

# Economic Evaluations in Public Health: What are the ethical implications?

TOPHC, Toronto, ON

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# National Collaborating Centre for Healthy Public Policy (NCCHPP)

- Our mandate
  - Support public health actors in their efforts to promote healthy public policies
- Our areas of expertise
  - The effects of public policies on health
  - Generating and using knowledge about policies
  - Intersectoral actors and mechanisms
  - Strategies to influence policy making



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# Overview

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- Introduction to economic evaluations
- Methods of economic evaluation
  - Cost-benefit analysis
  - Cost-utility analysis
- Ethics and economic evaluations
- Exercise
- Conclusion and evaluation



# Effectiveness and efficiency

## Effectiveness

- Achieving a goal...
- How well are the severity and duration of symptoms reduced?

## Efficiency

- ...at least possible cost
- What is the cost per unit reduction in symptom severity and duration?

- Standard economic problem
- Efficiency presupposes effectiveness



# What is an economic evaluation?

An **economic evaluation** looks at a single policy or a number of policies with respect to economic efficiency

- Examine costs and benefits
- Biggest “bang for the buck”
- Appear to be hard facts but have ethical aspect



# Other values

- Other social values and policy objectives can conflict with efficiency
  - **Equity:** attention to the distribution of goods that does not disadvantage particular sub-populations
  - **Justice:** attention to procedures, historical background
  - **Solidarity:** attention to community, cooperation and common cause
- Making values and assumptions *explicit*



# Cost-benefit analysis (CBA) 1

- Everything is in \$\$\$

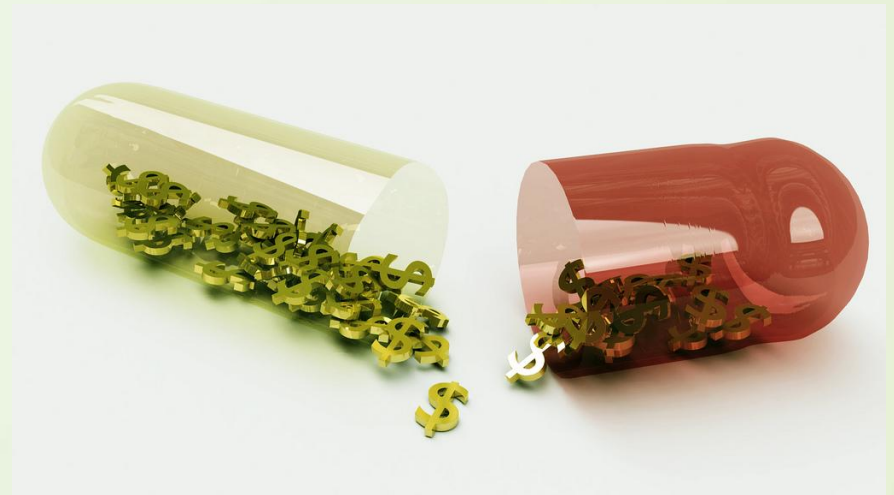
## 1. Identify

## 2. Measure

- E.g. time frame

## 3. Value

- Market price?
- No? Then must impute



Source: [www.flickr.com](http://www.flickr.com)  
Graphic by: Brooks Elliott.



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# CBA: Cost-benefit analysis 2

Two ways to think about efficiency

## 1. Ratio of benefit to cost

- More than 1 means value for money

## 2. Net present value (NPV)

- Benefits minus costs
- Always using *incremental* values: compared to relevant other option (e.g., present situation)



# Example of CBA efficiency measures

Program	Cost	Benefit	Ratio	NPV
<i>Option 1</i>	\$10,000	\$13,000	<b>1.3</b>	\$3,000
<i>Option 2</i>	\$100,000	\$110,000	1.1	<b>\$10,000</b>



# Cost-benefit analysis 3

## Strengths

- **Universal:** common language to compare very disparate things
- **Flexible:** can handle any kind of benefit

## Limitations

- **Prices:** translating some benefits into dollars is difficult
- **Biases:** who and how do we ask about translating intangibles into dollars?



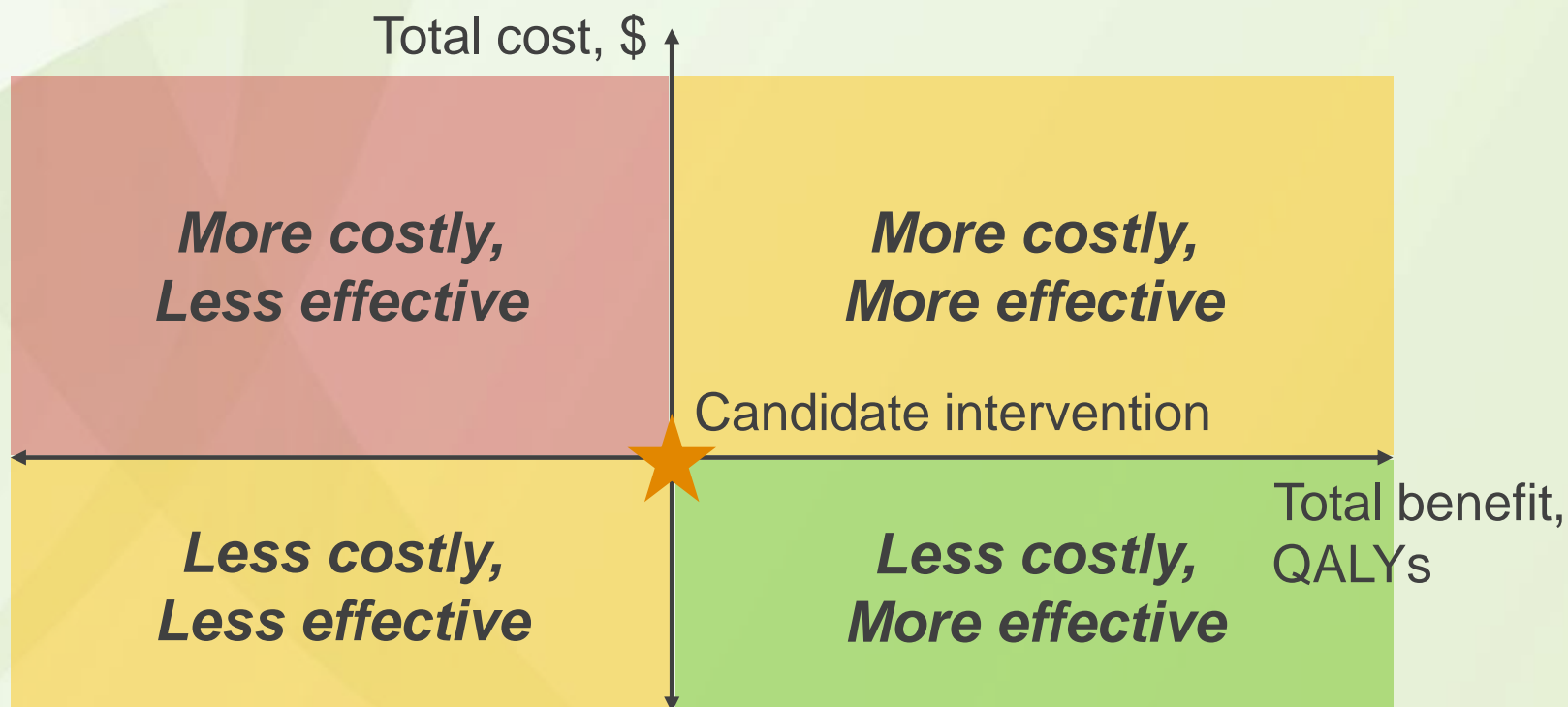
# Cost-utility analysis (CUA) 1

- How to compare policies with different health-improving goals without everything in \$\$\$
- Enter the Quality-Adjusted Life Year (QALY)
  - 0 to 1 scale of general health
  - Values come from questionnaires
- Efficiency measured in cost per QALY



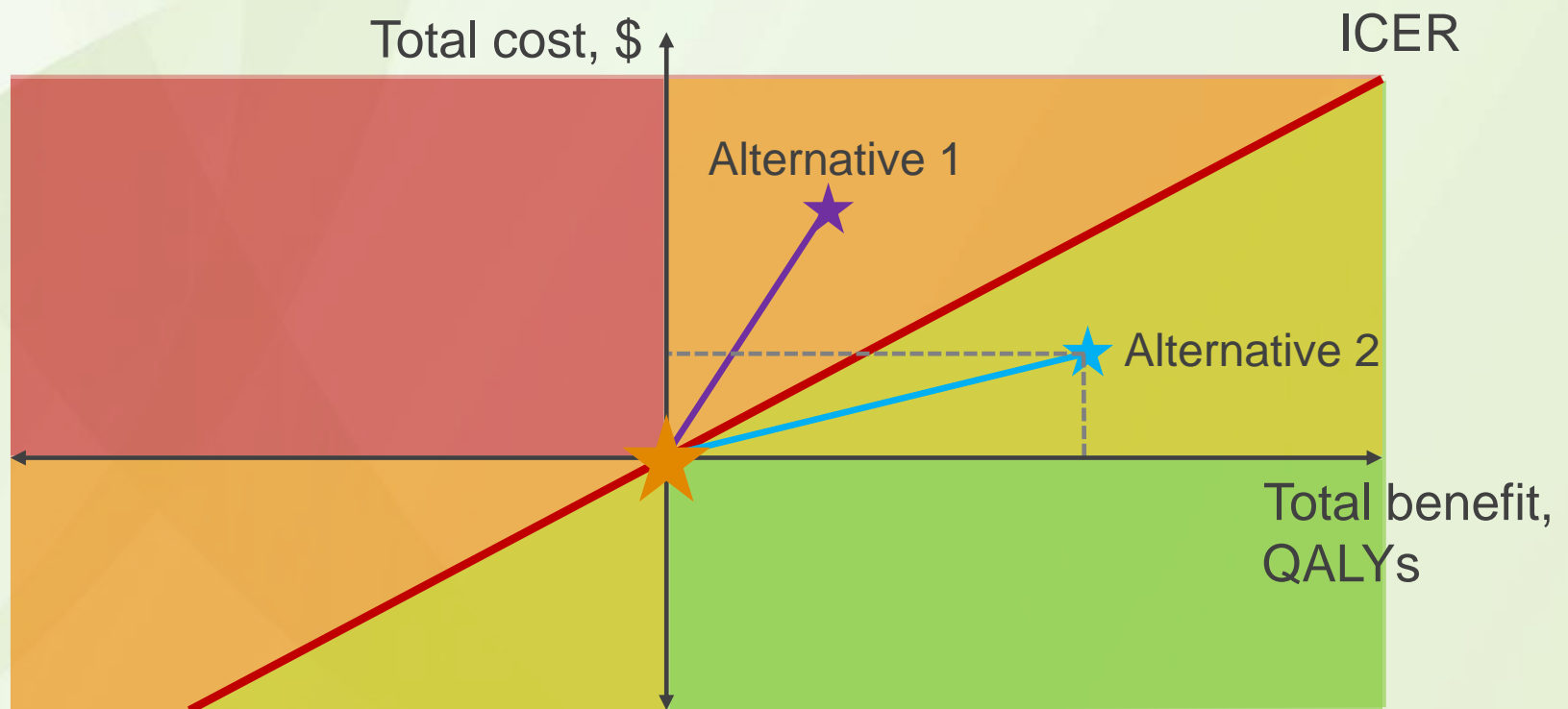
# Cost-utility analysis 2

- ICER: Incremental Cost Effectiveness Ratio



# Cost-utility analysis 3

- ICER: Incremental Cost Effectiveness Ratio



# Cost-utility analysis 4

## Strengths

- **Comparability:** can compare health impact of interventions with differing aims
- **Focus** on broad measure of health: holistic but without \$\$\$

## Limitations

- **Bias:** based on subjective valuations of health states
- **Context:** health can be a broader phenomenon not captured fully by QALYs



# Perspective 1

- Delimiting which costs and benefits to include
  - Individual beneficiary
  - Site: workplace, community centre, hospital
  - Administrative unit: ministry, agency
  - Society as a whole
- Example: foregone employment earnings
  - Relevant for individual and society as a whole
  - Irrelevant for “middle levels” of particular administrative units





# Perspective 2

- Healthy public policy especially sensitive
  - Costs and benefits often borne by disparate units
  - Benefits dispersed in time
  - Sometimes hard to account for
- Example: bike lanes
  - Costs: short-term, transportation division of one municipality
  - Benefits: long-term, the municipality, Health Ministry, Transportation Ministry, etc.



Source: [wikimedia.commons.org](https://commons.wikimedia.org/wiki/File:Arne_Hueckelheim_-_Bicycle_lane_in_Berlin.jpg)  
Photographer: [Arne Hückelheim](#)

# Equity 1: Who do we ask?

- CBA: willingness-to-pay (WTP)
  - Measuring willingness or ability to pay?
  - May reflect values of higher-income individuals
- CUA: adapting to conditions
  - Asking someone with a particular health condition or from a more polluted area
- Acknowledge individual preferences but asking if
  - They reflect existing injustices or
  - Replicate harmful norms



# Example of bias

- Should QALY values come from specific subgroups, i.e. segmentation for marginalized?
  - Can give voice to recipients or marginalized groups
  - Can also undervalue their experiences

	Marginalized	General population
<i>Cost per person</i>	\$100	\$100
<i>QALYs per person</i>	0.02	0.04
<i>Cost per QALY</i>	<b>\$5,000</b>	\$2,500



# Equity 2: Distribution of benefits

- “A dollar is a dollar” and “a QALY is a QALY”
- Abstract equality that can hide inequities
- Distribution of benefits to sub-groups
  - By gender, age, SES, location, etc.
- Ethical justification on external basis
  - Some support from surveys for equity over efficiency
  - Solutions include weights, etc.



# Individuals & communities

- Liberty, autonomy promoted; Equity, solidarity downplayed
- Community empowerment
  - Individual: what goods can the community deliver for me
  - Social: sense of belonging, safety, more altruism
- Focus on individuals can downplay web of relationships



Source: [www.lumaxart.com](http://www.lumaxart.com)



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# Community engagement

- Benefits calculated from individual perspective
  - What about what the community as a whole thinks health care priorities should be?



Source: [www.lumaxart.com](http://www.lumaxart.com)

- Deliberation could lead to different priorities
- Process as a value

- Consumers or citizens?



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# Questions?



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# Exercise

- Small group discussion to report back to larger group with 3 responses:
  1. How would you present the results of this economic evaluation **to a decision maker** in a way that takes into account the underlying ethical implications?
  2. Would your presentation change if the decision maker in question was working (A) in a **municipality**, (B) in a provincial **health authority** or (C) in a provincial **transportation authority**?
  3. Why?





# The handout (1)

The problem: Casualties on local, residential streets

Two options:<sup>1</sup>

	Do nothing	Install 20-mph zones
<i>Effects on casualties</i> <i>(effectiveness)</i>	Fatal: -4.3%/year Serious: -7.9%/year Slight: -6.2%/year  (Background trend)	Fatal: -57% for 10 years + -4.3%/year Serious: -26% for 10 years + -7.9%/year Slight: -22% for 10 years + -6.2%/year  (Effects of the zones + background trend)



Source: www.flickr.com  
Photographer: Pmcologic



Source: www.flickr.com  
Photographer: Richard Drdul



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# The handout (2)

Two methods:

	Cost-utility analysis (CUA)	Cost-benefit analysis (CBA)
<i>Recommended by</i>	Health authority	Transportation authority
<i>Perspective</i>	Public service sector perspective	Societal perspective
<i>Discount rate (costs and benefits)</i>	3.5%	3.5%
<i>Costs</i>	<p><b>Cost of construction:</b> a little <u>over</u> \$130,000/street km (total amount annuitized over 10 years at 1% interest rate)</p> <p><b>Cost of maintenance:</b> \$1,850/street km/year (arbitrary value)</p>	<p><b>Cost of construction:</b> a little <u>under</u> \$130,000/street km (total amount assumed to occur the first year)</p> <p><b>Cost of maintenance:</b> \$1,850/street km/year (arbitrary value)</p>



(3)

	CUA	CBA
<i>Benefits</i>	<p><b>QALYs saved:</b></p> <p><u>Fatal</u>: 100% of the QALY (Quality-adjusted life year) value of each year of life saved</p> <p><u>Serious permanent</u><sup>2</sup>: 9.5% of the QALY value of each remaining year of life</p> <p><u>Serious short term</u><sup>2</sup>: 2.4% of the QALY value of the year following the injury avoided</p> <p><u>Slight</u>: 1.5% of the QALY value of the year following the injury avoided</p> <p>(QALY value of one year of life by age: Under 25 yrs: 0.94; 25-34 yrs: 0.93; 35-44 yrs: 0.91; 45-54 yrs: 0.85; 55-64 yrs: 0.80; 65-74 yrs: 0.78; Over 74 yrs: 0.73 [i.e., <u>one year of life is worth less QALY as you get older</u>])</p> <p><b>Medical and police costs saved:</b></p> <p><u>Fatal</u>: \$3,750</p> <p><u>Serious permanent</u>: \$211,060</p> <p><u>Serious short-term</u>: \$22,050</p> <p><u>Slight</u>: \$2,450</p> <p>(Beyond 18 months, medical cost saved is assumed to be \$1850/year for serious permanent injuries.)</p> <p>QALYs implicitly account for benefits over time</p>	<p><b>Societal costs saved:</b></p> <p><u>Fatal</u>: \$3,163,930</p> <p><u>Serious</u>: \$357,680</p> <p><u>Slight</u>: \$27,580</p> <p>(Includes: death, pain, suffering, medical costs and lost productivity due to casualties.)</p> <p>(Excludes: medical cost saved after 18 months in the case of permanent injuries avoided)</p> <p>Total benefits accounted for when casualty occurs</p>
<i>Cost-effectiveness measure</i>	<p>Incremental cost-effectiveness ratio (ICER): \$/QALY</p> <p>(incremental cost / incr. QALY benefit)</p>	<p>Net present value (NPV): \$</p> <p>(incremental benefit - incr. Cost)</p>
<i>Efficiency threshold</i>	<p>\$36,990 - \$55,490 / QALY (U.-K.)</p>	<p>Over \$0.</p>



# The handout (4)

## Results:

	CUA	CBA
<i>Low casualty area</i> (mean: 0.6 cas. /km/ year)	<b>\$825,000 / QALY</b> (Incremental cost: \$123,750 Incremental benefit: 0.15 QALY)	<b>NPV: -\$46,990</b> (Incremental cost: \$138,920 Incremental benefit: \$91,930)
<i>High casualty area</i> (mean of 1.6 cas. /km/year)	<b>\$163,350 / QALY</b> (Incremental cost: \$115,980 Incremental benefit: 0.71 QALY)	<b>NPV: \$167,590</b> (Incremental cost: \$140,210 Incremental benefit: \$307,800)



# Exercise

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  3. Why?



# Evaluation

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- Please take 2 minutes to fill out the evaluation form.

THANKS!



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Presenters: Michal Rozworski & Olivier Bellefleur



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