Perspectives on cost-effectiveness thresholds in the United States

Moderated by:

- Dr. Steven Pearson, President
- Dr. Rick Chapman, Director of Health Economics

ICER
INSTITUTE FOR CLINICAL AND ECONOMIC REVIEW

Webinar 2: Willingness to pay as a basis for a cost-effectiveness threshold in the United States

Main Presentation:

Christopher McCabe, BA, MSc, PhD

CEO and Executive Director

Institute of Health Economics (IHE)

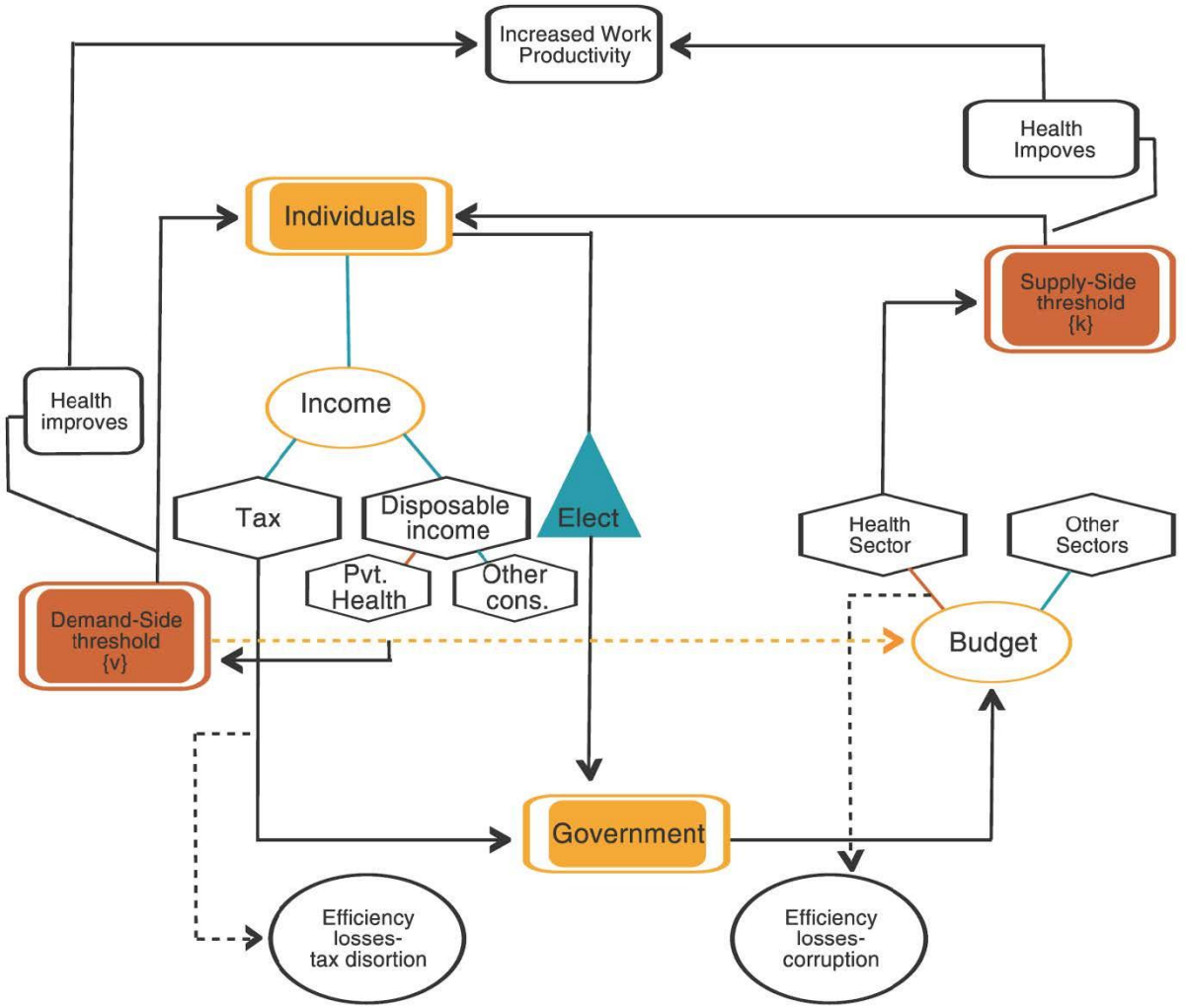
Using per capita GDP and/or individual surveys to determine a specific threshold range in the US

Dr. Christopher McCabe

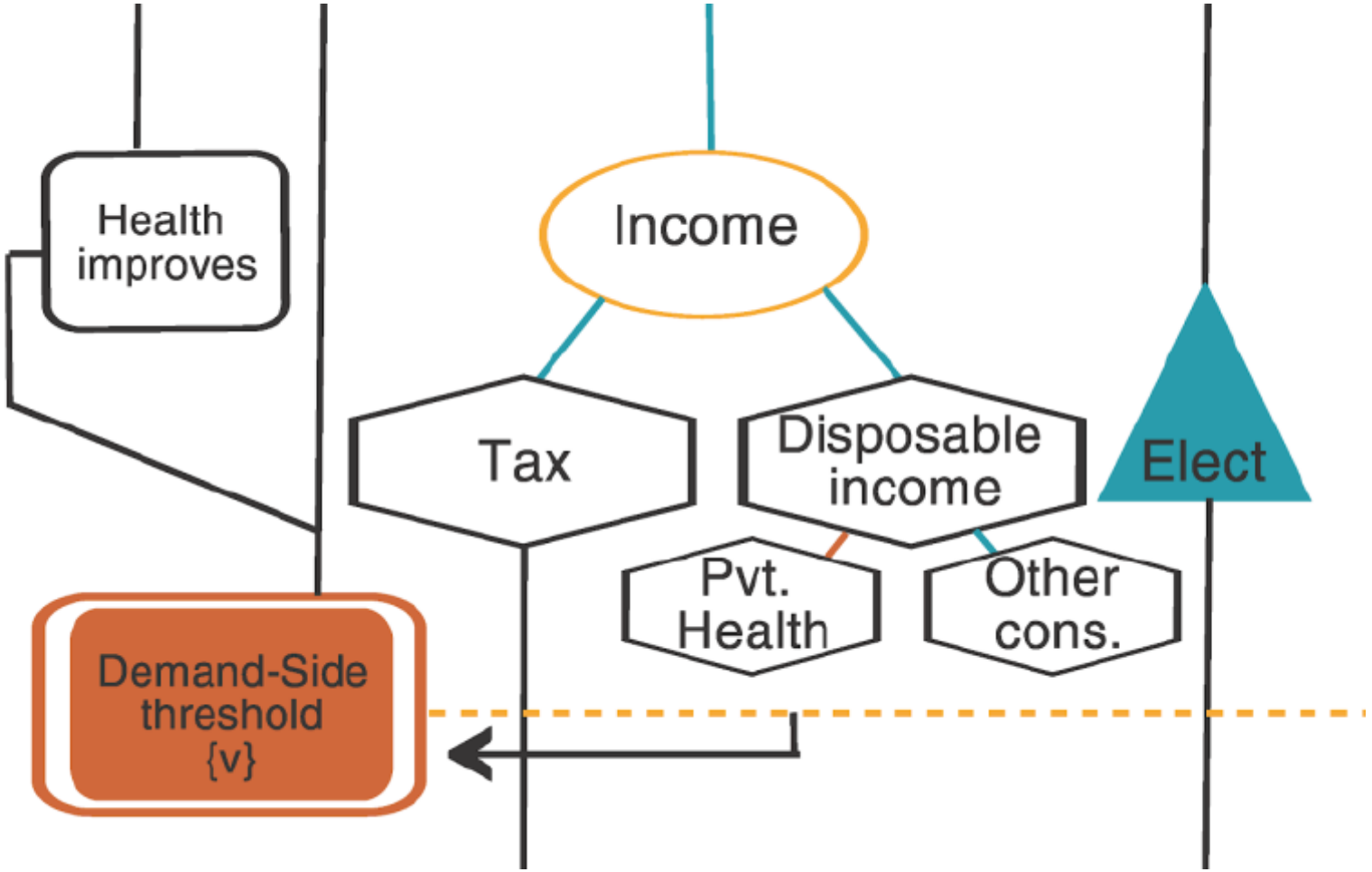
July 24, 2019

ICER Webinar Series

Demand (v) and Supply Side (k) Thresholds

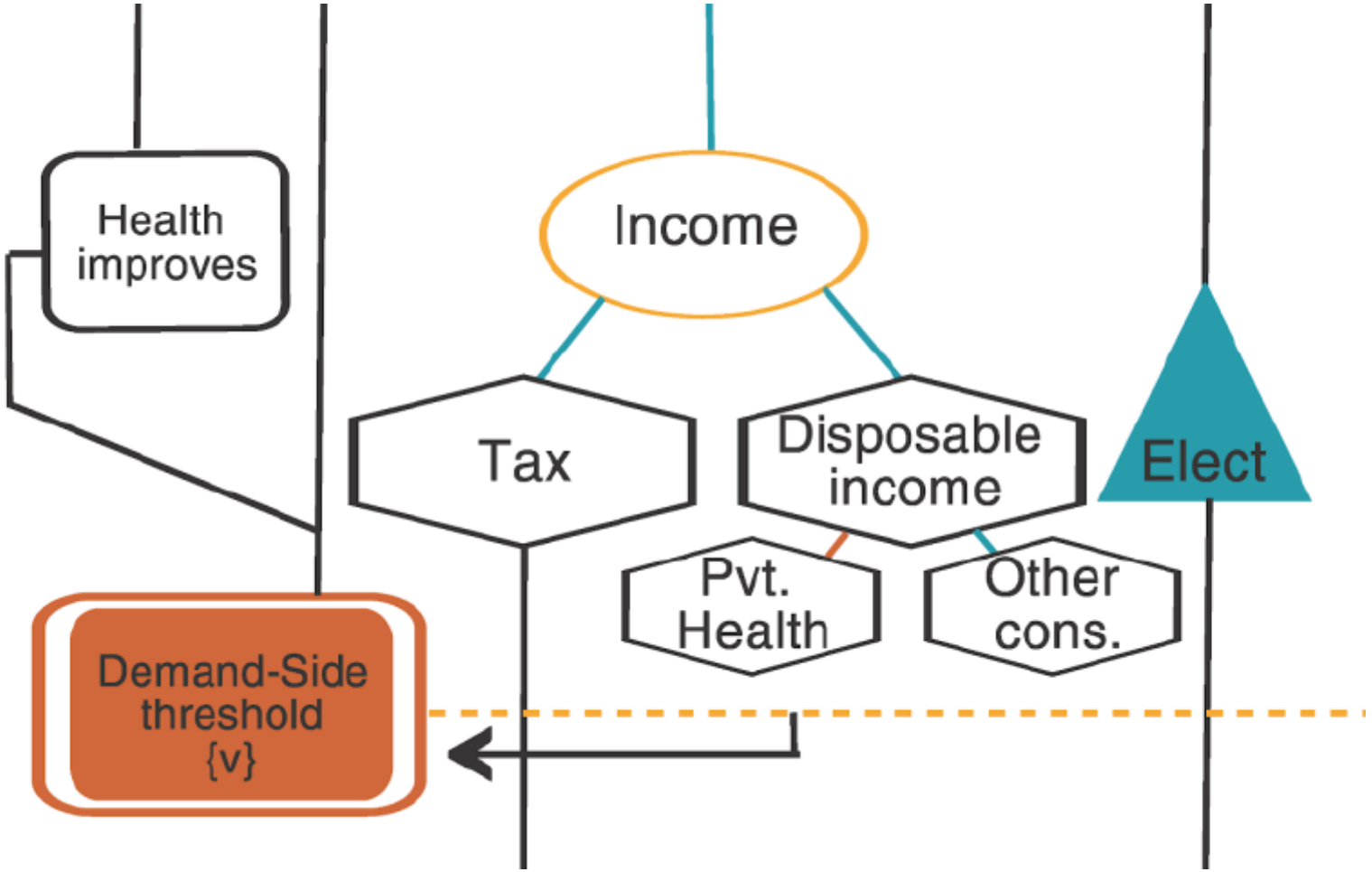


Demand side threshold (v) in the US



- Health insurance is an employment benefit
  - An imperfect expression of individual value of health
- Health insurance receives a tax credit
  - Impacts on disposable income
  - Impacts upon public funds available for other activities
  - Promotes income inequality in access to health care
  - Promotes inefficiency in production of health (inverse care law).

Demand (v) side threshold in the US



- What private health insurance is willing to cover does not provide insight into the normative question of what health insurance should cover as an expression of the preferences of Americans.

WHO-CHOICE GDP Thresholds

Criterion (Cost per DALY)	Definition	Implied US Threshold (2017 data)
Less than One times GDP	Very cost effective	< $59,532
Between One and Three times GDP	Cost effective	< = $178,596
Greater than Three times GDP	Not cost effective	> $178,596

WHO-CHOICE GDP Thresholds

Policy & practice

Thresholds for the cost–effectiveness of interventions: alternative approaches

Elliot Marseille,[a] Bruce Larson,[b] Dhruv S Kazi,[c] James G Kahn[d] & Sydney Rosen[b]

Abstract Many countries use the cost–effectiveness thresholds recommended by the World Health Organization's Choosing Interv that are Cost–Effective project (WHO-CHOICE) when evaluating health interventions. This project sets the threshold for cost–effect as the cost of the intervention per disability-adjusted life-year (DALY) averted less than three times the country's annual gross d product (GDP) per capita. Highly cost–effective interventions are defined as meeting a threshold per DALY averted of once the GDP per capita. We argue that reliance on these thresholds reduces the value of cost–effectiveness analyses and makes such analy blunt to be useful for most decision-making in the field of public health. Use of these thresholds has little theoretical justification, s difficult but necessary ranking of the relative values of locally-applicable interventions and omits any consideration of what is truly aff The WHO-CHOICE thresholds set such a low bar for cost–effectiveness that very few interventions with evidence of efficacy can b out. The thresholds have little value in assessing the trade-offs that decision-makers must confront. We present alternative approa applying cost–effectiveness criteria to choices in the allocation of health-care resources.

Bulletin of the World Health Organization

Policy & practice

Cost–effectiveness thresholds: pros and cons

Melanie Y Bertram [a], Jeremy A Lauer [a], Kees De Joncheere [a], Tessa Edejer [a], Raymond Hutubessy [a], Marie-Paule Kieny [a] & Suzanne R Hill [a]

a. World Health Organization, avenue Appia 20, 1211 Geneva 27, Switzerland.

Correspondence to Melanie Y Bertram (email: bertramm@who.int).

(Submitted: 16 September 2015 – Revised version received: 18 July 2016 – Accepted: 18 July 2016 – Published online: 19 September 2016.)

WHO-CHOICE GDP Thresholds

Criterion (Cost per DALY)	Definition	Implied US Threshold (2017 data)
Less than One times GDP	Very Cost Effective	< $59,532
Between One and Three times GDP	Cost Effective	< = $178,596
Greater than Three times GDP	Not Cost Effective	> $178,596

Criticisms

- Arbitrary – there is no normative justification for these thresholds
- Insensitive to:
  - affordability
  - local priorities
  - (in)efficiency of the local health care system
- Divorced from consideration of non-health calls on available resources
- Unhelpful – problematic technologies likely meet these thresholds

"Given the evidence suggesting that $50,000 per QALY is too low in the United States, it might best be thought of as an implied lower boundary. Instead, we would recommend that analysts use $50,000, $100,000, and $200,000 per QALY. If one had to select a single threshold outside the context of an explicit resource constraint or opportunity cost, we suggest using either $100,000 or $150,000." Neumann et al NEJM, 2014.

Stated Preference WTP for Health

HEALTH ECONOMICS
Health Econ. **24**: 1289–1301 (2015)
Published online 28 July 2014 in Wiley Online Library (wileyonlinelibrary.com). D

THE WILLINGNESS TO PAY FOR A QUALI
A REVIEW OF THE EMPIRICA

LINDA RYEN[a,*] and MIKAEL SVE

[a]*Department of Economics, Karlstad University,*
[b]*Department of Economics, Örebro University,*

ABSTRACT

There has been a rapid increase in the use of cost-effectiveness analysis, outcome measure, in evaluating both medical technologies and public hea literature on the monetary value of a QALY based on estimates of the wi review of the literature on the WTP for a QALY. In total, 24 studies con QALY are identified. Trimmed mean and median estimates amount to 74,1 tively. In regression analyses, the results indicate that the WTP for a QALY from life extension rather than quality of life improvements. The results als on the size of the QALY gain valued. Copyright © 2014 John Wiley & S

Received 7 October 2013; Revised 5 May 2014; Accepted 20 June 2014

Table I. List of included studies

Author(s) and year of publication	Country	Total sample size
Blumenschein and Johannesson (1998)	USA	69
Johannesson and Meltzer (1998)	SWE	—
Zethraeus (1998)	SWE	104
Cunningham and Hunt (2000)	UK	40
Hirth *et al.* (2000)	Several	—
Gyrd-Hansen (2003)	DEN	3201
Byrne *et al.* (2005)	USA	193
King *et al.* (2005)	USA	391
Mason *et al.* (2009)	UK	—
Lieu *et al.* (2009)	USA	478
Pinto-Prades *et al.* (2009)	ESP	892
Bobinac *et al.* (2010)	NED	1091
Shiroiwa *et al.* (2010)	AUS, JPN, KOR, TWN, UK, USA	5500
Bobinac *et al.* (2012)	NED	1091
Baker *et al.* (2010)	UK	409
Haninger and Hammitt (2011)	USA	2858
Zhao *et al.* (2011)	CHN	632
Bobinac *et al.* (2013)	NED	1004
Gyrd-Hansen and Kjær (2012)	DEN	1724
Thavorncharoensap *et al.* (2013)	THA	1191
Pennington *et al.* (2013)	NED, UK, FRA, ESP, SWE, NOR, DEN, POL, HUN	17,657
Robinson *et al.* (2013)	NED, UK, FRA, ESP, SWE, NOR, DEN, POL, HUN	21,896
Shiroiwa *et al.* (2013)	JPN	2283
Bobinac *et al.* (2014)	NED	1004

Stated Preference WTP for Health

Table II. Included stated preferences

Author(s)	Individual or social perspective	Gener pe
Blumenschein and Johannesson (1998)	Individual	
Zethraeus (1998)	Individual	
Cunningham and Hunt (2000)	Individual	
Gyrd-Hansen (2003)	Individual	
Byrne *et al.* (2005)	Individual	
King *et al.* (2005)	Individual	
Lieu *et al.* (2009)	Individual	
Pinto-Prades *et al.* (2009)	Individual	
Bobinac *et al.* (2010)	Individual	
Shiroiwa *et al.* (2010)	Both	
Bobinac *et al.* (2012)	Individual	
Baker *et al.* (2010)	Individual	
Haninger and Hammitt (2011)	Individual	
Zhao *et al.* (2011)	Individual	
Bobinac *et al.* (2013)	Societal	
Gyrd-Hansen and Kjær (2012)	Individual	
Thavorncharoensap *et al.* (2013)	Individual	
Pennington *et al.* (2013)	Individual	
Robinson *et al.* (2013)	Individual	
Shiroiwa *et al.* (2013)	Individual	
Bobinac *et al.* (2014)	Individual	

Table IV. Included studies—estimates of willingness to pay for a quality adjusted life year in 2010 Euros

Author(s)	No. of estimates in paper	Range of estimates		Mean estimate
		Lowest estimate	Highest estimate	
Blumenschein and Johannesson (1998)	2	7339	48,228	27,783
Johannesson and Meltzer (1998)	3	79,790	453,969	241,812
Zethraeus (1998)	2	14,632	19,291	16,961
Cunningham and Hunt (2000)	1	741	741	741
Hirth *et al.* (2000)	41	21,815	1,204,963	294,017
Gyrd-Hansen (2003)	2	11,892	14,121	13,007
Byrne *et al.* (2005)	9	1134	5284	3163
King *et al.* (2005)	12	11,174	28,785	20,799
Mason *et al.* (2009)	12	32,319	94,606	66,056
Lieu *et al.* (2009)	9	22,448	38,852	32,041
Pinto-Prades *et al.* (2009)	37	4654	125,588	30,843
Bobinac *et al.* (2010)	4	9838	25,108	16,627
Baker *et al.* (2010)	2	20,958	26,518	23,738
Shiroiwa *et al.* (2010)	24	20,682	75,813	45,376
Bobinac *et al.* (2010)	29	1231	21,959	9389
Haninger and Hammitt (2011)	27	132,335	4,864,167	892,065
Zhao *et al.* (2011)	4	3671	5693	4760
Bobinac *et al.* (2013)	6	51,006	184,578	92,533
Gyrd-Hansen and Kjær (2012)	14	3040	107,688	38,844
Thavorncharoensap *et al.* (2013)	24	633	6934	1922
Pennington *et al.* (2013)	15	6266	23,049	12,210
Robinson *et al.* (2013)	80	7841	43,279	20,161
Shiroiwa *et al.* (2013)	16	15,597	77,986	42,499
Bobinac *et al.* (2014)	8	54,132	244,768	114,665

Shiroiwa et al (2010) Mean = @ US $60,000.

WTP_{VSL} per QALY: 40 years life expectancy
VSL= $3,000,000

Table V. Mean (standard errors) and median estimates of willingness to pay for a quality adjusted life year in 2010 Euros

	All estimates	SP estimates	SP estimates excluding Haninger and Hammitt	VSL estimates
Mean	118,839 (19,120)	97,683 (21,339)	26,189 (1,636)	242,371 (35,786)
Median	24,226	20,622	19,196	109,858
Trimmed mean	74,159	49,778	23.721	228,630

SP, stated preference; VSL, value of statistical life.

WTP_{VSL} per QALY = @ 2010 US $300,000

WTP_{VSL} per QALY: 40 years life expectancy

VSL= $3,000,000

From Ryen & Svennson (2015)

$$VSL = \sum_{t=0}^{n} \frac{q_t + A\lambda}{(1+i)^t}$$

A = Average age of population t=0

t = time

n = life expectancy

i = discount rate

λ = WTP

Table V. Mean (standard errors) and median estimates of willingness to pay for a quality adjusted life year in 2010 Euros

	All estimates	SP estimates	SP estimates excluding Haninger and Hammitt	VSL estimates
Trimmed mean	74,159	49,778	23.721	228,630

SP, stated preference; VSL, value of statistical life.

WTP_{VSL} per QALY = 2010 @ US $300,000

Challenges

- Mean age, life expectancy and quality of life of covered population will vary by:
  - State
  - Payer
  - Socio-economic characteristics of the covered population

- Payers covering the most sickly populations will likely have highest thresholds - affordability
- Payers covering the healthiest populations will likely have lowest threshold – acceptability

- Is the demand for health all that is being expressed via health care reimbursementt – eg demand for innovation, equality, solidarity etc…?

Comments and Questions

- There is no off-the-shelf estimate of a US WTP for Health
- There is no consistent model of whose WTP for what in the published literature

For Discussion:

1. What would be ICER's objective in adopting a WTP/Threshold value?
2. Can we specify WTP question(s) that would be coherent with that objective?
    1. What would be the appropriate perspective for the question?
    2. How would we describe the objective(s) to respondents
3. Who would be the appropriate population to be surveyed?
4. Given ICER's objective:
    1. Is a VSL approach either feasible or appropriate?
    2. Is a DCE approach either feasible or appropriate?
    3. Can an implied WTP be extracted from revealed preferences for insurance coverage?

IHE INSTITUTE OF HEALTH ECONOMICS
ALBERTA CANADA


cmccabe@ihe.ca


1.780.448.4881


www.ihe.ca

Discussion

Responders: Jens Grueger, David Meltzer, Lou Garrison

Garrison Comments on WTP as Basis for Threshold and GDP per Capita/Surveys as Methods (1)

- WTP is a reasonable approach to thinking about thresholds in a consumer sovereignty-based (welfarist; NOT extra-welfarist) system.
- Value varies across individuals, across indications for the same medicine, and dynamically over time.
- In theory, we could use contingent valuation to get incremental insurance premium, but it's impractical. The QALY is a useful pragmatic work-around.
- Per our recent ISPOR Special Task Force on Value Assessment Frameworks, the QALY as the core measure of value is a reasonable starting point.
- It's important to recognize that innovative (patented) medicines are unique medico-economic goods—with global public good properties.
- QALY-based modeling works better for medicines than for other medical inputs such as physician and hospital care, which constitute the bulk of the spending.
- Although the QALY is a good starting point for the health gain, it has limitations including using mean treatment effects and ignoring the value of reducing uncertainty.

Garrison Comments on WTP as Basis for Threshold and GDP per Capita/Surveys as Methods (2)

- The STF identified a number of potential novel elements of value that could be used in augmented CEA: insurance value, value of hope, real option value, value of knowing, severity of disease, and fear of contagion.
- Other system-level factors can also affect value beyond the QALY: equity and scientific spillovers.

Regarding GDP per capita and surveys, specifically:

- GDP per capita/income
  - Can be a useful variable for global differential pricing across countries.
  - In the U.S., income is relevant, but WTP varies with income.
  - Phelps (2019) shows how income would affect the threshold.
  - GDP per capita would mix those can afford to pay something and those who can't. A "median voter rule" for this mixed population would give an different answer than among those who can afford to pay some amount.
  - Budget constraint (and hence threshold) for Medicaid (and Medicare?) is based on **willingness to redistribute** of the income-earning well-off population.
  - De facto, we have at least two thresholds already.
  - In U.S. market-based system, there is a case (Pauly, 2017) for multiple thresholds.
- Stated preference
  - Contingent valuation is not that useful here, due to insurance and very low incremental premium cost.

Next webinar:

Fri, Jul 26, 2019 3:00 PM - 4:00 PM EDT

Webinar 3: **Willingness to pay Part 2:** Using past funding decisions, value of a statistical life, and relative risk aversion as the basis for determining a cost-effectiveness threshold in the US

Hosts: Steve Pearson and Rick Chapman
Lead Presentation: Sean Sullivan and Chuck Phelps (risk aversion)
Responders: Chris McCabe, Jason Wasfy