



The Next Frontier in Defining Value: Health Economics in LMICs

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Researchers have been estimating cost-effectiveness in healthcare since at least the early '70s



Economic foundations of cost-effectiveness analysis

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Received 1 January 1995; accepted 1 July 1996



A Utility Maximization Model for Evaluation of Health Care Programs

by George W. Torrance, Warren H. Thomas, and David L. Sackett

OPERATIONS RESEARCH

Utility Functions for Life Years and Health Status

JOSEPH S. PLISKIN

Tel-Aviv University, Tel-Aviv, Israel

DONALD S. SHEPARD and MILTON C. WEINSTEIN

Harvard School of Public Health, Boston, Massachusetts

(Received November 1976; accepted July 1979)

A HEALTH-STATUS INDEX AND ITS APPLICATION TO HEALTH-SERVICES OUTCOMES

S. Fanshel, Ph.D.

Fairleigh Dickinson University, Teaneck, New Jersey

and

J. W. Bush, M.D.

New York University, New York, N.Y.

(Received October 7, 1969)

The Price of Life

Michael D. Bayles

University of Kentucky



But the current approach struggles to explain the value of treating severe illness and treating illnesses in LMICs



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ABOUT ASSESSMENTS METHODS COMMENTARIES DONATE

Institute for Clinical and Economic Review Announces Final Modified Framework for Assessing Value of Treatments for Ultra-Rare Diseases

FUTURE DEVELOPMENT

Why global vaccine equity is the prescription for a full recovery

Indermit Gill and Michele Ruta · Friday, February 11, 2022



-Broader societal considerations and expanded treatments targeting fewer than 10,000 patients

VOLUME 27 NUMBER 1 SUMMER 2009

Justice and the ADA: Does Prioritizing and Rationing Health Care Discriminate against the Disabled?

Published online by Cambridge University Press: 18 June 2009

Dan W. Brock

CGD CENTER FOR GLOBAL DEVELOPMENT

New Study Finds Some Poor Countries Paying 20 to 30 Times More for Basic Medicines Than Others

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Cancer Drugs Fund

A cottage industry has developed to deal with these anomalies



Health Economics

EDITORIAL

VALUING HEALTH TECHNOLOGIES AT NICE: RECOMMENDATIONS FOR IMPROVED INCORPORATION OF TREATMENT VALUE IN HTA

DANA GOLDMAN^a, DARIUS LAKDAWALLA^b, TOMAS J. PHILIPSON^{c*} and WESLEY YIN^d

HSR HEALTH SERVICES RESEARCH
Impacting Health Practice and Policy Through
State-of-the-Art Research and Thinking

The Value of Specialty Oncology Drugs

Dana P. Goldman, Anupam B. Jena, Darius N. Lakdawalla,
Jennifer L. Malin, Jesse D. Malkin, and Eric Sun

AJMC

Reconsidering the Economic Value of Multiple Sclerosis Therapies

Tiffany Shih, PhD; Craig Wakeford, MA; Dennis Meletiche, PharmD; Jesse Sussell, PhD; Adrienne Chung, PhD; Yanmei Liu, MS; Jin Joo Shim, MS; and Darius Lakdawalla, PhD

JOURNAL OF PUBLIC ECONOMICS

The insurance value of medical innovation[☆]

Darius Lakdawalla^{a,c}, Anup Malani^{b,c}, Julian Reif^{d,*}

Value in Health

Approaches to Aggregation and Decision Making—A Health Economics Approach: An ISPOR Special Task Force Report [5]

Charles E. Phelps, PhD, MBA^{1,*}, Darius N. Lakdawalla, PhD², Anirban Basu, PhD³, Michael F. Drummond, MCom, DPhil⁴, Adrian Towse, MPhil, MA⁵, Patricia M. Danzon, PhD⁶

Value in Health

Methodology

Health Technology Assessment With Diminishing Returns to Health: The Generalized Risk-Adjusted Cost-Effectiveness (GRACE) Approach

Darius N. Lakdawalla, PhD, Charles E. Phelps, PhD

Pharmacoeconomics

A Flexible Open-Source Decision Model for Value Assessment of Biologic Treatment for Rheumatoid Arthritis

Devin Incerti¹ · Jeffrey R. Curtis² · Jason Shafrin¹ · Darius N. Lakdawalla³ · Jeroen P. Jansen^{1,4}

2010

2012

2014

2016

2018

2020

2021

Health Affairs

By Darius N. Lakdawalla, John A. Romley, Yuri Sanchez, J. Ross Maclean, John R. Penrod, and Tomas Philipson

How Cancer Patients Value Hope And The Implications For Cost-Effectiveness Assessments Of High-Cost Cancer Therapies

AJMC

The Wider Public Health Value of HCV Treatment Accrued by Liver Transplant Recipients

Anupam B. Jena, MD, PhD; Warren Stevens, PhD; Yuri Sanchez Gonzalez, PhD; Steven E. Marx, PharmD; Timothy Juday, PhD; Darius N. Lakdawalla, PhD; and Tomas J. Philipson, PhD

Value in Health

Defining Elements of Value in Health Care—A Health Economics Approach: An ISPOR Special Task Force Report [3]

Darius N. Lakdawalla, PhD^{1,*}, Jalpa A. Doshi, PhD², Louis P. Garrison Jr, PhD³, Charles E. Phelps, PhD, MBA⁴, Anirban Basu, PhD⁵, Patricia M. Danzon, PhD⁶

Value in Health

A Health Economics Approach to US Value Assessment Frameworks—Summary and Recommendations of the ISPOR Special Task Force Report [7]

Louis P. Garrison Jr, PhD^{1,*}, Peter J. Neumann, ScD², Richard J. Willke, PhD³, Anirban Basu, PhD⁴, Patricia M. Danzon, PhD⁵, Jalpa A. Doshi, PhD⁶, Michael F. Drummond, MCom, DPhil⁷, Darius N. Lakdawalla, PhD⁸, Mark V. Pauly, PhD⁹, Charles E. Phelps, PhD, MBA¹⁰, Scott D. Ramsey, MD, PhD¹¹, Adrian Towse, MPhil, MA¹², Milton C. Weinstein, PhD¹³

JOURNAL OF HEALTH ECONOMICS

Health technology assessment with risk aversion in health

Darius N. Lakdawalla^{a,b,*}, Charles E. Phelps^c

Health Affairs

By David C. Grabowski, Darius N. Lakdawalla, Dana P. Goldman, Michael Eber, Larry Z. Liu, Tamer Abdelgawad, Andreas Kuznik, Michael E. Chernew, and Tomas Philipson

The Large Social Value Resulting From Use Of Statins Warrants Steps To Improve Adherence And Broaden Treatment



Why does cost effectiveness struggle to value treatment for the most vulnerable patients?



Many health economists have zealously argued that “a QALY is always a QALY,” so context never matters

- ▶ But in health, context always matters—patients with bleak quality of life place great value on even modest gains



Economists widely agree: goods are more valuable when people have less

- ▶ Thus, people with less health ought to value QALY gains more than others (i.e., people are averse to health risks)



Introducing risk-aversion and diminishing returns into CEA will produce new implications that better match preferences of real patients

Generalized Risk-Adjusted Framework (GRACE) works like the traditional CEA framework QALY



CEA

Reimburse if: $\frac{\Delta\$}{\Delta\text{QALY}} \leq \text{WTP}$

$\Delta\$$: Incremental cost of therapy

ΔQALY : Incremental QALYs gained

WTP: Willingness-to-Pay

GRACE

Reimburse if: $\frac{\Delta\$}{\Delta\text{GRA-QALY}} \leq \text{RASA-WTP}$

$\Delta\$$: Incremental cost of therapy

$\Delta\text{GRA-QALY}$: Incremental GRA-QALYs gained

RASA – WTP: Risk- and Severity-Adjusted WTP

Many implications follow from one generalization

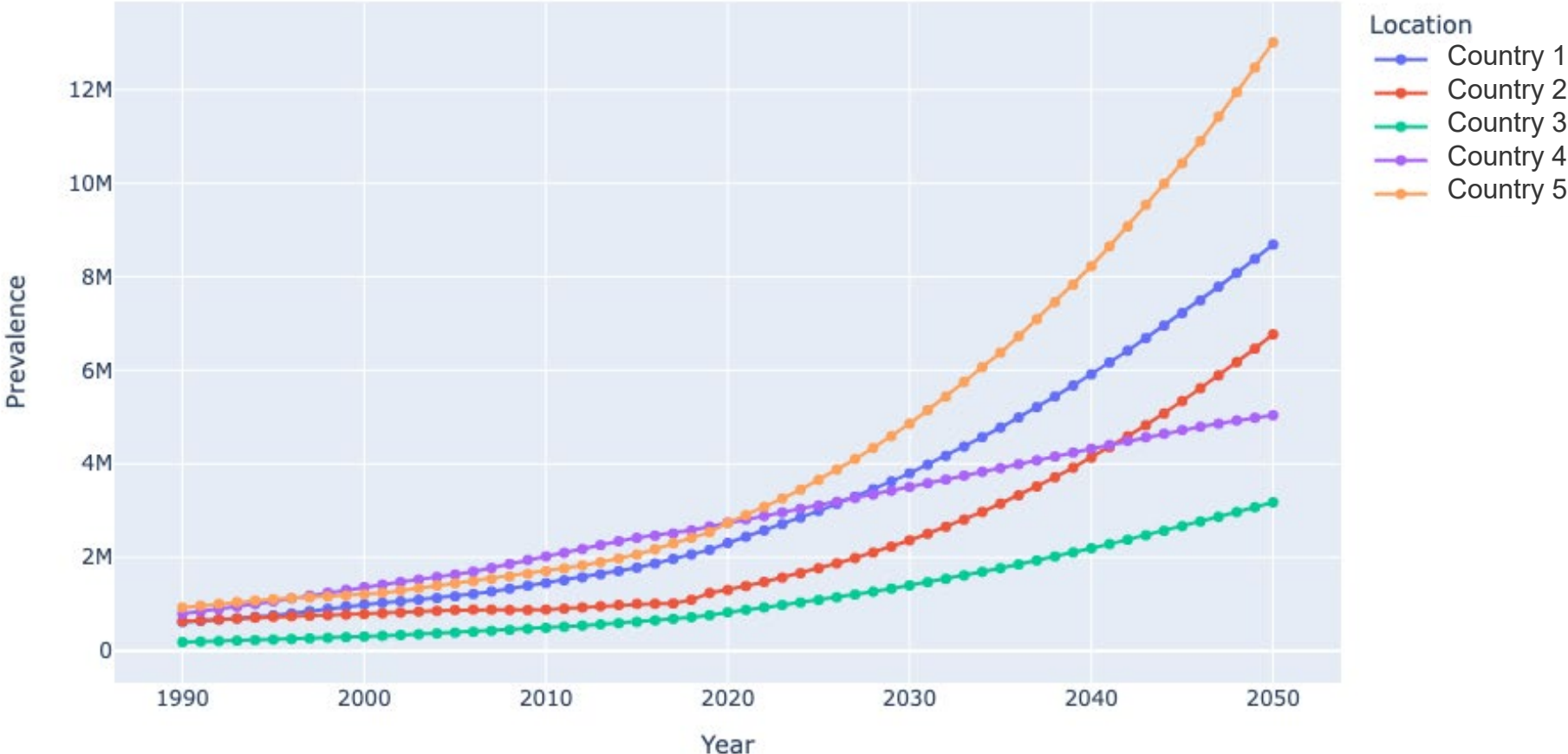


Traditional CEA	GRACE	Data Needs for GRACE
QoL gains are the same regardless of how sick patients are	QoL gains systematically varies with disease severity	Disease severity (e.g., burden of illness estimates)
Only average treatment outcomes matter (b/c patients do not bear risk)	Entire distribution of treatment outcomes matter (patients are risk averse)	Variance and skewness in QoL outcomes (e.g., clinical trial data)
QoL and survival tradeoffs are fixed , regardless of health status	Patients are allowed to value QoL more than survival when they have less QoL	Literature estimates of risk preferences

Consider patients with Type 2 Diabetes Mellitus (T2DM) in five countries in Sub-Saharan Africa



Prevalence of Diabetes is Growing and Projected to Grow





Consider three treatments for T2DM and their impacts on health outcomes

Treatment vs. Comparator Data From Clinical Trials

Three Treatment Options	Change in HbA1C	Change in BMI (kg/m ²)	Change in Systolic Blood Pressure (mmHG)	RR of Cardiovascular Event
2 nd Line	-1.63	-0.9	-4.16	92%
3 rd Line	-1.68	0.6	0	100%
4 th Line	-1.31	0.6	0	100%

Overview of methods and data



1. Model lifetime health outcomes

- Data: UK Prospective Diabetes Study
- Probability of heart attack, stroke, renal failure, and death

2. Make country specific adaptations

- Data: Global Burden of Disease
- Adjust for relative risk of diseases in each country

3. Obtain cost and utility parameters

- Data: ICER evaluations and Global Burden of Disease
- Obtain ICER cost estimates and DALY-derived utilities

4. Adjust cost and WTP with country-specific data

- Data: World Bank and US Medical Inflation
- Obtain country-specific PPP and GDP

5. Scale model by cohort size in each country

- Data: Global Burden of Disease
- Number of incident T2DM cases



Novel treatments reduce the time spent in disability

Number of Years Spent in Disability (Post Stroke or Renal Failure)

Treatment Options	Country 1	Country 2	Country 3	Country 4	Country 5
2 nd Line	-43,166	-19,816	-16,953	-59,008	-51,210
3 rd Line	-21,476	-10,054	-8,428	-29,430	-25,415
4 th Line	-17,014	-8,002	-6,675	-23,329	-20,122



Novel treatments also increase the number of healthy life years

Number of Healthy Years (Not Disabled or Dead)

Treatment Options	Country 1	Country 2	Country 3	Country 4	Country 5
2 nd Line	71,901	34,199	27,997	98,512	85,071
3 rd Line	38,124	18,753	14,745	52,351	45,005
4 th Line	30,728	14,965	11,711	41,607	35,716

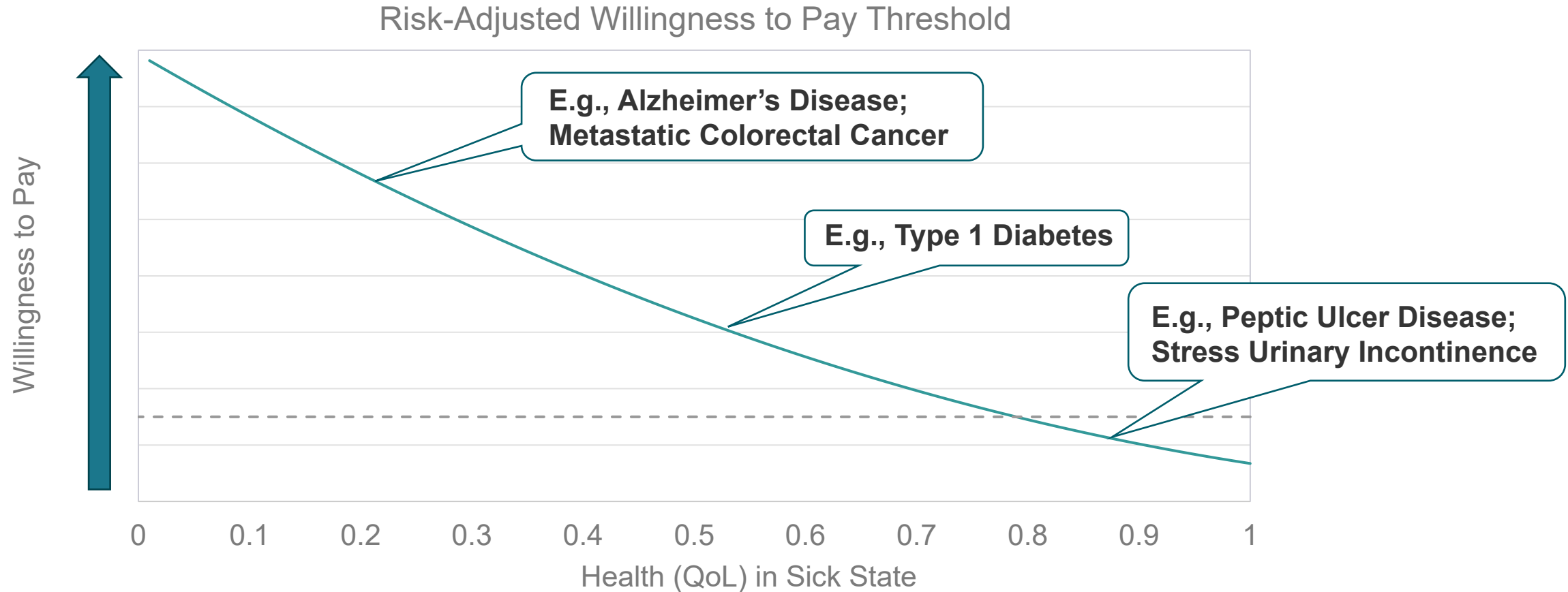


Relative to GRACE, traditional CEA underestimated the economic value by 8-11% in this context

Percent Difference Between in GRACE ICER and Traditional CEA ICER

Treatment Options	Country 1	Country 2	Country 3	Country 4	Country 5
2 nd Line	10.45%	10.13%	10.56%	10.44%	10.47%
3 rd Line	9.22%	8.65%	9.36%	9.18%	9.28%
4 th Line	9.01%	8.40%	9.15%	8.97%	9.08%

Key Implication: Under GRACE, quality of life improvement rises in value when the initial health state worsens



GRACE prioritizes conditions that cause the greatest burden of disease

How to Learn More about GRACE



Four articles in print: (Lakdawalla and Phelps)

Health Technology Assessment with Risk Aversion in Health

JHE
July 2020



A Guide to Extending and Implementing Generalized Risk-Adjusted Cost-Effectiveness (GRACE)

EJHE
September 2021



COMING SOON! (Phelps and Lakdawalla)

The Generalized and Risk-Adjusted Cost Effectiveness (GRACE) Model: Overview and Implementation (textbook, scheduled publication in 8/2023)

Health Technology Assessment w/ Diminishing Returns to Health: The Generalized Risk-Adjusted Cost-Effectiveness (GRACE) Model

VIH
February 2021



The Generalized Risk-Adjusted Cost-Effectiveness (GRACE) Model for Measuring the Value of Gains in Health: An Exact Formulation

Journal of Benefit-Cost Analysis
Forthcoming, 2023





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