. M. et al. (2011). Five preference-based indexes in cataract and heart failure patients were not equally responsive to change. J Clinical Epidemiology, 64, 497-506.

ICC for change was 0.16 for cataract and 0.07 for heart failure.
Feeny, D. et al. (2011). Agreement about identifying patients who change over time: Cautionary results in cataract and heart failure patients. Medical Decision Making, 32 (2), 273-286.

Existing Literature

- Most chronic medical conditions have a negative impact on daily functioning and well-being.
  - Rothrock et al., J Clin Epidemiology, 2010
- Medicare managed care beneficiaries with cancer report significantly worse physical health (SF-36 physical component summary score) than those without cancer.
  - Smith et al., Health Care Financing Review, 2008
- Significantly worse mental health is reported for some cancers (non-small cell lung, non-Hodgkin's lymphoma, female breast, colorectal, and bladder)
  - Smith et al., Health Care Financing Review, 2008

Specific Aims

Among Medicare managed care beneficiaries …

- 1) Do the associations of different types of cancer and (non-cancer) chronic conditions with health-related quality of life vary among Medicare managed care beneficiaries?

- 2) Do the associations of non-cancer conditions with health-related quality of life differ for those who have cancer versus do not?

- 3) Do the associations between cancer and health-related quality of life vary by stage of disease?

SEER-MHOS Dataset (1)

- Surveillance, Epidemiology and End Results (SEER) program of cancer registries that collect standardized clinical and demographic information for persons with newly diagnosed (incident) cancer in specific geographical areas
- Began in 1973 and covers ~ 26% of U.S. pop.
  - http://seer.cancer.gov/registries/list.html
  - California, Connecticut, Hawaii, Iowa, Kentucky, Louisiana, New Mexico, New Jersey, Utah
  - Atlanta, Detroit, rural Georgia, Seattle-Puget Sound metropolitan areas

SEER-MHOS Dataset (2)

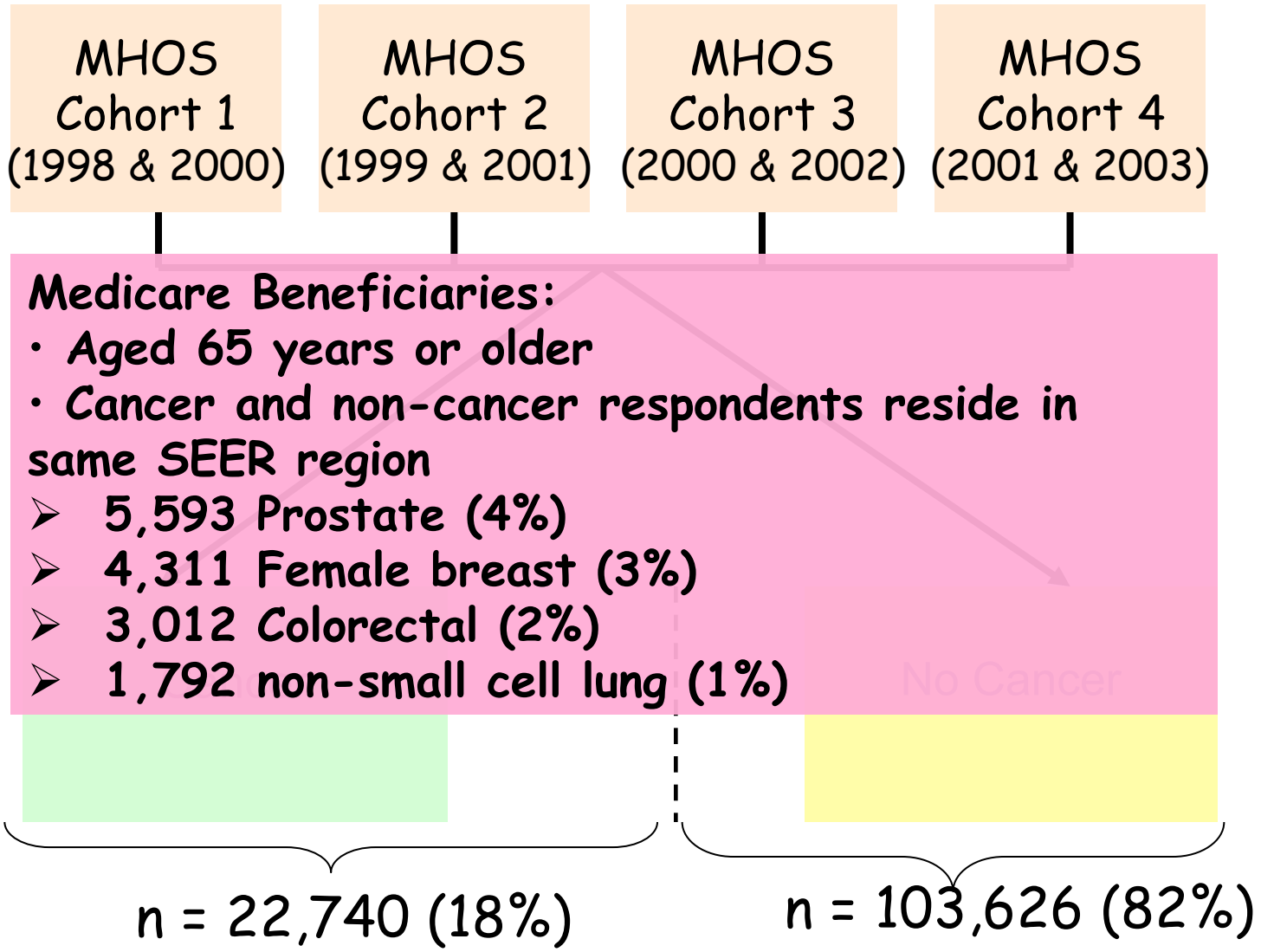
- Medicare Health Outcomes Survey (MHOS)
  - 95-item survey administered to 1,000 randomly selected beneficiaries (including institutionalized and disabled) in Medicare managed care plans
  - Baseline and follow-up survey (2 years later).
  - 63-72% response rates for baseline surveys
  - MHOS respondents matched using identifiers to SEER-Medicare file for 4 cohorts (1998 to 2003).

http://outcomes.cancer.gov/surveys/seer-mhos/

Limitations

- Does not include:
  - Those who did not complete at least one MHOS survey.
    - Medicare managed care beneficiaries not in MHOS (Including SEER cancer patients)
  - Medicare fee-for-service beneficiaries
  - Information on Medicare claims, prescription drug information, chemotherapy treatment, or cancer recurrences

Sample (n = 126,366)



Dependent Variable = SF-6D

- SF-36 health survey, version 1

- 11 of 36 questions representing 6 of 8 domains
  - –Physical functioning
  - –Role limitations
  - –Social function
  - –Pain
  - –Emotional well-being
  - –Energy/fatigue

- Standard gamble elicitation of preferences from a population sample in the UK.

- Scores for those alive range from 0.30 to 1.00 (dead = 0.00).

Health state 424421 (0.59)

- Your health limits you a lot in moderate activities (such as moving a table, pushing a vacuum cleaner, bowling or playing golf)
- You are limited in the kind of work or other activities as a result of your physical health
- Your health limits your social activities (like visiting friends, relatives etc.) most of the time.
- You have pain that interferes with your normal work (both outside the home and housework) moderately
- You feel tense or downhearted and low a little of the time.
- You have a lot of energy all of the time

10 Cancer Conditions (n = 22,740; 18%)

- Prostate cancer (n = 5,593; 4%)
- Female breast Cancer (n = 4,311; 3%)
- Colorectal cancer (n = 3,012; 2%)
- Non-small cell lung cancer (n = 1,792; 1%)

- Bladder cancer (n = 1,299; 1%)
- Melanoma (n = 1,135; 1%)
- Endometrial cancer (n = 902; 1%)
- Non-Hodgkin's lymphoma (n = 668; 1%)
- Kidney cancer (n = 488; 0.4%)

- Other cancer (n = 3,540; 3%)

Note: Those with more than one cancer diagnosis are excluded.

Historic Stage of Disease (time of diagnosis)

- Localized
  - 2045 breast, 2652 prostate, 1481 colorectal, 466 lung
- Distant (metastatic)
  - 26 breast, 61 prostate, 48 colorectal, 47 lung
- Unstaged
  - 347 breast, 633 prostate, 203 colorectal, 65 lung

13 Non-cancer Conditions (mean number = 2.44)

• Hypertension	n = 66,968	(53%)
• Arthritis of the hip	n = 44,524	(35%)
• Arthritis of the hand	n = 40,402	(32%)
• Sciatica	n = 26,878	(21%)
• Other heart disease	n = 25,455	(20%)
• Diabetes	n = 20,089	(16%)
• Angina/coronary artery disease	n = 18,017	(14%)
• Chronic obstructive pulmonary disease	n = 15,445	(12%)
• Depressed in the last year	n = 14,815	(12%)
• Myocardial infarction/heart attack	n = 11,982	(9%)
• Stroke	n = 9,479	(8%)
• Congestive heart failure	n = 7,893	(6%)
• Inflammatory bowel disease	n = 5,882	(5%)

Has a doctor ever told you that you had: …
In the past year, have you felt depressed or sad much of the time?

Demographic & Administration Variables

- Age (continuous)
- Education (8th grade or less; some high school; high school graduate; some college; 4 year college grad; > 4 year college)
- Gender (male; female)
- Income (<10k, 10-19999, 20-29999, 30-39999, 40-49999, 50-79999, 80k and above, don't know or missing)
- Race/ethnicity (Hispanic, non-Hispanic white, black, Asian, American Indian, other race, missing)
- Marital status (married, widowed, divorced/separated/ never married)

- Proxy completed survey (11%)
- Mode of administration (88% mail vs. 12% phone)

Sample (n = 126,366)

- 55% female
- 79% non-Hispanic white, 7% Hispanic, 5% Black, 5% Asian
- 60% married
- 58% high school graduate or less
- 51% < $30,000 income

Results (1)

- Adjusted R-squared of 39% for 43 dfs
- Intercept = 0.80
  - No chronic condition, average education and age, divorced/separated/never married, white, don't know/missing income, phone mode)
  - SD = 0.14
- Only 2 of 23 conditions had non-significant associations (melanoma, endometrial cancer)

Results (2)

- Adjusted means
  - 0.80 (colorectal cancer, myocardial infarction)
  - 0.79 (bladder cancer, kidney cancer, non-Hodgkin's lymphoma, female breast cancer, prostate cancer, hypertension)
  - 0.78 (non-small cell lung cancer, other cancer, angina/CAD, other heart disease, diabetes, arthritis of the hand)
  - 0.77 (CHF, inflammatory bowel disease)
  - 0.76 (stroke, COPD/asthma, sciatica, arthritis of the hip)
  - 0.67 (depressive symptoms)

Results (3)

- 52 possible two-way interactions between four most prevalent cancers (female breast, prostate, colorectal, lung) and the 13 non-cancer conditions
  - Only 6 were statistically significant.
  - Two negative interaction coefficients (-0.01)
    - Colorectal cancer and diabetes
    - Lung cancer and COPD/asthma

Distant stage of cancer associated with 0.05-0.10 lower SF-6D Score

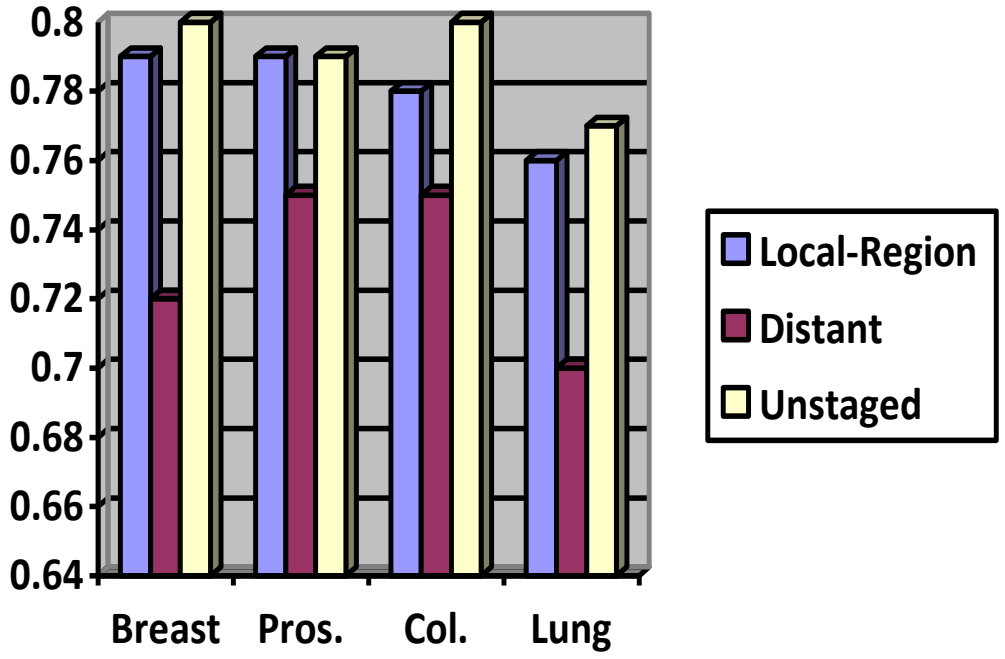


Figure 1. Distant Stage of Disease Associated with Worse SF-6D Scores (Sample sizes for local/regional, distant, and unstaged: Breast (2045,26, 347); Prostate (2652, 61 and 633), Colorectal (1481, 48 and 203), and Lung (466, 47 and 65).

Summary

- Unique associations of multiple chronic conditions on health-related quality of life are generally similar and additive, not interactive
- The largest unique associations of chronic conditions with health-related quality of life among Medicare managed care beneficiaries was observed for four conditions
  - Stroke, COPD/asthma, sciatica, arthritis of the hip
- Advanced stage of cancer is associated with noteworthy decrement in health-related quality of life for four “big” cancers (breast, prostate, colorectal, lung)

Thank you