Measuring health benefits 1

- Contingent valuation
- Clinical measures
- QALYs
- DALYs
- Discounting

Tuesday, September 17, 2024
PPHS 528 Economic evaluation of health programs
Alton Russell

McGill

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Today

Wrapping up cost unit

- **Contingent valuation (willingness to pay/accept)**

Measuring health benefit

- Types of outcome measures
- Quality-adjusted life years (QALYs)
- Disability-adjusted life years (DALYs)
- Discounting

Non-market resources

- Peace of mind from getting negative test result sooner
- Feeling of security from having a seatbelt in your car
- An afternoon strolling through a park
- A neighborhood free of litter

How do we value these?

Option 1: Revealed preferences

- Value of a life implied in:
  - Wage differentials for riskier jobs
  - Price increment for safety features
- Clearly this assumes perfect information and ‘rational’ decision-making under uncertainty
- Nonetheless this method has continued credence
- The value of a statistical life in the US is estimated to be about $10 million (Knieser & Viscusi, 2019, “The value of a statistical life”, *Vanderbilt Law Research Paper* No. 19-15).

Option 2: Contingent valuation

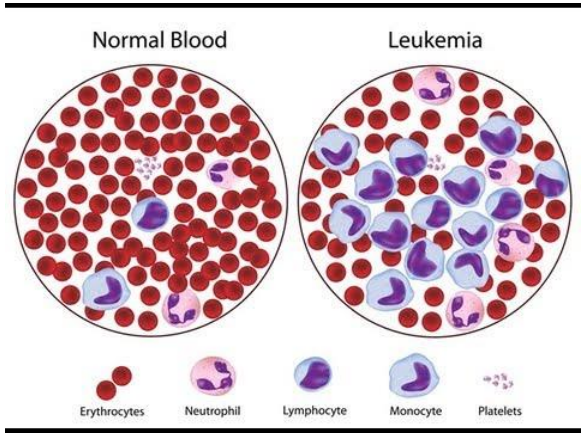
- Contingent meaning “dependent or conditioned on something else”
- Thus, valuing a benefit as if there were a market for it
- Since there is in fact no market, we have to ask people how much they value the benefit in monetary terms i.e., what they are willing to pay for it

Willingness to pay for what?

Degrees of uncertainty in what one pays for:

- Certain need, certain health outcome of Tx
  - Tx **will** solve a problem you **do** have
- Certain need, uncertain health outcome
  - Tx that **may** solve a problem you **do** have
    - Uncertain need/future use,uncertain outcome
- Uncertain need, uncertain health outcome
  - Tx that **may** solve a problem you **may** develop

Example: 3 WTP questions related to treatment for leukemia



Certain need, certain health outcome of Tx

You have leukemia. What is the most you would pay for a 100% effective cure?

Certain need, uncertain health outcome

You have leukemia. What is the most you would pay for 90% effective cure?

Uncertain need/future use,uncertain outcome

There is a 1.5% chance that you will develop leukemia later on in life. What is the maximum amount that you would be willing to pay in additional taxes so that, should you get this illness, you will be provided with a treatment that is 90% effective? (the percents can all be varied)

Methods for eliciting WTP values

- Open-ended question
  - Ex.: “How much would you be willing to pay each year for a supplemental insurance plan that would fully cover you for all expenses associated with cancer treatment, should you be diagnosed with that illness”?
  - May be unbiased, but imprecise
- Closed-ended
  - Bidding games – search algorithm
    - Starting point bias? Studies differ in their conclusion on this point
  - Take it or leave it
    - Ex: “Would you be willing to pay $1000 per year for the supplemental cancer insurance plan described above”?
    - Need larger sample

Two validity tests for WTP study results

- Do people with higher income give higher WTP values on average? (they should)
- Tests of scope: Do people give higher WTP values for more comprehensive benefits (ie benefits with greater scope)?
  - Ex: Should give greater WTP values for a more comprehensive insurance package than for a less comprehensive one

HEALTH ECONOMICS
Health Econ. (2009)
Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/hec.1513

THE VALUE OF INFORMAL CARE–A FURTHER INVESTIGATION OF THE FEASIBILITY OF CONTINGENT VALUATION IN INFORMAL CAREGIVERS

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WTP question for caregivers

Suppose it were possible for you to decrease your informal caregiving by one hour per week. Someone else would take over this hour, so that the care recipient would still receive the same amount of care. How much would **you maximally be willing to pay** to have this hour taken over by someone else?

The amount an individual can pay is constrained by their disposable income, and likely to rise with their disposable income.

WTA question for caregivers

Suppose the person you provide informal care to needed an additional hour of care per week and government would pay you for it. How much would you **minimally want to receive from government** to provide this additional hour of care?

The amount an individual can receive is not directly constrained by income. But, possibly, people with higher income would value their time more highly and only be willing to accept higher amounts

Study characteristics

- 1,453 **caregivers** (large N!) fill out extensive questionnaire
- 603 provided both WTP and WTA values
- 787 **care recipients** filled out similar questionnaire
- Linear regression used to analyse factors associated with WTP and WTA values

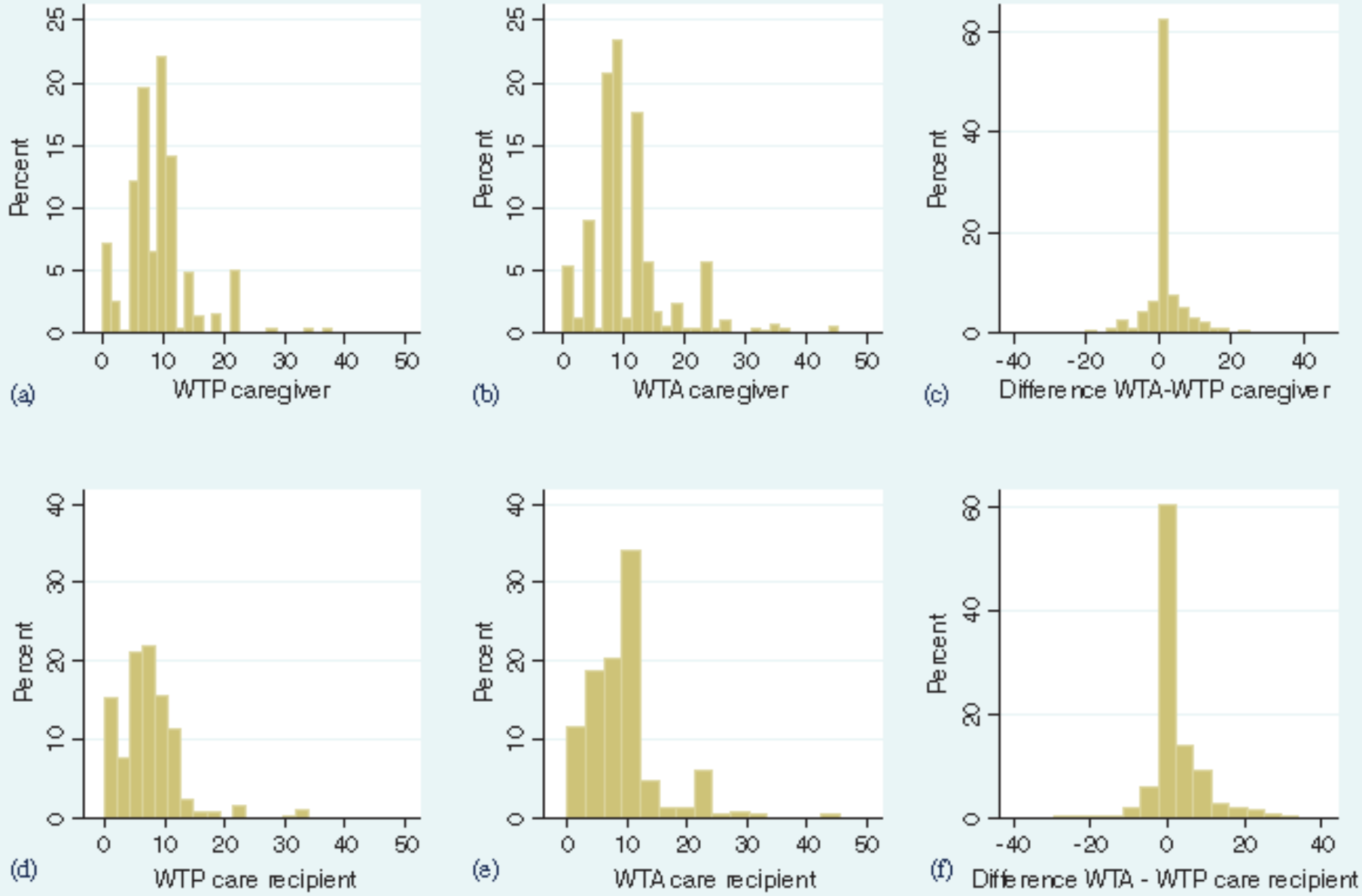


Figure 1(a–f). Caregivers' and care recipients' CV values in euro's

Noteworthy findings

- Average WTP for being relieved of one hour per week of caregiving: € 9.13
- Average WTA to have to provide one extra hour of caregiving: € 10.52
- Average WTA > WTP, but difference small
- For respondents under 65s, higher income associated with higher WTP. For those over 65 higher income associated with higher WTA

Study conclusions

- Both methods give similar results, that are in the range of what a professional caregiver might cost (in UK in early 2000s)
- Responses may be biased upwards – respondents tended to be those who were dissatisfied with their care situation.
- This is encouraging in terms of the value of the WTP methodology:

> The results suggest that CV values are sensitive to the heterogeneity and dynamics of informal care, implying that the CV method has the capability of capturing the full effects of the informal care situation in monetary terms.

- All in all we see how this remains a methodology with some limitations.

Today

Measuring health benefit

- **Types of outcome measures**
- Quality-adjusted life years (QALYs)
- Disability-adjusted life years (DALYs)
- Discounting

Cost-effectiveness analysis needs measure of health outcomes

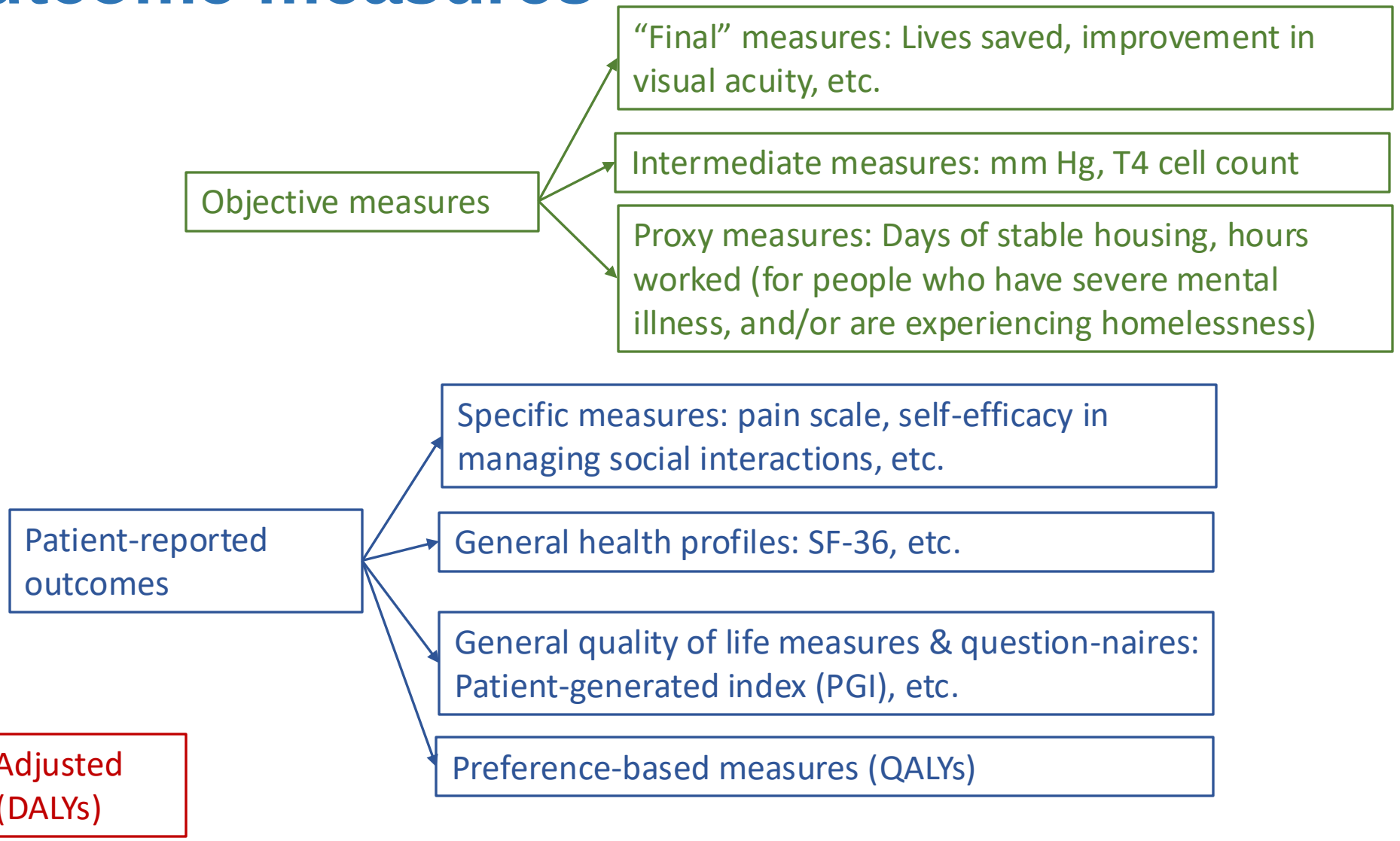
Overall cost per person of new intervention (NI)	-	Overall cost per person of alternative intervention	=	**Difference in cost**
Average outcome with new intervention (e.g., in mm Hg)	-	Average outcome with alternative intervention (e.g., in mm Hg)	=	**Difference in outcome**

$$\frac{\textbf{Difference in cost}}{\textbf{Difference in outcome}} = \textbf{Incremental cost per incremental unit of outcome (e.g., additional \$ per additional unit of reduction in (systolic) blood pressure)}$$

Unit of outcome can depend on the type of strategies compared

- One medication vs another
- A medication strategy vs another or vs standard care
- A procedure or device vs another or vs standard care
- A way of delivering care vs another
- A prevention program vs another or vs no prevention
- An educational strategy for professionals vs another…

Types of outcome measures



Eur Radiol (2018) 28:214–225
DOI 10.1007/s00330-017-4967-9

HEALTH ECONOMY

A cost-effectiveness analysis of the diagnostic strategies for differentiating focal nodular hyperplasia from hepatocellular adenoma

EXAMPLE OF AN OBJECTIVE OUTCOME MEASURE

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Correct diagnosis (1 or 0 outcome) as a measure of effectiveness

Assessment of effectiveness

The primary goal of each diagnostic strategy is to correctly diagnose FNH or HCA using a biopsy or MRI tests which are common diagnostic methods used in clinical practice, so that surgery can be avoided for diagnostic purposes. As a primary outcome measure for 'effectiveness', the correct diagnosis of FNH (true positive) and HCA (true negative) using MRI and/or a biopsy was assigned a value of 1, i.e. successful diagnosis by MRI/biopsy. When the final diagnosis was incorrect (false positive) or was determined by surgery because of an inconclusive biopsy or MRI test results, we assigned a value of 0, i.e. failed diagnosis by MRI/biopsy.

ANOTHER EXAMPLE OF AN OBJECTIVE OUTCOME MEASURE

Schizophrenia Bulletin
doi:10.1093/schbul/sbaa130

Economic Evaluation of Extended Early Intervention Service vs Regular Care Following 2 Years of Early Intervention: Secondary Analysis of a Randomized Controlled Trial

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In this case, symptoms were assessed by independent evaluators using 2 scales: Scale for Assessment of Positive Symptoms

Cost-effectiveness studies of early intervention services (EIS) for psychosis have not included extension beyond the first 2 years. We sought to evaluate the cost-effectiveness of a 3-year extension of EIS compared to regular care (RC) from the public health care payer's perspective. Following 2 years of EIS in a university setting in Montreal, Canada, patients were randomized to a 3-year extension of EIS (n = 110) or RC (n = 110). Months of total symptom remission served as the main outcome measure. Resource use and cost data for publicly cov-

Eur J Health Econ (2012) 13:723–740
DOI 10.1007/s10198-011-0326-y

ANOTHER EXAMPLE OF AN OBJECTIVE OUTCOME MEASURE

ORIGINAL PAPER

The use of cost per life year gained as a measurement of cost-effectiveness in Spain: a systematic review of recent publications

José Manuel Rodríguez Barrios · Ferran Pérez Alcántara · Carlos Crespo Palomo · Paloma González García · Enrique Antón De Las Heras · Max Brosa Riestra

Abstract

Objectives The objective of this study was to evaluate the methodological characteristics of cost-effectiveness evaluations carried out in Spain, since 1990, which include LYG as an outcome to measure the incremental cost-effectiveness ratio.

Methods A systematic review of published studies was conducted describing their characteristics and methodological quality. We analyse the cost per LYG results in relation with a commonly accepted Spanish cost-effectiveness threshold and the possible relation with the cost per quality adjusted life year (QALY) gained when they both were calculated for the same economic evaluation.

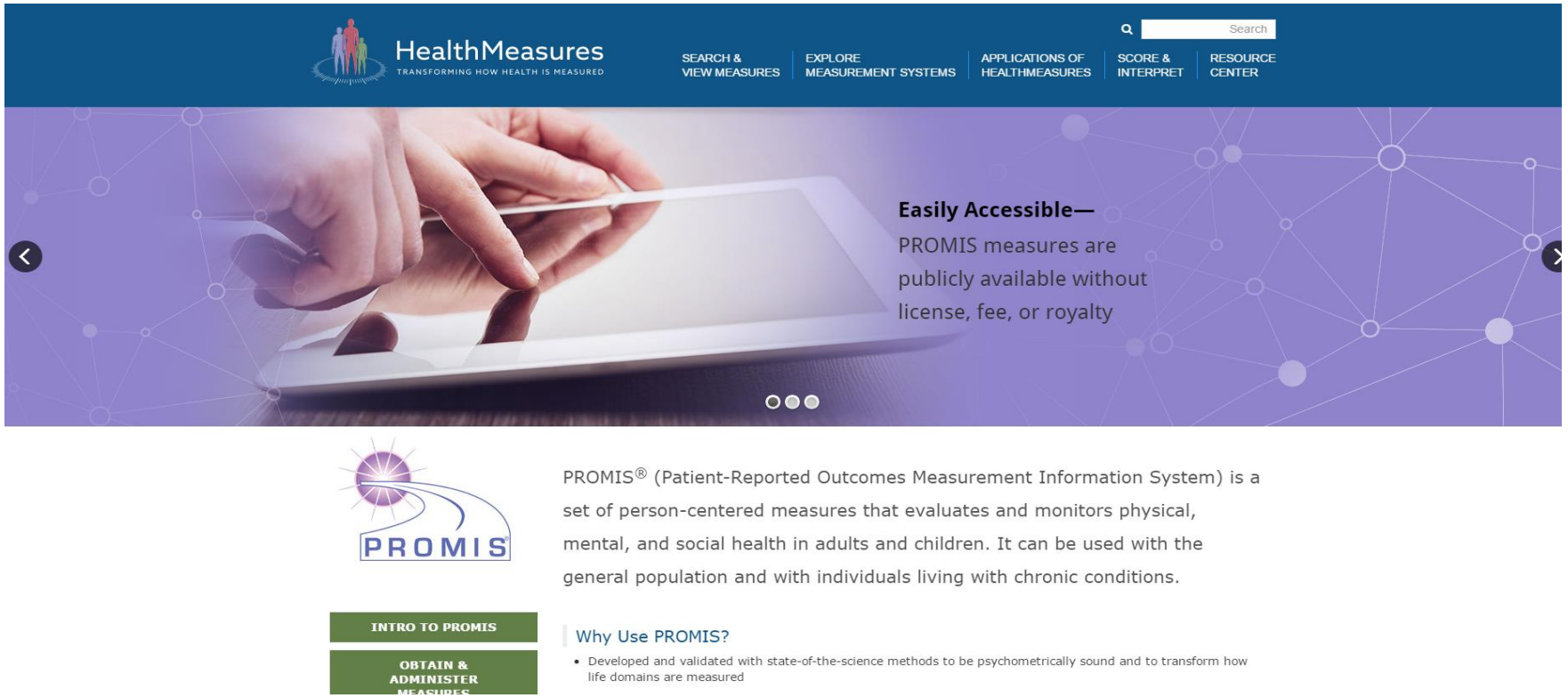
Results A total of 62 economic evaluations fulfilled the selection criteria, 24 of them including the cost per QALY gained result as well. The methodological quality of the studies was good (55%) or very good (26%). A total of 124 cost per LYG results were obtained with a mean ratio of 49,529€ and a median of 11,490€ (standard deviation of 183,080). Since 2003, a commonly accepted Spanish threshold has been referenced by 66% of studies. A significant correlation was found between the cost per LYG and cost per QALY gained results (0.89 Spearman-Rho, 0.91 Pearson).

Conclusions There is an increasing interest for economic health care evaluations in Spain, and the quality of the studies is also improving. Although a commonly accepted threshold exists, further information is needed for decision-making as well as to identify the relationship between the costs per LYG and per QALY gained.

The SF-36
Example of a general health profile

Items	Scales	Summary Measures
3a. Vigorous Activities	**Physical Functioning (PF)**	**Physical Health**
3b. Moderate Activities		
3c. Lift, Carry Groceries		
3d. Climb Several Flights		
3e. Climb One Flight		
3f. Bend, Kneel		
3g. Walk Mile		
3h. Walk Several Blocks		
3i. Walk One Block		
3j. Bathe, Dress		
4a. Cut Down Time	**Role-Physical (RP)**	
4b. Accomplished Less		
4c. Limited in Kind		
4d. Had Difficulty		
7. Pain-Magnitude	**Bodily Pain (BP)**	
8. Pain-Interfere		
1. EVGFP Rating	**General Health (GH)***	
11a. Sick Easier		
11b. As Healthy		
11c. Healthy to Get Worse		
11d. Health Excellent		
9a. Pep/Life	**Vitality (VT)***	**Mental Health**
9e. Energy		
9g. Work Out		
9i. Tired		
5. Social-Extent	**Social Functioning (SF)***	
10. Social Time		
5a. Cut Down Time	**Role-Emotional (RE)**	
5b. Accomplished Less		
5c. Not Carreful		
9b. Nervous	**Mental Health (MH)**	
9c. Down in Dumps		
9d. Peaceful		
9f. Blue/Sad		
9h. Happy		

PROMIS (Patient-Reported Outcomes Measurement Information System) : A modern suite of patient-reported outcome measures



http://www.healthmeasures.net/explore-measurement-systems/promis

PROMIS® Adult Self-Reported Health

Global Health

	Physical Health	Mental Health	Social Health
PROMIS Profile Domains	Fatigue Pain Intensity Pain Interference Physical Function Sleep Disturbance	Anxiety Depression	Ability to Participate in Social Roles & Activities
PROMIS Additional Domains	Dyspnea Gastrointestinal Symptoms Itch Pain Behavior Pain Quality Sexual Function Sleep-related Impairment	Alcohol Anger Cognitive Function Life Satisfaction Meaning & Purpose Positive Affect Psychosocial Illness Impact Self-efficacy for Managing Chronic Conditions Smoking Substance Use	Companionship Satisfaction with Social Roles & Activities Social Isolation Social Support

7/24/2018

To learn more:

http://www.healthmeasures.net/explore-measurement-systems/promis/intro-to-promis

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A depression score derived from a patient questionnaire is:

a) An objective outcome measure
b) A patient-reported outcome measure
c) A proxy measure for QALYs
d) A preference-based health measure
e) None of the above

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A depression score derived from a patient questionnaire is:

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Specific measures

General health profiles

- More responsive to change
- More acceptable to patients and clinicians
- Do not yield results that can be compared across disease domains

- May be less responsive to change
- May be less acceptable to patients and clinicians
- May yield results comparable across disease domains

Today

- Measures of benefit
- **Quality-adjusted life years (QALYs)**
- Disability-adjusted life years (DALYs)
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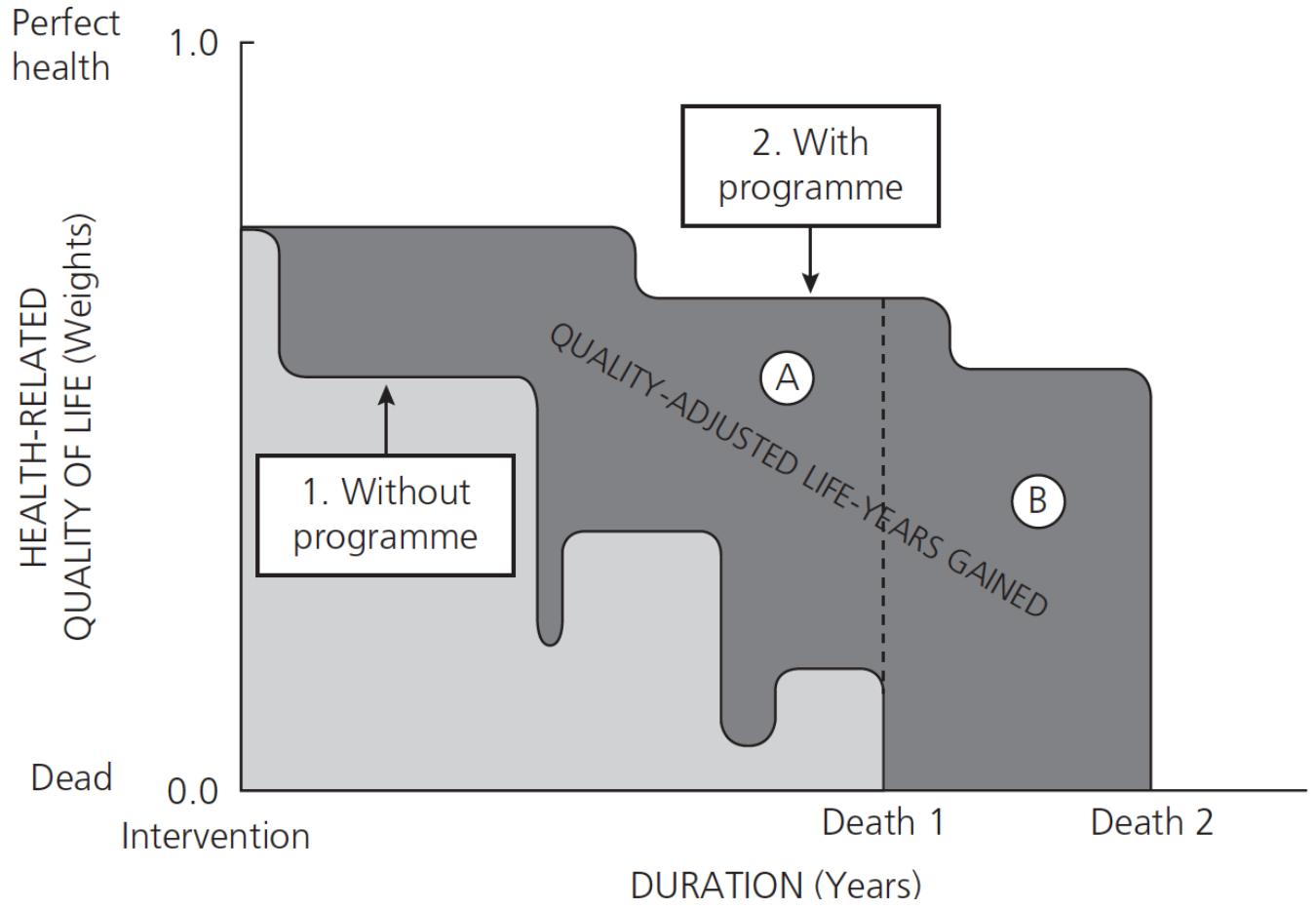
Quality-adjusted life years visualized



How do we measure QALYs?

Mechanics are easy: Multiply HRQoL* weight by duration in that state.

Ex: 3 years with HRQoL weight of 0.6:

3 x 0.6 = 1.8 QALYs.

Where does the Health-Related Quality-of-Life (HRQoL) weight comes from? Find out Thursday

Slido

Without treatment, patient will experience 9 months at HRQOL 0.3, then 15 years at 0.95, then death.

With treatment, a patient will experience 6 months at HRQoL 0.4, then 16 years at 0.95, then death

How many undiscounted QALYs would this patient gain with treatment?

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Without treatment, patient will experience 9 months at HRQOL 0.3, then 15 years at 0.95, then death. With treatment, a patient will experience 6 months at HRQoL 0.4, then 16 years at 0.95, then death. How many undiscounted QALYs would this patient gain with treatment?

ⓘ Start presenting to display the poll results on this slide.

Decision-making context of QALYs

- Can be personal clinical or insurance decision, but usually used by decision-makers for:
  - Societal audit (evaluation of ongoing programs) or
  - **Priority setting – prospective**
- Goal is to maximize health of population, subject to resource constraints
- Health or health improvement can be measured or valued based on amount of time spent in different health states

Further assumptions of QALYs

QALYs

- Are valued in terms of preference (desirability)
- Are worth the same regardless of when they occur (except for discounting) and are additive across time
  - 1 year with HRQoL of 0.8 valued same as 2 years with HRQoL of 0.4
- Have interval scale properties
  - Utility increase from 0.2 to 0.4 is as valuable as from 0.7 to 0.9)
- Can be aggregated and used for group
  - QALY is worth the same regardless of who gets it
  - Will discuss equity considerations later

Today

- Measures of benefit
- Quality-adjusted life years (QALYs)
- **Disability-adjusted life years (DALYs)**
- Discounting

Disability-adjusted life years : The concept

“A societal measure of the **disease or disability burden** in populations. DALYs are calculated by combining measures of **life expectancy** as well as the **adjusted quality of life** during a burdensome disease or disability for a population. DALYs are related to the quality-adjusted life year (QALY) measure; however QALYs only measure the benefit with and without medical intervention and therefore do not measure the **total burden**. Also, QALYs tend to be an individual measure, and not a **societal measure**..”

Wikipedia: Disability-adjusted life year

QALYs

Quality-adjusted life year

Measures health **gained**

In a year, a person's QALYs are between

- 0 (death)
- 1 (perfect health)

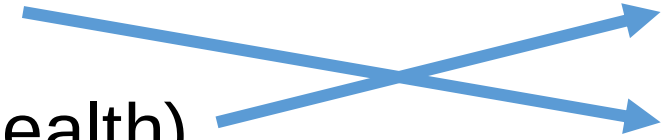
DALYs

Disability-adjusted life year

Measures health **loss**

In a year, a person's DALYs are between

- 0 (perfect health)
- 1 (death)



Calculating DALYs: Years of Life Lost

The YLL component of the DALY calculation is based on updated life tables (projecting remaining life expectancy at any age of death)

$$YLL = N \times L$$

where N is number of deaths from a given condition, for a given age and sex, and L is maximum remaining life expectancy given age and sex (based on a standard life table that reflects the highest national life expectancy projected for the year 2050).

As a measure of the burden of premature mortality, YLL has the following advantages:....and (iv) a death at a given age represents the same amount of years of life lost irrespective of the location where it occurred, keeping the egalitarian nature of YLL.[7] (Reflection on modern methods: years of life lost due to premature mortality—a versatile and comprehensive measure for monitoring non-communicable disease mortality | International Journal of Epidemiology | Oxford Academic (oup.com))

Supplementary Table 1. Standard life expectancy for computing YLL used in Global Burden of Disease studies (GBD) and WHO Global Health Estimates (WHO GHE)

Old methodology, ignore →

		GBD 1990 age-weighted, discounted		GBD 1990 no age-weights or discounting		GBD 2010	GBD 2013-2016	WHO GHE
age code	Age range	Male†	Female‡	Male†	Female‡	Total	Total	Total
0	Neonatal (0-27 days)	33.27	33.38	79.94	82.43	86.01	86.60	91.93
1	Postneonetal (28-365 days)	34.22	34.34	78.85	81.36	85.68	85.78	91.55
5	1-4	35.17	35.29	77.77	80.28	83.63	81.81	89.41
10	5-9	37.22	37.36	72.89	75.47	78.76	76.84	84.52
15	10-14	37.31	37.47	67.91	70.51	73.79	71.87	79.53
20	15-19	36.02	36.22	62.93	65.55	68.83	66.92	74.54
25	20-24	33.84	34.08	57.95	60.63	63.88	61.98	69.57
30	25-29	31.11	31.39	52.99	55.72	58.94	57.03	64.60
35	30-34	28.08	28.40	48.04	50.83	54.00	52.11	59.63
40	35-39	24.91	25.30	43.10	45.96	49.09	47.21	54.67
45	40-44	21.74	22.19	38.20	41.13	44.23	42.36	49.73
50	45-49	18.63	19.16	33.38	36.36	39.43	37.59	44.81
55	50-54	15.65	16.26	28.66	31.68	34.72	32.90	39.92
60	55-59	12.82	13.52	24.07	27.10	30.10	28.30	35.07
65	60-64	10.19	10.96	19.65	22.64	25.55	23.80	30.25
70	65-69	7.80	8.60	15.54	18.32	21.12	19.42	25.49
75	70-74	5.71	6.45	11.87	14.24	16.78	15.27	20.77
80	75-79	4.00	4.59	8.81	10.59	12.85	11.46	16.43
85	80-84	2.68	3.09	6.34	7.56	9.34	8.16	12.51
90	85+	1.37	1.23	3.82	3.59	5.05	5.53	7.60

Standard life expectancies are expresses in number of years by age group. † *Life expectancy from model life table West 25 [1] for females was used for men (with life expectancy at birth of 80 years).* ‡*Life expectancy from model life table West 26 [2] (with life expectancy at birth of 82.4 years for women. Life expectancy from WHO GHE is based on projected frontier period life expectancy and life table for year 2050 using UN World Population Prospects 2012[3]. GBD refers to Global Burden of Disease Study and WHO GHE refers to World Health Organization Global Health Estimates.*

Calculating DALYs: Years Lived with Disability Component

The YLD component is :

$$YLD = P \times DW$$

where P is the prevalence of the condition and DW is the disability weight

Thus, the duration of the disease enters *implicitly* into the calculation in that diseases of longer duration, given a certain incidence, will translate into greater prevalence.

Global Burden of Disease Study 2019

The Global Burden of Disease Study 2019 (GBD 2019), coordinated by the Institute for Health Metrics and Evaluation (IHME), estimated the burden of diseases, injuries, and risk factors for 204 countries and territories and selected subnational locations. Disability weights, which represent the magnitude of health loss associated with specific health outcomes, are used to calculate years lived with disability (YLD) for these outcomes in a given population. The weights are measured on a scale from 0 to 1, where 0 equals a state of full health and 1 equals death. This table provides disability weights for the 440 health states (including combined health states) used to estimate nonfatal health outcomes for the GBD 2019 study.

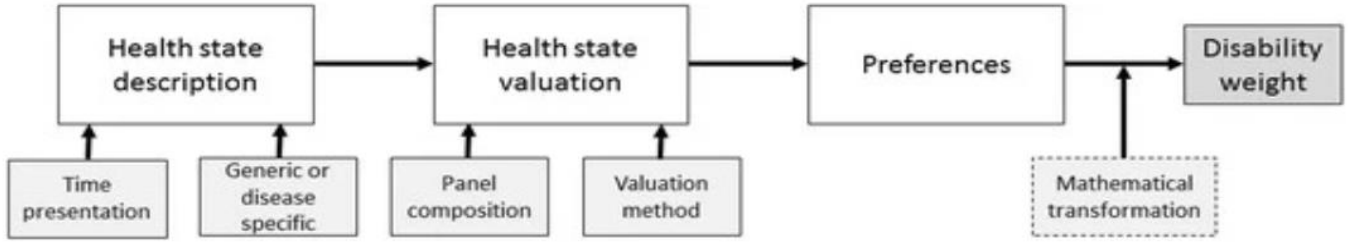
Source: http://ghdx.healthdata.org/record/global-burden-disease-study-2016-gbd-2016-disability-weights

Methodology for estimating disability weights

The methodology has evolved since the first set of weights published in 1996. Now surveys of the general population are preferred to expert panels, and people are typically asked to indicate which among two health states they prefer. The data thus produced are analyzed statistically to produce disability weights.

Figure 1

From: Review of disability weight studies: comparison of methodological choices and values



Conceptual model of assessing disability weights and its design choices.

Source: Haagsma JA, Polinder S, Cassini A, Colzani E, Havelaar AH (2014), Review of disability weight studies: comparison of methodological choices and values, Population Health Metrics 12, Article 20

Global Burden of Disease Study 2019 Disability Weights (sample – (1))

Subset of Table 2: Disability weights for 235 unique health states

Health State	Estimate	95% Uncertainty Interval
Infectious disease		
Infectious disease: acute episode, mild	0.006	0.002-0.012
AIDS with moderate anemia	0.603	0.43-0.758
Extensively drug-resistant tuberculosis	0.333	0.224-0.454
Cancer		
Controlled phase of colon and rectum cancers, with stoma	0.139	0.094-0.192
Metastatic phase of liver cancer due to hepatitis C	0.451	0.307-0.600
Cardiovascular and circulatory disease		
Acute myocardial infarction: days 1-2	0.432	0.288-0.579
Severe heart failure due to ischemic heart disease	0.179	0.122-0.251
Stroke: long-term consequences, mild	0.019	0.010-0.032
Stroke: long-term consequences, moderate	0.070	0.046-0.099
Diabetes, digestive, and genitourinary disease		
Diabetic neuropathy due to diabetes mellitus type 1, without diabetic foot or amputation	0.133	0.089-0.187
End-stage renal disease on dialysis without anemia due to type 1 diabetes mellitus	0.571	0.398-0.725
Cirrhosis and other chronic liver diseases due to hepatitis B, decompensated, without anemia	0.178	0.123-0.250

Source: Global Burden of Disease Study 2019 (GBD 2019) Data Resources | GHDx (healthdata.org)

Global Burden of Disease Study 2016 Disability Weights (sample – (2))

Health State	Estimate	95% Uncertainty Interval
Chronic respiratory diseases		
Controlled asthma	0.015	0.007-0.026
Partially controlled asthma	0.036	0.022-0.055
Neurological disorders		
Dementia: mild	0.069	0.046-0.099
Dementia: moderate	0.377	0.252-0.508
Dementia: severe	0.449	0.304-0.595
Mental, behavioural, and substance use disorders		
Alcohol use disorder, mild	0.235	0.160-0.327
Anxiety disorders, moderate	0.133	0.091-0.186
Major depressive disorder, severe episode	0.658	0.477-0.807
Schizophrenia, residual state	0.588	0.411-0.754
Hearing and vision loss		
Hearing loss, mild	0.010	0.004-0.019
Hearing loss, profound, with ringing	0.277	0.182-0.387
Distance vision, moderate impairment	0.031	0.019-0.049
Musculoskeletal disorders		
Low back pain: moderate	0.054	0.035-0.079

Using DALYs in cost-effectiveness analysis

- More common for analyses in “global health” settings
- ‘Cost per DALY averted’ equivalent to ‘Cost per QALY gained’
- Typically, apply disability weights from GBD study
- Use country-specific life tables to model expected survival

Today

- Measures of benefit
- Quality-adjusted life years (QALYs)
- Disability-adjusted life years (DALYs)
- **Discounting**

Choice of discounting rate matters!

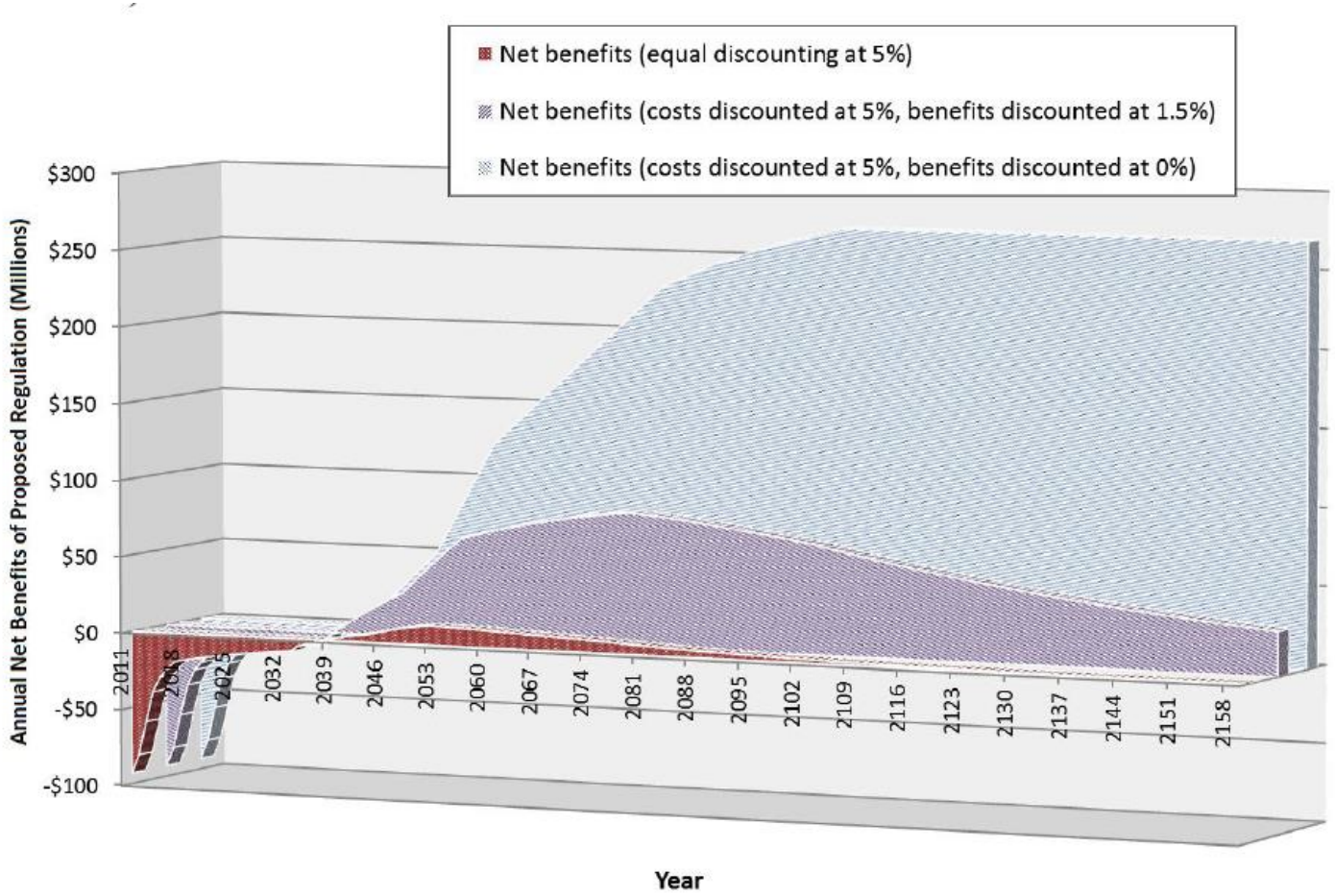


Figure 1: Present Value of Annual Net Benefits for Hypothetical Health Standard over Time, under Equal and Differential Discounting

2011

The Case for Differential Discounting: How a Small Rate Change Could Help Agencies Save More Lives and Make More Sense

Melissa Luttrell

Discounting benefits at the same rate as costs is contested, but usual practice

- A key reason for discounting benefits remains: Uncertainty about the future
  - But this is not a major reason for discounting benefits as collectively we are likely to still be around in the coming decades
- But while we may be richer later (so that a given amount of money in the future would be valued less than the same amount today), there is less reason to think that the health of people in the future should be valued less than the health of people now.
  - Lives per se should matter just as much
  - Even if greater wealth means greater health gains, why would we value health increments any less?
- Thus some have argued that benefits should not be discounted, or discounted less.
- Usual practice is simply to discount benefits at the same rate as costs… but there is not unanimous agreement on this.

Discount rate guidelines by country

4 out of 24 countries discount costs more than effects: Belgium (3% vs. 1.5%), the Netherlands (4% vs. 1.5%), Poland (5% vs. 3.5%), Russia (5% vs. 0%)

Table 1 National guidelines on discounting in health economic evaluations

Country	Costs	Effects	Justification
Australia [44]	5%	5%	–
Austria [45]	3% (sens. 0, 5, 10%)	3% (sens. 0, 5, 10%)	–
Belgium [46]	3% (sens. 0, 5%)	1.5% (sens. 0, 3, 5%)	Differential discounting: avoid a too strong penalization of interventions that generate most of their benefits in the future (e.g., screening and vaccination programs) Costs: allow the comparison with previous economic evaluations Prefers consistency in the discount rate above a fluctuating one Effects: awaiting further evidence, and to remain consistent with previous guidelines
Canada [47]	1.5% (sens. 0, 3%)	1.5% (sens. 0, 3%)	Long-term cost of borrowing for Canadian provinces
Croatia [48]	3% (sens. 0, 5%)	3% (sens. 0, 5%)	Based on the calculated mean of the base rate for four quarters within a respective year, over the last 3 years (reflecting the Croatian trend in the base rate and discount rate over the last 3 years)
Estonia, Latvia, Lithuania [49]	5%	5%	–

Partial table from Attema et. al. 2018 Pharmacoeconomics https://doi.org/10.1007%2Fs40273-018-0672-z

Recap

- Contingent valuation used to estimate monetary value by asking people what they are willingness to pay/accept for a non-market good
- Health benefit can be measured with objective measures, patient-reported outcomes, or the disability-adjusted life year
- QALYs tally health gains while DALYs tally health loss

Logistics

- Assignment 2 due Thursday Oct 3 (syllabus wrong)
- Project groups + topic due today
- Finish reading read Drummund Ch. 5 for next class
- Visit office hours with any questions
  - **Alton:** Tues and Thurs 1:30 – 2:30pm, conference room #1103
  - **Graham:** Mon and Wed 2:00 – 3:00pm (make appointment via email)