



# The Benefit-Cost Analysis Reference Case: What It Is and How to Use It

## Concepts and Framework

Lisa A. Robinson

Center for Health Decision Science and Center for Risk Analysis  
Harvard T.H. Chan School of Public Health

International Health Economics Association  
Pre-Congress Workshop

July 14, 2019

# Contents

- Background
- Conceptual Framework
- Summary Measures

# Background

## What is benefit-cost analysis?\*

- One of several tools for assessing policy impacts.
  - Well-established and widely-used to evaluate health and other interventions, particularly those implemented outside of the health care system.
- Measures improvements and harms using the same metric (money).
  - Facilitates comparison of dissimilar impacts.
  - Provides information on the preferences of those affected by the policy.



\*a.k.a. cost-benefit analysis, return on investment analysis.

# Background

- Frequently used for regulatory impact assessment.
- Increasingly applied to social programs.
- Also used for priority setting.

The screenshot shows the World Bank website's 'Global Indicators of Regulatory Governance' page. The header includes the World Bank logo and navigation links: 'WHO WE ARE', 'WHAT WE DO', 'WHERE WE WORK', 'UNDERSTANDING POVERTY', and 'WORK WITH US'. The main title is 'Global Indicators of Regulatory Governance'. Below the title, there are dropdown menus for 'Data by Country' and 'Compare Data'. The page content includes a sidebar with links for 'Home', 'Key Findings', 'Research', 'Reforms', 'Methodology', and 'About us'. The main content area is titled 'Global Database for Regulatory Impact Assessment (RIA)' and contains a search bar, a table of results, and a description of the database. The table shows results for Albania, including 'Law Drafting Manual in Albania: A Guide to the Legal System' and 'Improving the Process of Economic Reform Legislation'.

The cover of the 'Pew-MacArthur Results First Initiative' report. It features the logos for 'THE PEW CHARITABLE TRUSTS' and 'MacArthur Foundation'. The text on the cover includes 'PROJECT' and 'Pew-MacArthur Results First Initiative'.

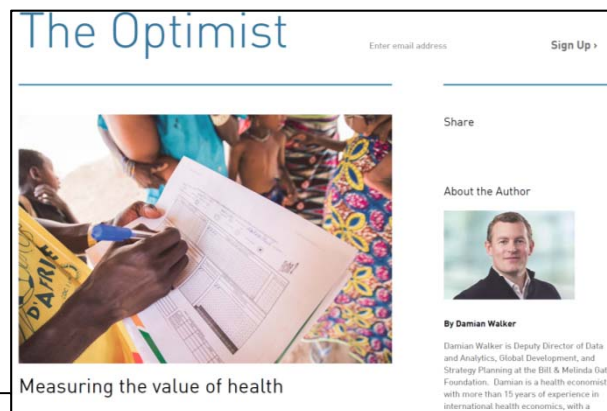
The cover of the report 'Prioritizing Development: A Cost Benefit Analysis of the United Nations' Sustainable Development Goals'. The title is in large red font. Below the title, it says 'A Cost Benefit Analysis of the United Nations' Sustainable Development Goals'. The editor's name, 'EDITED BY BJORN LOMBORG', is at the bottom. The background features a collage of images related to development, including a bar chart and text snippets like 'HEALTH expanded immunization and pressure medication reduced tuberculosis deaths 90%', 'Cut salt intake 30%', 'Reduce malaria infections', 'Increase tobacco prices 125%', 'End funding for 1bn poorest', 'Reduce infant mortality', 'Reduce heart attack pill stroke / Heart attack pill', 'End funding for 2.5bn poorest', 'SECURITY AND NUTRITION reduce child malnutrition yields increase electricity', and 'EDUCATION in Sub-Saharan Africa'.



**HARVARD**  
**T.H. CHAN**  
SCHOOL OF PUBLIC HEALTH

# Background

- Increasingly used in health.



IDEAS | THE SATURDAY ESSAY

## Bill Gates: The Best Investment I've Ever Made

Global health groups that buy and distribute medicines are a sure bet for saving lives, but their government funding is now in danger, and even the biggest philanthropies can't fill the gap

The Lancet Commissions



The Lancet Commission on pollution and health

Philip J Landrigan, Richard Fuller, Nereus J R Acosta, Olusoji Adeyi, Robert Arnold, Niladri (Nil) Basu, Abdoulaye Bibi Baldé, Roberto Bertollini, Stephan Bose-O'Reilly, Jo Ivey Boufford, Patrick N Breysse, Thomas Chiles, Chulabharn Mahidol, Awa M Coll-Seck, Maureen L Cropper, Julius Fobil, Valentin Fuster, Michael Greenstone, Andy Haines, David Hanrahan, David Hunter, Mukesh Khare, Alan Krupnick, Bruce Lanphear, Bindu Lohani, Keith Martin, Karen V Mathiesen, Maureen A McTeer, Christopher J L Murray, Johanita D Ndahimananjara, Frederica Perera, Janez Potočnik, Alexander S Preker, Jairam Ramesh, Johan Rockström, Carlos Salinas, Leona D Samson, Karti Sandilya, Peter D Sly, Kirk R Smith, Achim Steiner, Richard B Stewart, William A Suk, Onno C P van Schayck, Gautam N Yadama, Kandehe Yumkella, Ma Zhong

The Lancet Commissions

GLOBAL HEALTH 2035

THE LANCET



Global health 2035: a world converging within a generation

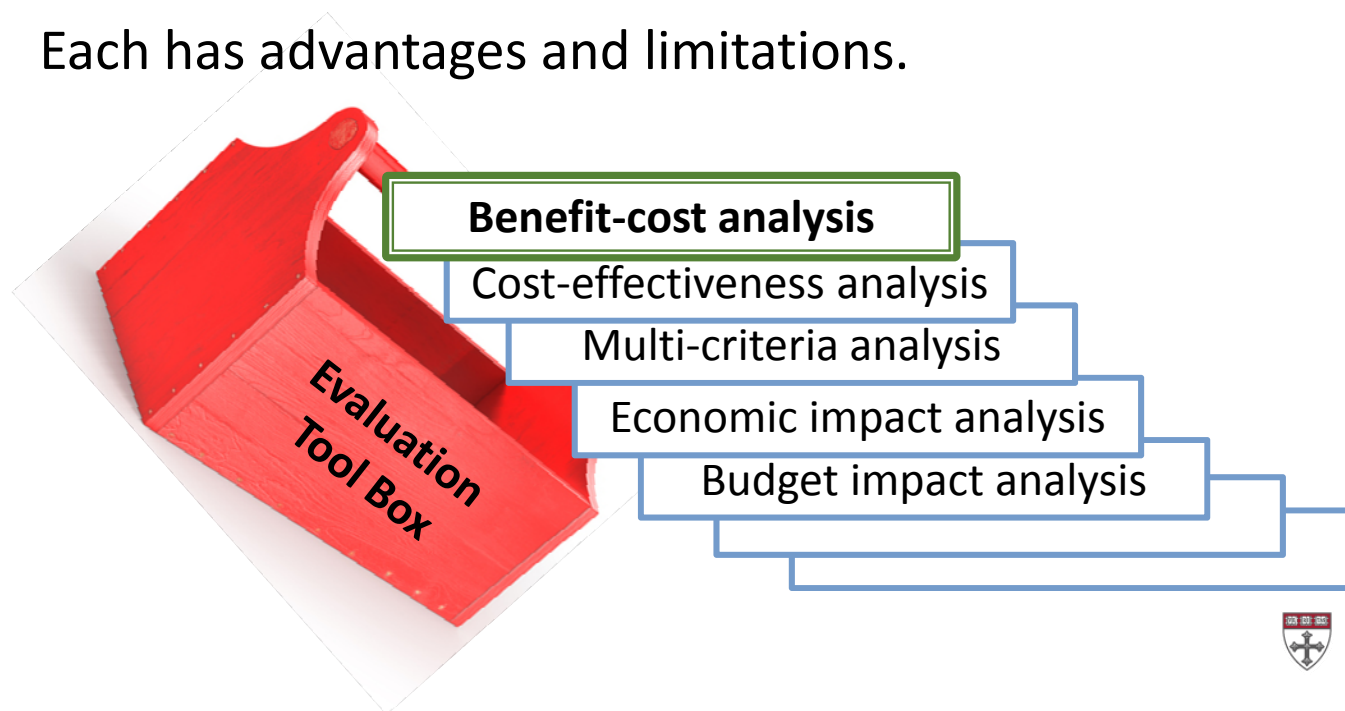
Dean T Jamison, Lawrence H Summers, George Alleyne, Kenneth J Arrow, Seth Berkley, Agnes Binagwaho, Flavia Bustreo, David Evans, Richard G A Feachem, Julio Frenk, Gargee Ghosh, Sue J Goldie, Yan Guo, Sanjeev Gupta, Richard Horton, Margaret E Kruk, Adel Mahmoud, Linah K Mahohlo, Mthuli Ncube, Ariel Pablos-Mendez, K Srinath Reddy, Helen Saxenian, Agnes Soucat, Karen H Ulltveit-Moe, Gavin Yamey



**HARVARD**  
**T.H. CHAN**  
SCHOOL OF PUBLIC HEALTH

# Background

- Preferred analytic approach depends on context.
  - What choice is the analysis intended to inform?
  - What questions are likely to be raised by decision-makers, other stakeholders?
- Often useful to conduct more than one type of analysis.
  - Each has advantages and limitations.



# Background

- BCA may be particularly useful when the goal is to allocate limited resources:
  - Across policies implemented within and outside of the health care system.
  - Across policies with both health and nonhealth consequences.
- Many policies implemented outside the health care system have significant health impacts.
  - Including those addressing, for example, education, environment, transportation, nutrition.



# Background

- CEA may be particularly useful when the goal is to allocate limited resources so as to maximize health.
  - For example, single-payer health plans, universal health coverage.
  - Consistent with notion that health-improving interventions should be provided regardless of the affected individual's preferences for allocating resources.





# Background

## Why conduct economic evaluation?

- Encourages thorough examination of impacts; supports evidence-based decisions.
  - Provides information on the preferences of those affected by the policy.
- Often unearths information needed for policy development and implementation, such as:
  - Otherwise unanticipated consequences
  - Available technology, costs, effectiveness
  - Who bears costs and receives benefits
  - Sources of support and opposition



- Typically supports, but does not determine, decisions.
- Other considerations include:
  - Statutory and other legal requirements
  - Government policy
  - Stakeholder views
  - Distribution of costs and benefits, equity
  - Difficult-to-quantify impacts (ethical concerns, human dignity)

# Conceptual Framework

- Benefit-cost analysis is often used to describe any process for weighing benefits and harms.
- Technical definition is more precise.
  - Rooted in welfare economics.
  - Reflects an explicit normative framework.
- Focuses on trade-offs associated with the allocation of limited resources.
  - If we use resources for one purpose, they will not be available for other uses.

➤ **“Opportunity costs.”**

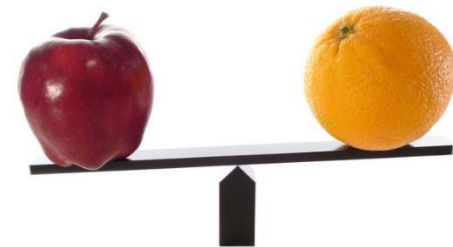


# Conceptual Framework

- Value is based on how much money an affected individual is willing to pay or accept for the outcome.
  - Generally assume individuals are the best (most legitimate) judge of their own welfare (“consumer sovereignty”); not paternalistic.
- Describes extent to which individuals are willing, as members of a society, to reduce their consumption of other goods and services to achieve particular policy outcomes.

# Conceptual Framework

- Money is not important *per se*.
  - Represents the use of resources (labor, materials, etc.).
- Allows comparison of disparate impacts using a common metric, including health and non-health benefits such as environmental improvements as well as costs.
- Could use another measure; money is simply a convenient and well-established measure of exchange.

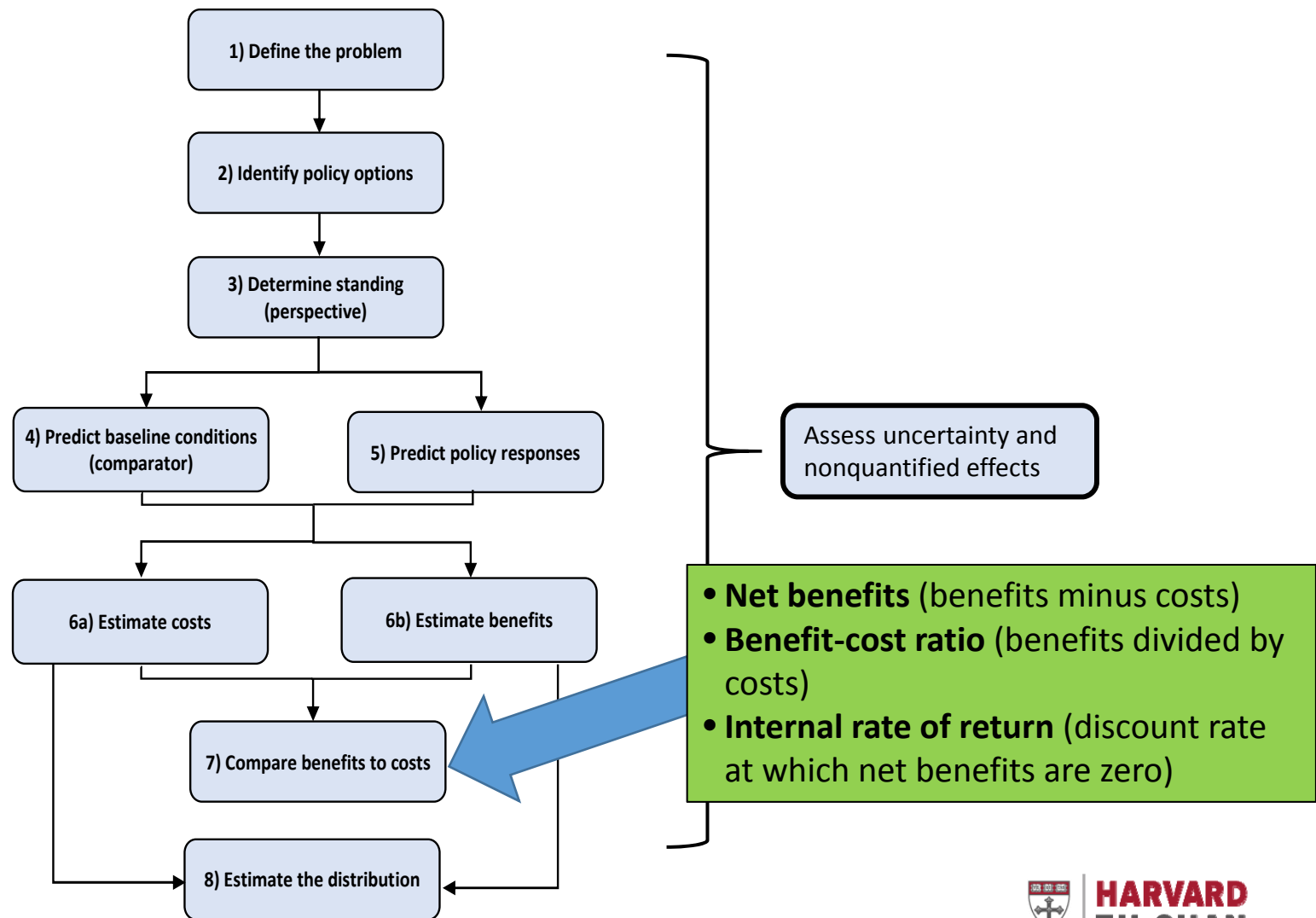


# Conceptual Framework



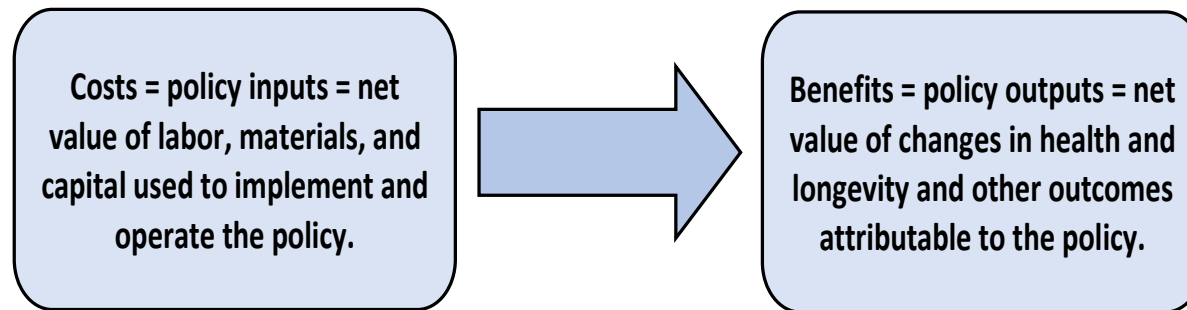
- Rely on market data where possible for valuation.
  - Presumably, if an individual chooses to buy a good or service, he or she values it more than the other things the money could buy.
- For nonmarketed goods, use stated or revealed preference methods.
  - *Stated preferences* - ask respondents to indicate what they would be willing to pay under hypothetical scenarios (contingent valuation, choice experiments).
  - *Revealed preferences* – use data on market transactions or observed behavior to estimate value, controlling for other attributes statistically.

# Summary Measures



# Summary measures

- Consistent categorization of benefits and costs is needed for total benefits, total costs, and benefit-cost ratios to be comparable across analyses.



- Net benefits are often used when selecting among options for addressing a particular problem.
- Benefit-cost ratios or IRRs are often used in prioritizing spending across diverse policies.

# Summary measures

- If the benefit-cost ratio or IRR is the highlighted summary measure,
  - Net benefits should also be reported to indicate the magnitude of the impacts.
- For example, if we compare a policy with \$1,000 in benefits and \$100 in costs to a policy with \$1,000,000 in benefits and \$100,000 in costs:
  - Both have a benefit-cost ratio of 10 to 1.
  - The latter policy leads to substantially larger improvements in welfare, but requires a much greater investment.
- Similarly, if the costs of these policies occur in the current year and the benefits occur 10 years later:
  - They have the same IRR (29 percent) but the second policy has the larger present value if the discount rate is smaller than this rate.



# Summary Measures

## Key questions

- Given uncertainty,
  - For an individual policy, how likely is it that the benefits will exceed the costs?
  - For a group of policies, how likely is it that the relative ranking will change?
- In some cases, conclusions may not be significantly affected by uncertainty; in others it will be important.
- Regardless of the summary measure featured, a policy should not necessarily be implemented simply because its benefits exceed its costs, its benefit-cost ratio exceeds one, or its IRR is favorable.
  - Comparison to other policies is necessary to identify the most efficient use of resources.
  - Decision-makers also need to consider issues such as legal, political, and budgetary constraints as well as any distributional concerns.

In your own work, in what contexts would BCA be most useful?

Why would it be particularly useful?



# Thank you!

Please visit us at  
<https://sites.sph.harvard.edu/bcaguidelines/>