Cost Utility Analysis Or Cost Benefit Analysis For The Economic Evaluation Of Nutrition Interventions?

CBA for evaluating nutrition interventions

David Epstein
University of Granada
Email: davidepstein@ugr.es Website: www.ugr.es/~davidepstein
Meeting: ISPOR Copenhagen 4-6 November 2019

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA v CEA

- The "C" (cost) methodology is similar in both methods.
- The main difference is in defining and measuring "value"
- CBA: measure value by
  - Sum of individuals' willingness to pay for the intervention
  - Or for the (multiple) consequences of the intervention
- CEA: measure individual health
  - then apply central decision maker's WTP (threshold) for health

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Principal concerns with WTP for measuring "value" in health

- Unwillingness to monetize health or quantify value of human life
  - Might be mitigated if the perspective or objectives are not only health
- Concern about relation of WTP with income, as health equity is an important outcome
  - Might be mitigated if WTP is used to value market(able) goods
- Concern about complexity of methods and potential for bias
  - Might be mitigated if the consumer is familiar with the intervention
  - Or use incentive compatible mechanisms

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Circumstances that favour CBA versus CEA

Favours WTP (CBA)	Favours CEA
Stakeholders, population and objectives	
Pricing, reimbursement and access	
Individual engagement required	
Familiarity of consumer with the intervention	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Circumstances that favour CBA versus CEA

Favours WTP (CBA)	Favours CEA
Stakeholders, population and objectives	
Multiple stakeholders, multiple objectives, and healthy consumers	Health service stakeholders; patient population; health objectives,
Pricing, reimbursement and access	
Individual engagement required	
Familiarity of consumer with the intervention	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Circumstances that favour CBA versus CEA

Favours WTP (CBA)	Favours CEA
Stakeholders, population and objectives	
Multiple stakeholders, multiple objectives, and healthy consumers	Health service stakeholders; patient population; health objectives,
Pricing, reimbursement and access	
Substantial consumer OOP, product available on the market	Substantial cost to health service; only available on prescription
Individual engagement required	
Familiarity of consumer with the intervention	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Circumstances that favour CBA versus CEA

Favours WTP (CBA)	Favours CEA
Stakeholders, population and objectives	
Multiple stakeholders, multiple objectives, and healthy consumers	Health service stakeholders; patient population; health objectives,
Pricing, reimbursement and access	
Substantial consumer OOP, product available on the market	Substantial cost to health service; only available on prescription
Individual engagement required	
Effectiveness depends on individual engagement; Use is pleasurable	Passive recipient of therapy; No immediate satisfaction (benefit derived from health)
Familiarity of consumer with the intervention	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Circumstances that favour CBA versus CEA

Favours WTP (CBA)	Favours CEA
Stakeholders, population and objectives	
Multiple stakeholders, multiple objectives, and healthy consumers	Health service stakeholders; patient population; health objectives,
Pricing, reimbursement and access	
Substantial consumer OOP, product available on the market	Substantial cost to health service; only available on prescription
Individual engagement required	
Effectiveness depends on individual engagement; Use is pleasurable	Passive recipient of therapy; No immediate satisfaction (benefit derived from health)
Familiarity of consumer with the intervention	
Informed consumer; Product used routinely in daily life	Uninformed patient; Used contingent on illness

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Main methods used for WTP in this area

- Open – ended WTP
  - Ask directly
- Closed- ended iterative WTP
  - Start from a reference price chosen by investigator
- Discrete choice experiment (DCE)
  - Define attributes & levels
  - Choose between 2 or 3 discrete scenarios (combinations)
- Auctions
  - Real product with real money
  - May require "auction winner" to buy product at stated price

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Some biases of WTP and possible solutions

Potential bias	Possible solution
Hypothetical bias	
Incentive incompatibility	
Lexicographic preferences (inelastic demand)	
Inconsistent responses	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Some biases of WTP and possible solutions

Potential bias	Possible solution
Hypothetical bias	
Participant unfamiliar with the product or intervention; Unable to make an informed choice	Home use testing; Ask "purse-string" holder; WTP experiment preceded by information session
Incentive incompatibility	
Lexicographic preferences (inelastic demand)	
Inconsistent responses	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Some biases of WTP and possible solutions

Potential bias	Possible solution
Hypothetical bias	
Participant unfamiliar with the product or intervention; Unable to make an informed choice	Home use testing; Ask "purse-string" holder; WTP experiment preceded by information session
Incentive incompatibility	
Participant may have reasons not to state true WTP; Strategic responses (overstate WTP); Protest valuations	Revealed preference WTP (real goods are exchanged for real money); Auction methods
Lexicographic preferences (inelastic demand)	
Inconsistent responses	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Some biases of WTP and possible solutions

Potential bias	Possible solution
Hypothetical bias	
Participant unfamiliar with the product or intervention; Unable to make an informed choice	Home use testing; Ask "purse-string" holder; WTP experiment preceded by information session
Incentive incompatibility	
Participant may have reasons not to state true WTP; Strategic responses (overstate WTP); Protest valuations	Revealed preference WTP (real goods are exchanged for real money); Auction methods
Lexicographic preferences (inelastic demand)	
Always choosing "none of the above"; Always choosing the same option over all scenarios	Adapt the scenarios to allow more variation; Adapt the estimation model
Inconsistent responses	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Some biases of WTP and possible solutions

Potential bias	Possible solution
Hypothetical bias	
Participant unfamiliar with the product or intervention; Unable to make an informed choice	Home use testing; Ask "purse-string" holder; WTP experiment preceded by information session
Incentive incompatibility	
Participant may have reasons not to state true WTP; Strategic responses (overstate WTP); Protest valuations	Revealed preference WTP (real goods are exchanged for real money); Auction methods
Lexicographic preferences (inelastic demand)	
Always choosing "none of the above"; Always choosing the same option over all scenarios	Adapt the scenarios to allow more variation; Adapt the estimation model
Inconsistent responses	
Preferring objectively worse scenarios; Stating WTP that exceeds the participant's income	Pre-test phase to train participants; Simplifying the exercise; Real goods for real money

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Some biases of WTP and possible solutions

Potential bias	Possible solution
Hypothetical bias	
Participant unfamiliar with the product or intervention; Unable to make an informed choice	Home use testing; Ask "purse-string" holder; WTP experiment preceded by information session
Incentive incompatibility	
Participant may have reasons not to state true WTP; Strategic responses (overstate WTP); Protest valuations	Revealed preference WTP (real goods are exchanged for real money); Auction methods
Lexicographic preferences (inelastic demand)	
Always choosing "none of the above"; Always choosing the same option over all scenarios	Adapt the scenarios to allow more variation; Adapt the estimation model
Inconsistent responses	
Preferring objectively worse scenarios; Stating WTP that exceeds the participant's income	Pre-test phase to train participants; Simplifying the exercise; Real goods for real money

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Examples of stated preference WTP

Method	Strengths and weaknesses
Stated preference, closed ended iterative WTP	
Stated Preference DCE	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Examples of stated preference WTP

Method	Strengths and weaknesses
Stated preference, closed ended iterative WTP	
• Fisher el al, 2016. • 3 hypothetical personalised nutrition interventions. Reference price given by investigator	• Little information given to participants • Arbitrary anchor price. • Large number of zero valuations.
Stated Preference DCE	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Examples of stated preference WTP

Method	Strengths and weaknesses
Stated preference, closed ended iterative WTP	
• Fisher el al, 2016. • 3 hypothetical personalised nutrition interventions. Reference price given by investigator	• Little information given to participants • Arbitrary anchor price. • Large number of zero valuations.
Stated Preference DCE	
• Grisolía et al 2013. • Current lifestyle vs other lifestyles. • Attributes: Diet options, exercise options, risk of fatal CVD, and OOP cost	• Information given about personal CVD risk (interactive online QRISK2 calculator) associated with each lifestyle option and current lifestyle; • Menus appropriate for region (Northern Ireland)

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Examples of revealed preference WTP

Method	Strengths and weaknesses
"Revealed preference" DCE	
"Revealed preference" auction	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

CBA for evaluating nutrition interventions

Examples of revealed preference WTP

Method	Strengths and weaknesses
"Revealed preference" DCE	
• Meenakshi et al 2012. Zambia. • Choose between white, yellow and orange (GM vitamin fortified) maize. • Nutritional information, central location testing, home testing. • Obliged to buy one random choice at stated price	• Real product with real money; • Some lexicographic preferences (price inelastic for orange maize); • Prior nutritional information does influence preferences
"Revealed preference" auction	

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Examples of revealed preference WTP

Method	Strengths and weaknesses
"Revealed preference" DCE	
• Meenakshi et al 2012. Zambia. • Choose between white, yellow and orange (GM vitamin fortified) maize. • Nutritional information, central location testing, home testing. • Obliged to buy one random choice at stated price	• Real product with real money; • Some lexicographic preferences (price inelastic for orange maize); • Prior nutritional information does influence preferences
"Revealed preference" auction	
• De Groote et al 2014. • Biofortified protein maize (not GM). • Home use test. • Auction method. • Obliged to buy at stated price.	• Real product with real money. • Nutritional information & familiarity influences preferences

under grant agreement No 816303.

CBA for evaluating nutrition interventions

References

1. De Groote H, Chege CK, Tomlins K, Gunaratna NS. Combining experimental auctions with a modified home-use test to assess rural consumers' acceptance of quality protein maize, a biofortified crop. Food Qual Prefer. 2014;
2. Grisolía JM, Longo A, Boeri M, Hutchinson G, Kee F. Trading off dietary choices, physical exercise and cardiovascular disease risks. Soc Sci Med. 2013;F
3. Fischer M, Krep H, Wierich D, et al. Comparison of the Emergency Medical Services Systems of Birmingham and Bonn: Process Efficacy and Cost Effectiveness 2004;38(2):630–42.
4. Meenakshi J V., Banerji A, Manyong V, Tomlins K, Mittal N, Hamukwala P. Using a discrete choice experiment to elicit the demand for a nutritious food: Willingness-to-pay for orange maize in rural Zambia. J Health Econ. 2012;

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Discussion and Conclusions

- Hypothetical WTP
  - Informs to what extent, and under what conditions, individuals might be willing to adopt hypothetical interventions and healthier lifestyles
  - Helps policy makers to understand "preference formation"
  - Careful design required to mitigate risk of bias
- Revealed preference WTP
  - Informs consumer acceptability (and hence often effectiveness) of real nutritional products that have to be bought
- WTP can be complementary with CEA
  - CEA: whether an intervention (e.g. an information campaign) could offer value for money for NHS
  - WTP: Likely effectiveness of that information campaign to change consumer behaviour.

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Thank you!

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816303.

Live Content Slide

When playing as a slideshow, this slide will display live content

Poll: Which of these approaches is usually more appropriate for the economic evaluation of nutrition interventions?