Erasmus School of
Health Policy
& Management

Health Economics

Demonstrating and increasing the societal value of health innovations

Prof. dr. W.B.F. Brouwer

Óbuda University

Budapest, 8 May 2024

Erasmus University Rotterdam

Thank you!

- Extremely honored
- Long history of working together
- International collaborations between universities increasingly important
- Multi-, inter- and transdisciplinarity to solve societal problems

Three aspects in this lecture

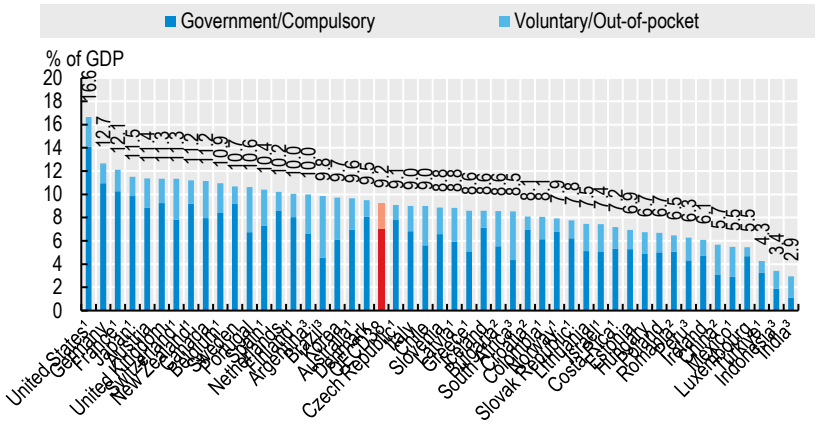
1. Economic evaluations to support reimbursement decisions
2. Studying preferences of patients to understand adoption / compliance
3. Informing development of new medical innovations

In all three, health economics can assist in order to assess and increase the value of medical innovations

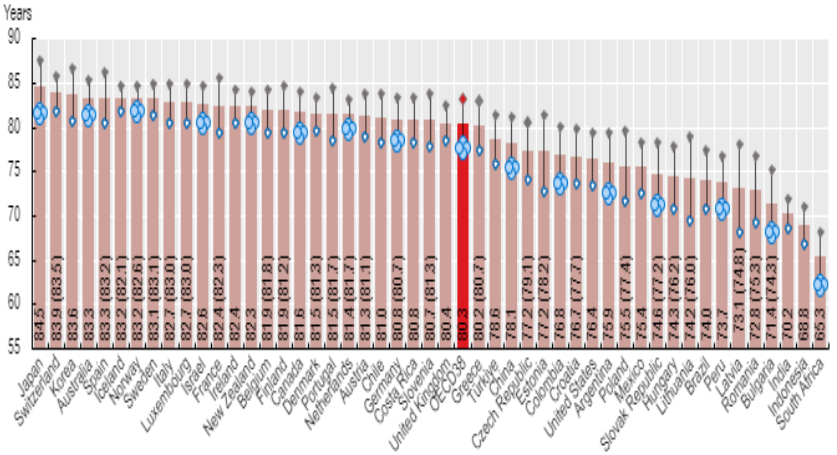
While progress is made – a lot needs to be done – jointly!

Healthcare: burden *and* blessing

Expenditures



Life expectancy



Fogel: “The increasing share of global income spent on healthcare expenditures is not a calamity; it is a sign of the remarkable economic and social progress of our age” .

Healthcare and economics?

- Economics concerned with the **efficient** allocation of scarce resources over alternative uses and the resulting **equity** implications
- In healthcare scarcity is often denied (‘*money should not matter when it comes to health*’), also in politics: *‘The first lesson of economics is scarcity…’ … “… the first lesson of politics is to disregard the first lesson of economics…*” (Sowell)

- Health technology important driver of costs (and health!) increases
- Newhouse (1992):“*…the bulk of the residual increase is attributable to technological change, …the march of science and the increased capabilities of medicine”*
- Economic evaluation: balance costs and benefits - only fund/reimburse health technologies that offer ‘value for money’ (relative to relevant comparator)
- Increasingly used to inform healthcare decision-makers

Economic Evaluation simplified

All relevant costs (and savings)

All relevant (health) effects

Intervention A → Effects A

Intervention B → Effects B

Quality Adjusted Life Years

Difference in costs (Δct)

Difference in effects (ΔQi)

ICER: Δct / ΔQi

e.g. €25,000/QALY

Is it cost-effective (i.e. value for money)? Do additional benefits justify the additional costs? Only then the technology should be funded.

Societal perspective: decision rule

- Economic evaluation applied welfare economics (potential Pareto optimum)
- Classical decision rule to optimize welfare: incremental benefits of intervention should exceed incremental costs: $v_i \Delta Q_i - \Delta c_t > 0$ OR $\Delta c_t / \Delta Q_i < v_i$

Where v_i is consumption value per unit effect (e.g. QALYs), ΔQ_i is incremental units (e.g. QALYs) gained (subscript i allows different values for QALY equity classes), Δc_t total incremental costs (within and outside HC)

DECISION RULE: do not sacrifice more costs per unit effect (e.g. QALY) than its value

- Demonstrating value for money of a technology therefore requires
  - (Methods to allow) balancing all relevant societal costs and benefits
  - (Methods to have) estimates of value of health / wellbeing (in different contexts)…

Societal perspective in evaluation

Effects

- Health effects (LE, QoL, adverse events) in patients
- Health effects in others (carers, family)
- Wellbeing effects in patients and others (e.g. elderly care)

Costs

- Direct medical costs (regardless of payment source)
- Future related medical costs
- Productivity costs (paid *and unpaid*!)
- Direct non-medical costs (travel, patient time, *informal care costs*)
- *Other relevant costs (education, justice, housing, …)*
- Future unrelated medical costs in LYG
- Future non-medical costs (consumption) in LYG

Threshold (value)

- Societal value of health gains (potentially equity adjusted): vi
- If budget is non-optimal, an estimate of marginal CE of current HC spending (k)

Productivity costs


ORIGINAL ARTICLES
Economic Evaluation

The iMTA Productivity Cost Questionnaire
A Standardized Instrument for Measuring and Valuing Health-Related Productivity Losses

Clazien Bouwmans, MSc[1,2,*], Marieke Krol, PhD[1,2], Hans Severens, PhD[1], Marc Koopmanschap, PhD[1], Werner Brouwer, PhD[2], Leona Hakkaart-van Roijen, PhD[1,2]

- Health interventions may affect productivity of individuals
- Productivity costs are '*the costs associated with production loss and replacement due to illness, disability and death of productive persons, both paid and unpaid*'
- If productivity is affected by an intervention the associated value should be included

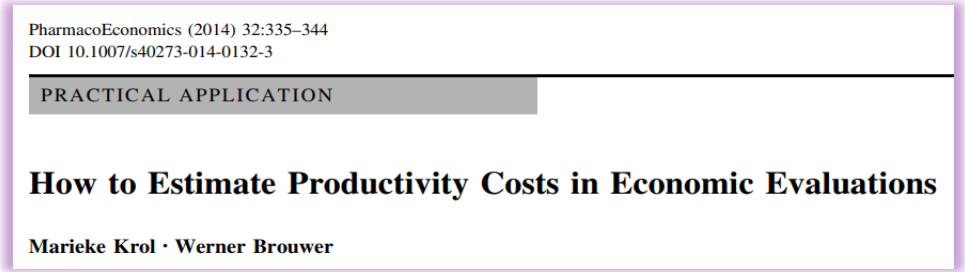
- Methods for measuring (e.g. iPCQ – see www.imta.nl) and valuing (e.g. friction cost method) have been developed, but need for international standardization
- More research needed on replacement and value of unpaid work, measurement of presenteeism (also given work from home), and the effects of reduced productivity on other workers (e.g. multiplier effects)


PharmacoEconomics (2023) 41:1103–1115
https://doi.org/10.1007/s40273-023-01253-y

ORIGINAL RESEARCH ARTICLE

Production Losses due to Absenteeism and Presenteeism: The Influence of Compensation Mechanisms and Multiplier Effects

Werner Brouwer[1,2] · Kaya Verbooy[3] · Renske Hoefman[4] · Job van Exel[1,2]

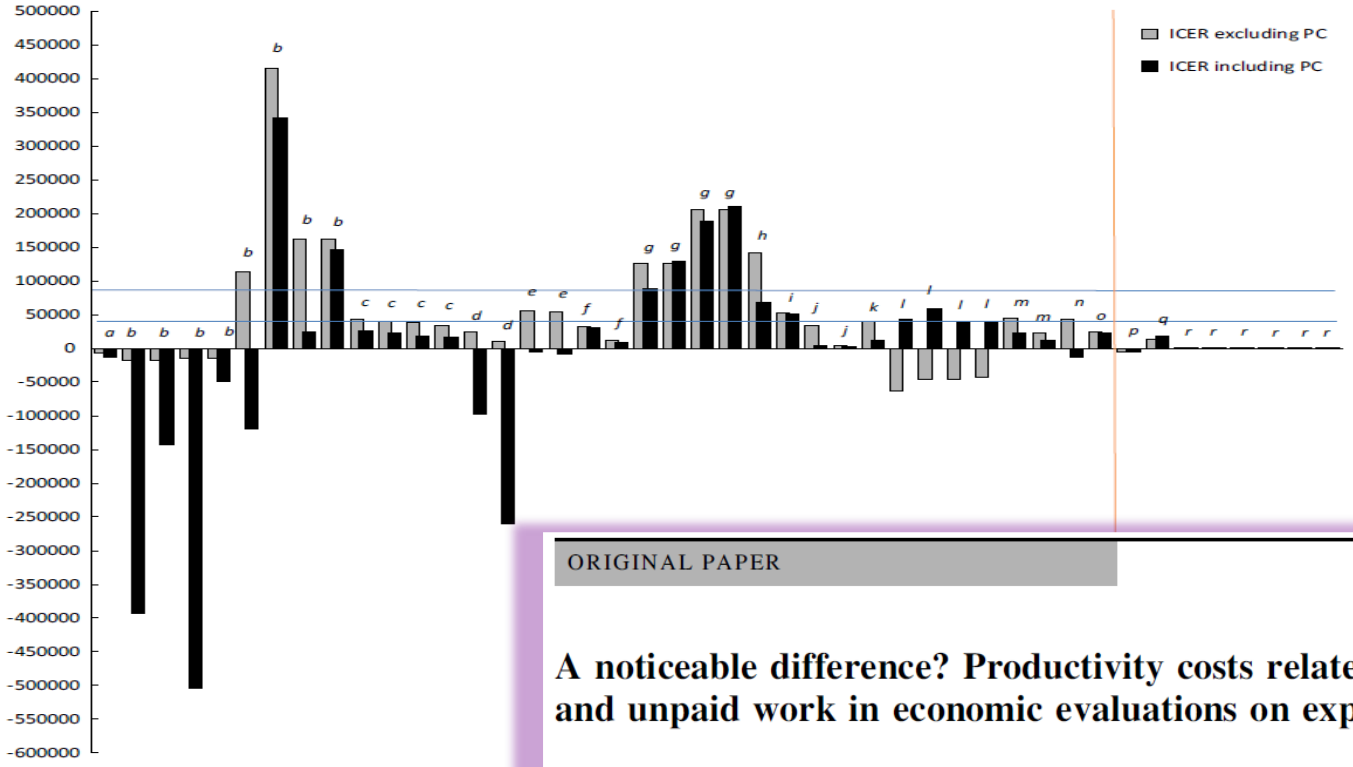

PharmacoEconomics (2014) 32:335–344
DOI 10.1007/s40273-014-0132-3

PRACTICAL APPLICATION

How to Estimate Productivity Costs in Economic Evaluations

Marieke Krol · Werner Brouwer

Inclusion can make a real difference!



Krol et al., EJHE 2016

ORIGINAL PAPER

A noticeable difference? Productivity costs related to paid and unpaid work in economic evaluations on expensive drugs

Marieke Krol[1,2] · Jocé Papenburg[3] · Siok Swan Tan[1,2] · Werner Brouwer[1,2] · Leona Hakkaart[1,2]

Costs in gained life years

Health Policy Analysis

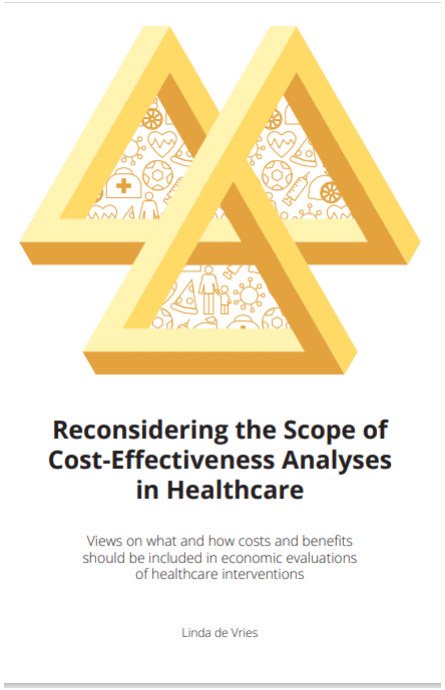
Practical Guidance for Including Future Costs in Economic Evaluations in The Netherlands: Introducing and Applying PAID 3.0

Klas Kellerborg, MSc,[†] Meg Perry-Duxbury, MSc,[†,*] Linda de Vries, MSc,[†] Pieter van Baal, PhD

- When interventions prolong life, this may also result in additional costs during those gained life years
- Medical costs related to the intervention (e.g. blood thinners after cardiac surgery) would typically be included

- Medical costs unrelated to the intervention (e.g. hip replacement after cardiac surgery) typically are not
- Same holds for non-medical costs (e.g. housing, food, travel)

- Methods to include these costs have been developed (www. imta.nl) but need more application and inclusion shown to be impactful (e.g. De Vries et al., Vaccine 2024)
- Guidelines need to prescribe inclusion



Informal care

- Provision of informal care leads to time costs of caregivers a
  potential effects on their quality of life
- Methods to measure and value time of caregivers have been developed (e.g. IQVIC – see www.imta.nl)

- Inclusion of time costs can substantially affect outcomes of economic evaluations (Krol et al., 2014)
- Health effects in others potentially large: e.g., up to 0.48 QALY per QALY in meningitis patients

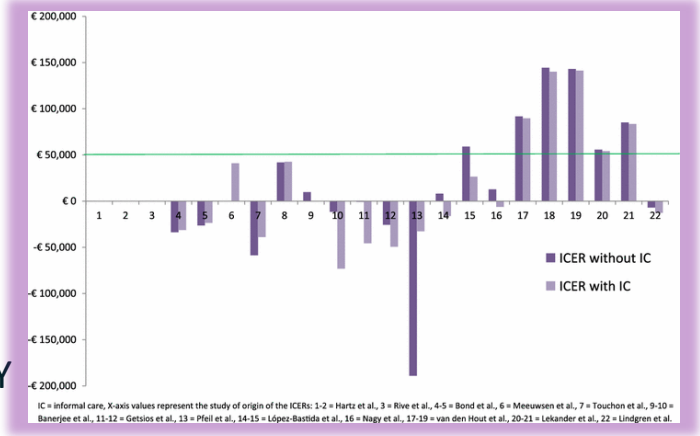
- Inclusion spillover health effects rare
- Effects on QoL beyond health…

PharmacoEconomics (2013) 31:1105–1119
DOI 10.1007/s40273-013-0104-z

PRACTICAL APPLICATION

How to Include Informal Care in Economic Evaluations

Renske J. Hoefman · Job van Exel · Werner Brouwer



HEALTH ECONOMICS
Health Econ. **25**: 1529–1544 (2016)
Published online 14 October 2015 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/hec.3259

MEASURING HEALTH SPILLOVERS FOR ECONOMIC EVALUATION: A CASE STUDY IN MENINGITIS

HARETH AL-JANABI[a,*], JOB VAN EXEL[b], WERNER BROUWER[b], CAROLINE TROTTER[c], LINDA GLENNIE[d], LAURIE HANNIGAN[d,†] and JOANNA COAST[a]

CarerQoL

PharmacoEconomics (2020) 38:633–643
https://doi.org/10.1007/s40273-020-00899-2

ORIGINAL RESEARCH ARTICLE

Development of Population Tariffs for the CarerQol Instrument for Hungary, Poland and Slovenia: A Discrete Choice Experiment Study to Measure the Burden of Informal Caregiving

Petra Baji[1] · Miklós Farkas[2] · Dominik Golicki[3] · Valentina Prevolnik Rupel[4] · Renske Hoefman[5] · Werner B. F. Brouwer[6,7] · Job van Exel[6,7] · Zsombor Zrubka[1] · László Gulácsi[1] · Márta Péntek[1]

CarerQol-7D

Please draw an "X" to indicate which description best fits your current care giving situation

	no	some	a lot of	
a. I have	☐	☐	☐	fulfillment with carrying out my care tasks.

Completely unhappy — *Completely happy*

0 1 2 3 4 5 6 7 8 9 10

Figure 1. CarerQol questionnaire.

Well-being

- Health / social care / digital interventions can have broader effects on patient
- Not capturing these may result in misinformed decisions

- New outcome measures ('well-being measures') have been developed, e.g. ICECAP and ASCOT instruments, all with own pros and cons (e.g. Hackert et al., 2019)

Quality of Life Research (2020) 29:2863–2874
https://doi.org/10.1007/s11136-020-02542-1

Check for updates

Capability of well-being: validation of the Hungarian version of the ICECAP-A and ICECAP-O questionnaires and population normative data

Petra Baji[1] · Miklós Farkas[2] · Ágota Dobos[3] · Zsombor Zrubka[1] · László Gulácsi[1] · Valentin Brodszky[1] · Fanni Rencz[1,4] · Márta Péntek[1]

ICECAP
capability
measures

WiX

Applied Research in Quality of Life (2024) 19:381–413
https://doi.org/10.1007/s11482-023-10241-5

Check for updates

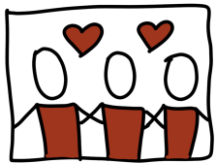
Development and Content Validation of the 10-item Well-being Instrument (WiX) for use in Economic Evaluation Studies

Daphne C. Voormolen[1,2,3] · Judith A. M. Bom[1,2] · Esther W. de Bekker-Grob[1,2,3] · Werner B. F. Brouwer[1,2] · Job van Exel[1,2,3]

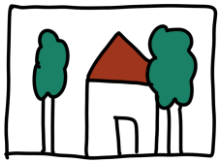
The WiX covers 10 most important well-being domains

Mental health

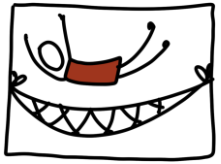
Physical health



Relationships



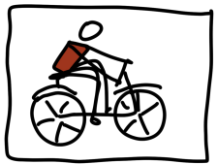
Living environment



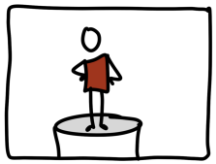
Safety

Financial situation

Relaxation & leisure time



Activities



Independence

Self-worth

Construct Validity, Reliability, and Responsiveness of the 10-Item Well-being Instrument for Use in Economic Evaluation Studies

Judith A.M. Bom, PhD, Daphne C. Voormolen, PhD, Werner B.F. Brouwer, PhD, Esther W. de Bekker-Grob, PhD, Job van Exel, PhD

Erasmus

Most difficult? The value of health / wellbeing

- Interpreting an ICER requires knowledge about the value of health (vi)
- Evidence is scarce: methods, samples and estimates differ substantially
- Most estimates concern individual valuations of own health gains
- Decisions concern societal valuations relating to solidarity or equity (operationalized differently in different countries – e.g. Norway, UK)

- Netherlands

Burden of disease	Acceptable costs (€) per QALY
0,1 - 0,4	Up to € 20.000 per QALY
0,41 - 0,7	Up to € 50.000 per QALY
0,71 – 1.0	Up to € 80.000 per QALY

When is it too expensive? Cost-effectiveness thresholds and health care decision-making

Werner Brouwer[1,2,3] · Pieter van Baal[1] · Job van Exel[1,2] · Matthijs Versteegh[3]

Estimating values

Received: 11 September 2020 | Revised: 18 March 2021 | Accepted: 5 April 2021
DOI: 10.1002/hec.4279

RESEARCH ARTICLE

Health Economics WILEY

The value of health—Empirical issues when estimating the monetary value of a quality-adjusted life year based on well-being data

Sebastian Himmler[1] | Jannis Stöckel[1] | Job van Exel[1,2] | Werner B. F. Brouwer[1,2]

[1]Erasmus School of Health Policy & Management, Erasmus University Rotterdam, Netherlands
[2]Erasmus School of Economics, Erasmus University Rotterdam, Netherlands

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Sebastian Himmler and Jannis Stöckel, Erasmus School of Health Policy & Management, Erasmus University Rotterdam, Netherlands.
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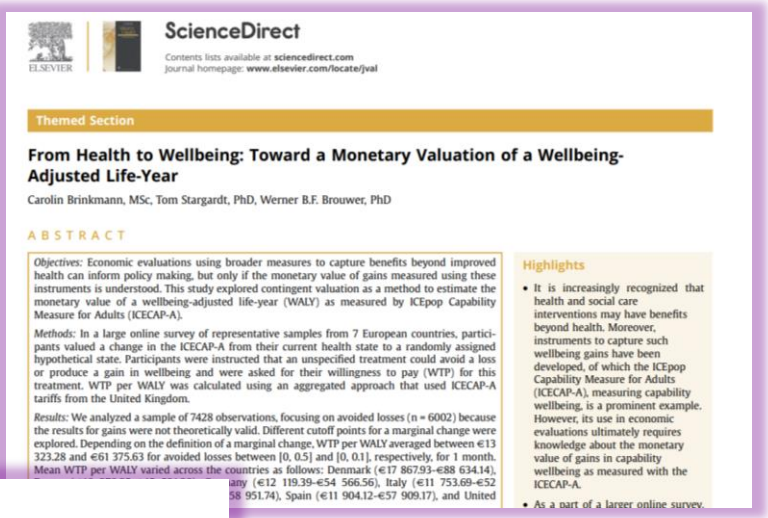
Abstract
Decisions on interventions or policy alternatives affecting health can be informed by economic evaluations, like cost-benefit or cost-utility analyses. In this context, there is a need for valid estimates of the monetary equivalent value of health (gains), which are often expressed in € per quality-adjusted life years (QALYs). Obtaining such estimates remains methodologically challenging, with a recent addition to the health economists' toolbox, which is based on well-being data: The well-being valuation approach. Using general population panel data from Germany, we put this approach to the test by investigating several empirical and conceptual challenges, such as the appropriate functional specification of income utility, the choice of health utility tariffs, or the health state dependence of consumption utility. Depending on specification, the bulk of estimated € per QALY values ranged from €20,000–60,000, with certain specifications leading to more considerable deviations, underlining persistent practical challenges when applying the well-being valuation methodology to health and QALYs. Based on our findings, we formulate recommendations for future research and applications.

KEYWORDS
health valuation, instrumental variable regression, panel data, piecewise regression, quality-adjusted life years, well-being valuation

JEL CLASSIFICATION
D61, I18, I31, C33, C36

Value Wellbeing >
Value Health



ScienceDirect
Contents lists available at sciencedirect.com
Journal homepage: www.elsevier.com/locate/jval

Themed Section

From Health to Wellbeing: Toward a Monetary Valuation of a Wellbeing-Adjusted Life-Year

Carolin Brinkmann, MSc, Tom Stargardt, PhD, Werner B.F. Brouwer, PhD

ABSTRACT

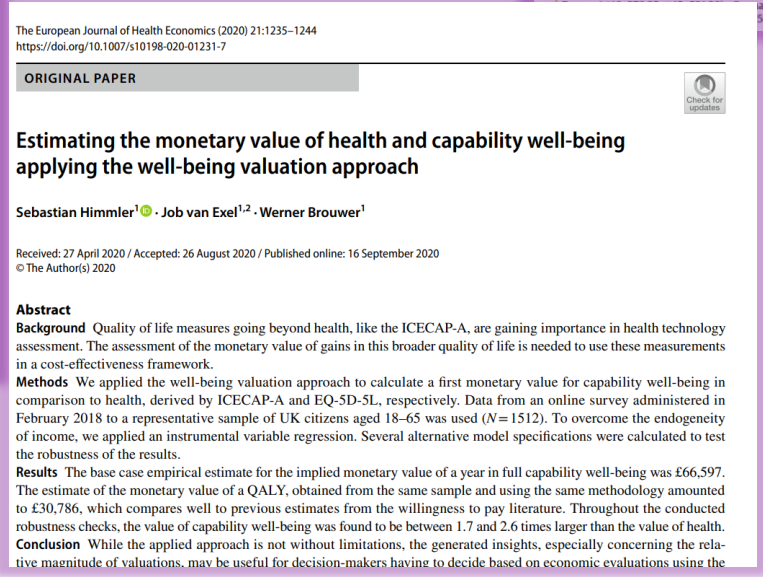
Objectives: Economic evaluations using broader measures to capture benefits beyond improved health can inform policy making, but only if the monetary value of gains measured using these instruments is understood. This study explored contingent valuation as a method to estimate the monetary value of a wellbeing-adjusted life-year (WALY) as measured by ICEpop Capability Measure for Adults (ICECAP-A).

Methods: In a large online survey of representative samples from 7 European countries, participants valued a change in the ICECAP-A from their current health state to a randomly assigned hypothetical state. Participants were instructed that an unspecified treatment could avoid a loss or produce a gain in wellbeing and were asked for their willingness to pay (WTP) for this treatment. WTP per WALY was calculated using an aggregated approach that used ICECAP-A tariffs from the United Kingdom.

Results: We analyzed a sample of 7428 observations, focusing on avoided losses (n = 6002) because the results for gains were not theoretically valid. Different cutoff points for a marginal change were explored. Depending on the definition of a marginal change, WTP per WALY averaged between €13 323.28 and €61 375.63 for avoided losses between [0, 0.5] and [0, 0.1], respectively, for 1 month. Mean WTP per WALY varied across the countries as follows: Denmark (€17 867.93–€88 634.14), [illegible] (€12 119.39–€54 566.56), Italy (€11 753.69–€52 [illegible]58 951.74), Spain (€11 904.12–€57 909.17), and United

Highlights

- It is increasingly recognized that health and social care interventions may have benefits beyond health. Moreover, instruments to capture such wellbeing gains have been developed, of which the ICEpop Capability Measure for Adults (ICECAP-A), measuring capability wellbeing, is a prominent example. However, its use in economic evaluations ultimately requires knowledge about the monetary value of gains in capability wellbeing as measured with the ICECAP-A.
- As a part of a larger online survey



The European Journal of Health Economics (2020) 21:1235–1244
https://doi.org/10.1007/s10198-020-01231-7

ORIGINAL PAPER

Check for updates

Estimating the monetary value of health and capability well-being applying the well-being valuation approach

Sebastian Himmler[1] · Job van Exel[1,2] · Werner Brouwer[1]

Received: 27 April 2020 / Accepted: 26 August 2020 / Published online: 16 September 2020

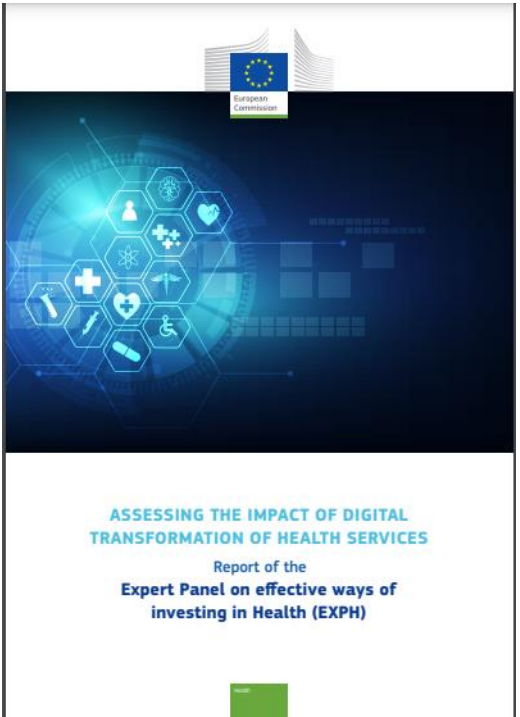
Abstract
Background Quality of life measures going beyond health, like the ICECAP-A, are gaining importance in health technology assessment. The assessment of the monetary value of gains in this broader quality of life is needed to use these measurements in a cost-effectiveness framework.
Methods We applied the well-being valuation approach to calculate a first monetary value for capability well-being in comparison to health, derived by ICECAP-A and EQ-5D-5L, respectively. Data from an online survey administered in February 2018 to a representative sample of UK citizens aged 18–65 was used ($N = 1512$). To overcome the endogeneity of income, we applied an instrumental variable regression. Several alternative model specifications were calculated to test the robustness of the results.
Results The base case empirical estimate for the implied monetary value of a year in full capability well-being was £66,597. The estimate of the monetary value of a QALY, obtained from the same sample and using the same methodology amounted to £30,786, which compares well to previous estimates from the willingness to pay literature. Throughout the conducted robustness checks, the value of capability well-being was found to be between 1.7 and 2.6 times larger than the value of health.
Conclusion While the applied approach is not without limitations, the generated insights, especially concerning the relative magnitude of valuations, may be useful for decision-makers having to decide based on economic evaluations using the

- Few societal valuations
- Equity adjusted values not replicated

Erasmus

Broadening the scope

- Economic evaluations mainly developed in context of assessing pharmaceuticals
- Broadening scope (digital, mental, social care) advocated but not without problems
- More attention for valuing less labour intensive and more sustainable technologies



Original Research Article

MDM Medical Decision Making

Medical Decision Making
2024, Vol. 44(1) 64–75
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DOI: 10.1177/0272989X231208645
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Sage

Estimating a Preference-Based Value Set for the Mental Health Quality of Life Questionnaire (MHQoL)

Frédérique C. W. van Krugten, Marcel F. Jonker, Sebastian F. W. Himmler, Leona Hakkaart-van Roijen, and Werner B. F. Brouwer

Background. Health economic evaluations using common health-related quality of life measures may fall short in adequately measuring and valuing the benefits of mental health care interventions. The Mental Health Quality of Life questionnaire (MHQoL) is a standardized, self-administered mental health–related quality of life instrument covering 7 dimensions known to be relevant across and valued highly by people with mental health problems. The aim of this study was to derive a Dutch value set for the MHQoL to facilitate its use in cost-utility analyses. **Methods.** The value set was estimated using a discrete choice experiment (DCE) with duration that accommodated nonlinear time preferences. The DCE was embedded in a web-based self-complete survey and administered to a representative

Health Economics, Policy and Law (2021), **16**, 440–456
doi:10.1017/S1744133120000237

HEALTH ECONOMICS, POLICY and LAW

ARTICLE

Broadening the application of health technology assessment in the Netherlands: a worthwhile destination but not an easy ride?

Joost J. Enzing[1,2*], Saskia Knies[1,2], Bert Boer[1] and Werner B.F. Brouwer[1]

ELSEVIER

Contents lists available at ScienceDirect

Health Policy and Technology

journal homepage: www.elsevier.com/locate/hlpt

Original Article/Research

Do economic evaluations of TAVI deal with learning effects, innovation, and context dependency? A review

Joost J. Enzing[a,b,*], Sylvia Vijgen[b], Saskia Knies[a,b], Bert Boer[a], Werner B.F. Brouwer[a]

[a] Erasmus School of Health Policy & Management, Erasmus University Rotterdam, Rotterdam, The Netherlands
[b] Zorginstituut Nederland, Diemen, The Netherlands

Patient preferences

Eur J Health Econ
DOI 10.1007/s10
ORIGINAL
Acceptab
arthritis:
Márta Péntek
Péter Keszthe
László Tamás
Bálint Strbák
Received: 17 Feb
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Abstract Sor
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Eur J Health Econ (2014) 15 (Suppl
DOI 10.1007/s10198-014-0597-1
ORIGINAL PAPER
Subjective health
a survey of rheum
Márta Péntek · László Gulács
Valentin Brodszky · Job van
Received: 7 February 2014 / Accepte
© Springer-Verlag Berlin Heidelberg
Abstract Subjective health e
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Péntek et al. Health Qual Life Outcomes (2020) 18:346
https://doi.org/10.1186/s12955-020-01568-w
RESEARCH
Acceptabl
of a cross-
Márta Péntek[1,2], Job
, Fanni Rencz[1,5] and
Abstract
Background: We aim
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dimensions, acceptabil
Conclusion: In Hunga

Health and Quality
doi: 10.1111/j.1369-7625.2012.00797.x
Subjective expectations regarding length and
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Márta Péntek
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Accepted for pub
9 May 2012
Keywords: ageing
health status, Hu

Hölgyesi et al. BMC Medical Informatics and Decision Making (2024) 24:87
https://doi.org/10.1186/s12911-024-02470-x
BMC Medical Informatics and Decision Making
RESEARCH
Open Access
Robot-assisted surgery and artificial intelligence-based tumour diagnostics: social preferences with a representative cross-sectional survey
Áron Hölgyesi[1,2*], Zsombor Zrubka[2], László Gulácsi[2], Petra Baji[3], Tamás Haidegger[4,5], Miklós Kozlovszky[6,7], Miklós Weszl[8], Levente Kovács[9] and Márta Péntek[2]
Abstract
Background The aim of this study was to assess social preferences for two different advanced digital health technologies and investigate the contextual dependency of the preferences.
Methods A cross-sectional online survey was performed among the general population of Hungary aged 40 years and over. Participants were asked to imagine that they needed a total hip replacement surgery and to indicate whether they would prefer a traditional or a robot-assisted (RA) hip surgery. To better understand preferences for the

Helping development of new technologies

- Societal challenge keeping healthcare affordable, efficient, equitable, and sustainable (in terms of labour force and environment) requires multidisciplinary collaboration

- Collaboration helps to understand patient & professional preferences, reimbursement requirements, and societal restrictions (legal, ethical, organisational) at the start of the development of new technologies

- Bringing together technical and social sciences crucial

- A structural and growing collaboration between the TU Delft, Erasmus Medical Center and the Erasmus University Rotterdam: Convergence

Convergence

- Over €25 million annually

- Permanent collaboration
- Five main areas:
  - Resilient delta
  - Healthy start
  - Pandemic & Disaster Preparedness Center
  - AI, Data, Digitalisation
  - Health & Technology

- *School of Convergence* planned

Transplantation

Only a small proportion of all donor organs meet the quality requirements for transplantation. The scarcity of organs means that 20% of patients die while they are still on a waiting list for a transplant. The Organ Transplantation Flagship Programme is focusing on reducing the shortfall. A first step is to improve the preservation of organs that are suitable for transplantation. The next goal is to upgrade unsuitable organs. This requires the use of technology, but also the meticulous balancing of ethical, economic and societal considerations.

Source: www.convergence.nl

Price

'A promising avenue from a medical and technical point of view is to repair, and even grow, organs,' says Esther de Bekker-Grob, Professor of Health Economics & Health Preferences at Erasmus University and a co-lead of the Flagship Project. 'However, every step and technical development involves all sorts of ethical, economic and societal issues. Do we want to go down that road? What are the implications for the patient? Do we as a society think this is worth the cost? We work with ethicists, legal experts, psychologists, health economists and choice modellers. But also with patients and lobby organisations. The goal is to prolong patients' lives and enhance their quality of life. But at what price, and which other limits apply?'

To conclude

- Demonstrating value for money for new technologies increasingly important
- Requires (joint!) development and application of sound methods to capture all relevant costs and benefits of health technologies

- Understanding preferences of patients & professionals facilitates adoption/compliance
- Bringing together technical and social sciences needed to address societal challenges in healthcare

- Much to cooperate on and to look forward to!

Building bridges

Erasmus School of
Health Policy
& Management

ERASMUS CENTRE
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