

# Determining the proper place of economic evaluation in health: a case study of Cost-Benefit Analysis and “active travel” and health

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# CBA, EBM, and Health Policy Evaluation

- Empirical evaluation of the clinical effectiveness of treatments is a foundation of the practice of medicine. This was made more systematic beginning in the 1970s with the rise of “Evidence-based medicine” (EBM).
- As public budgets tightened across the world in the 1980s and 1990s, the push for consideration of economic efficiency in health care and other programs increased in North America and beyond.

# CBA foundation: Welfare economics

- Welfare economics: 'optimal' allocation of scarce resources
- **Assume:** atomistic, disembodied, rational, maximising agents each with individual utility functions. Utility=satisfaction= 'welfare'
- **Basic task of each agent:** Max U s.t. budget constraint (scarcity)
- **Market mechanism:** individuals consuming, producing and transacting to achieve maximum valued output through the **price mechanism**<sup>3</sup>

(B. McGilvray, *Introduction to Welfare Economics*)

# Transport economics assumptions

- Introduce: *physical space* and “**friction**” of need to *travel (transport)* across that space
- Travel is a ‘bad’ (cost) to be minimised by whatever means possible (e.g. location, mode etc).
- *Minimise generalised costs:*
- $G = p + u(w)$ , where  $p$  is monetary costs of travel,  $u(w)$  is utility costs of travel,  $w$  being level of service of the transport network.
- In the simplest world  $u(w) = \textit{travel time}$ .

# Transport CBA

- CBA, as already noted, is an application of welfare economics, while transport CBA adds transport economics principles.
- Given market imperfections (e.g. public goods) there may be a need for nonmarket interventions (CBA refers to these as “projects”).
- CBA measures all “benefits” (U +) against all “costs” (U -) to determine the net gain/loss of total U due to the project.
- Net negative U projects are rejected, while net

- Societal welfare (utility) without project ( ' before ' condition or ' baseline ' )

- Societal welfare (utility) with project ( ' after ' condition)

U without project

U with project

U WITH

minus

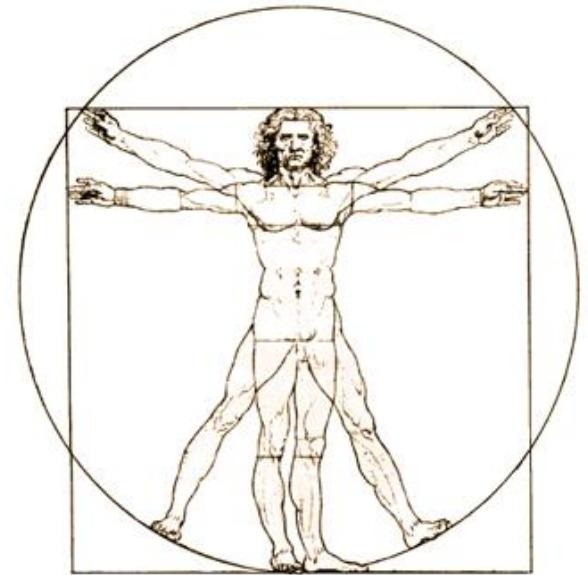
U WITHOUT

U NET GAIN/LOSS

equals

# Complication: human health

- Welfare economics implicitly assumes ***immortal agents*** in ***disembodied form*** (or at least **irrelevancy of individual mortality**).
- When we relax these assumptions we come to the need to account for ***human mortality*** (life expectancy, and reductions and increases in that life expectancy) and ***human morbidity*** (the occurrence of disease).



# Energy expenditure, transport, and health

- Because human beings have a specific form, physiology now becomes an important thing to study.
- “Physical activity” is a broad term that refers to any form of muscular movement that produces energy expenditure.
- It is the energy expenditure that yields the health benefit generally (i.e. reduced mortality and morbidity).
- The traditional CBA/welfare economics/transport economics paradigm



# Travel mode and travel choice

- Because of this link between human health and energy expenditure, these choices:
  - Choice to travel or not
  - Choice of mode of travel
- ...are no longer straightforward, since there are individual-specific mortality and morbidity considerations entering into both.

# The case of “active” transport

- These are both important considerations in “active” transport, i.e. cycling and walking (and other modes, generally insignificant, such as rollerblading).
- Transport economics compares mode choice simply along relative generalised costs. Otherwise mode choice is “neutral”.
- Active transport has implications for mortality and morbidity and is not neutral with respect to inactive modes. In other words, the form of mode does matter.
- It raises the question of how CBA may need to

# Transport may be a 'good'

- The disembodied CBA model also assumes that travel is always a “bad” (i.e. utility reducing) as opposed to sometimes a 'good' (i.e. utility increasing).
- In other words, travel may possibly at times be an end in itself or, if used for a particular purpose, some forms may be more



Source: <https://vimeo.com/74324675>

# More travel time is better than less

- Human physiology also up-ends, at least in part, the fundamental primacy of VTTS (Value of Travel Time Saved) as a core benefit, especially for active transport investments.
- Already mentioned is the impact of health on VTTS.
- But given that utility is a measure of the *subjective experience* of travel and that is the core valuation standard of CBA, what are we to make of the possibility that some cyclists and walkers also subjectively prefer more time spent in those modes rather than less, at least at times?

# What to do (analytically)?

- How should transport project evaluations change to properly:
  - (1) account for health impacts of transport
  - (2) assess active versus inactive transport modes
- Conceptually I argue that we must ask ourselves a number of “first principle” questions in terms of method choice and application.
- It should not be assumed that standard CBA can accommodate these dimensions under all circumstances. In many cases they may need to be modified, sometimes fundamentally.

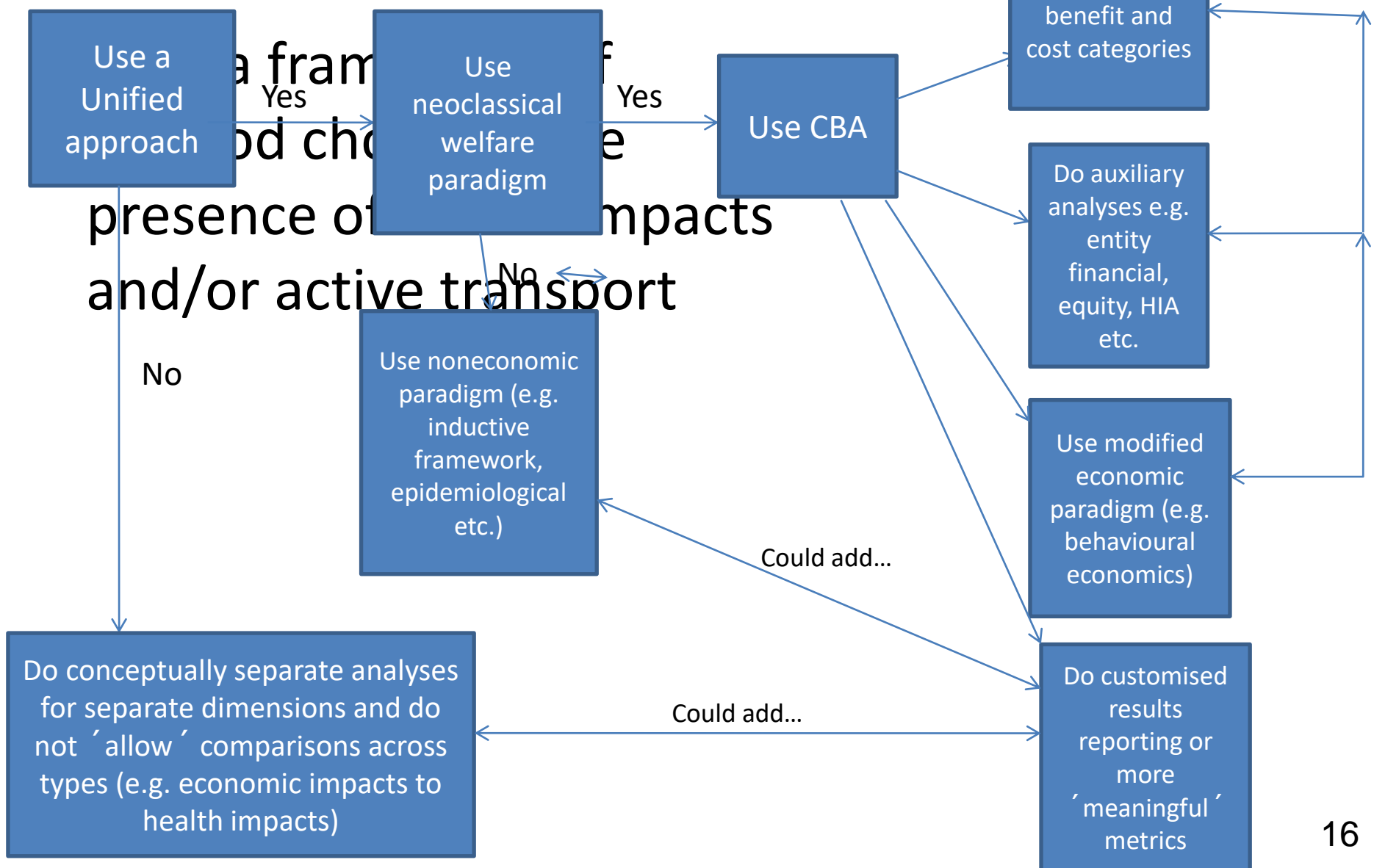
# CBA adjustments in order of deviation from neoclassical paradigm

- ***Adjust existing benefit and cost categories*** for health/active transport factors (e.g. adjust generalised cost parameters)
- ***Add new benefit and cost categories*** specific to health and active transport
- Do ***customised/specialised results report*** (applies to either above)

## CBA adjustments continued

- Do ***detailed separate analyses*** for health, epidemiological impacts etc.
- ***Modify the CBA assumptions***, e.g. modified utility maximisation according to behavioural economics
- ***Don't monetise*** benefits and costs – provide only impacts.
- ***Incorporate more inductive measures*** into the CBA costs and benefits, especially epidemiology findings

# A decision tree of analytical alternatives:





# An 'ecosystem' of approaches?

- Of course these branches need not be mutually exclusive for all domains.
- Indeed, it is probably true that traditional CBA works well for some projects in some domains (e.g. road expansions) which can be adapted with relative ease to account for noneconomic impacts with relative ease but that alternatives are needed for other projects in other domains.
- Health and active transport would seem to be one of those domains.

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