Perspectives on cost-effectiveness thresholds in the United States

Moderated by:
- Dr. Steven Pearson, President
- Dr. Rick Chapman, Director of Health Economics
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
Demand (v) and Supply Side (k) Thresholds

- **Increased Work Productivity**
- **Health Improves**
- **Supply-Side threshold (k)**

**Individuals**

**Income**

- Tax
  - Disposable income
    - Elect
      - Pvt. Health
      - Other cons.

**Health improves**

**Demand-Side threshold (v)**

**Government**

- Efficiency losses - tax distortion
- Efficiency losses - corruption

**Budget**

- Health Sector
- Other Sectors
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).
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.
<table>
<thead>
<tr>
<th>Criterion (Cost per DALY)</th>
<th>Definition</th>
<th>Implied US Threshold (2017 data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than One times GDP</td>
<td>Very cost effective</td>
<td>&lt; $59,532</td>
</tr>
<tr>
<td>Between One and Three times GDP</td>
<td>Cost effective</td>
<td>&lt;= $178,596</td>
</tr>
<tr>
<td>Greater than Three times GDP</td>
<td>Not cost effective</td>
<td>&gt; $178,596</td>
</tr>
</tbody>
</table>
Thresholds for the cost–effectiveness of interventions: alternative approaches
Elliot Marseille, Bruce Larson, Dhruv S Kazi, James G Kahn & Sydney Rosen

Abstract Many countries use the cost–effectiveness thresholds recommended by the World Health Organization’s Choosing Interventions that are Cost–Effective project (WHO-CHOICE) when evaluating health interventions. This project sets the threshold for cost–effectiveness as the cost of the intervention per disability-adjusted life-year (DALY) averted less than three times the country’s annual gross domestic product (GDP) per capita. Highly cost-effective interventions are defined as meeting a threshold per DALY averted of one-third the GDP per capita. We argue that reliance on these thresholds reduces the value of cost–effectiveness analyses and makes such analyses blunt to be useful for most decision-making in the field of public health. Use of these thresholds has little theoretical justification, is difficult but necessary ranking of the relative values of locally-applicable interventions and omits any consideration of what is truly off. The WHO-CHOICE thresholds set such a low bar for cost–effectiveness that very few interventions with evidence of efficacy can meet them. We present alternative approaches 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, Jeremy A Lauer, Kees De Joncheere, Tessa Edejer, Raymond Hutubessy, Marie-Paule Kieny & Suzanne R Hill

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

<table>
<thead>
<tr>
<th>Criterion (Cost per DALY)</th>
<th>Definition</th>
<th>Implied US Threshold (2017 data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than One times GDP</td>
<td>Very Cost Effective</td>
<td>$&lt; 59,532</td>
</tr>
<tr>
<td>Between One and Three times GDP</td>
<td>Cost Effective</td>
<td>$\leq 178,596</td>
</tr>
<tr>
<td>Greater than Three times GDP</td>
<td>Not Cost Effective</td>
<td>$&gt; 178,596</td>
</tr>
</tbody>
</table>

**Criticsms**

- 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.
THE WILLINGNESS TO PAY FOR A QUALITY OF LIFE IMPROVEMENT: A REVIEW OF THE EMPIRICAL EVIDENCE

LINDA RYEN and MIKAEL SVI

Department of Economics, Karlstad University
Department of Economics, Örebro University

ABSTRACT

There has been a rapid increase in the use of cost-effectiveness analysis, and the outcome measure, in evaluating both medical technologies and public health policy. One of the key issues is the estimation of the monetary value of a quality-adjusted life year (QALY). The review of the literature on the WTP for a QALY is an important step in this process. In total, 24 studies were included in this review. The results indicate that the WTP for a QALY is significantly lower in studies that use a life extension measure rather than a quality of life measure. The results are consistent with studies that have used a larger sample size.

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

Table I. List of included studies

<table>
<thead>
<tr>
<th>Author(s) and year of publication</th>
<th>Country</th>
<th>Total sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blumenschein and Johannesson (1998)</td>
<td>USA</td>
<td>69</td>
</tr>
<tr>
<td>Johannesson and Melzer (1998)</td>
<td>SWE</td>
<td>—</td>
</tr>
<tr>
<td>Zethraeus (1998)</td>
<td>SWE</td>
<td>104</td>
</tr>
<tr>
<td>Cunningham and Hunt (2000)</td>
<td>UK</td>
<td>40</td>
</tr>
<tr>
<td>Hirth et al. (2000)</td>
<td>Several</td>
<td>—</td>
</tr>
<tr>
<td>Gyrd-Hansen (2003)</td>
<td>DEN</td>
<td>3201</td>
</tr>
<tr>
<td>Byrne et al. (2005)</td>
<td>USA</td>
<td>193</td>
</tr>
<tr>
<td>King et al. (2005)</td>
<td>USA</td>
<td>391</td>
</tr>
<tr>
<td>Mason et al. (2009)</td>
<td>UK</td>
<td>—</td>
</tr>
<tr>
<td>Liaw et al. (2009)</td>
<td>USA</td>
<td>478</td>
</tr>
<tr>
<td>Pinto-Prades et al. (2009)</td>
<td>ESP</td>
<td>892</td>
</tr>
<tr>
<td>Bobinac et al. (2010)</td>
<td>NED</td>
<td>1091</td>
</tr>
<tr>
<td>Shiraiwa et al. (2011)</td>
<td>AUS, JPN, KOR, TWN, UK, USA</td>
<td>5500</td>
</tr>
<tr>
<td>Bobinac et al. (2012)</td>
<td>NED</td>
<td>1091</td>
</tr>
<tr>
<td>Baker et al. (2010)</td>
<td>UK</td>
<td>409</td>
</tr>
<tr>
<td>Haninger and Hammitt (2011)</td>
<td>USA</td>
<td>2858</td>
</tr>
<tr>
<td>Zhao et al. (2011)</td>
<td>CHN</td>
<td>632</td>
</tr>
<tr>
<td>Bobinac et al. (2013)</td>
<td>NED</td>
<td>1004</td>
</tr>
<tr>
<td>Gyrd-Hansen and Kjær (2012)</td>
<td>DEN</td>
<td>1724</td>
</tr>
<tr>
<td>Thavorncharoen sap et al. (2013)</td>
<td>THA</td>
<td>1191</td>
</tr>
<tr>
<td>Pennington et al. (2013)</td>
<td>NED, UK, FRA, ESP, SWE, NOR, DEN, POL, HUN</td>
<td>17,657</td>
</tr>
<tr>
<td>Robinson et al. (2013)</td>
<td>NED, UK, FRA, ESP, SWE, NOR, DEN, POL, HUN</td>
<td>21,896</td>
</tr>
<tr>
<td>Shiraiwa et al. (2013)</td>
<td>JPN</td>
<td>2283</td>
</tr>
<tr>
<td>Bobinac et al. (2014)</td>
<td>NED</td>
<td>1004</td>
</tr>
</tbody>
</table>
Shiroiwa et al (2010) Mean = @ US $60,000.
$WTP_{VSL}$ per QALY: 40 years life expectancy
$VSL = $3,000,000

$WTP_{VSL}$ 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 $t=0$

$\lambda$ = WTP
WTP\textsubscript{VSL} per QALY = 2010 @ US $300,000

<table>
<thead>
<tr>
<th></th>
<th>All estimates</th>
<th>SP estimates</th>
<th>SP estimates excluding Hanising and Hammitt</th>
<th>VSL estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimmed mean</td>
<td>74,159</td>
<td>49,778</td>
<td>23,721</td>
<td>228,630</td>
</tr>
</tbody>
</table>

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

**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 reimbursement – eg demand for innovation, equality, solidarity etc...?
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?
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