Willingness to pay to avoid minor morbidity: An international comparison

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A pyramid of disease burden

- Symptoms
- Diagnosed diseases
- Death

Population coverage at one point of time

Heavily researched

Lack local information
Studies of symptom valuation

• Norwegian - Navrud 1996
• Taiwan - Alberini 1997
Methodology

• Random digit dialing followed with reliability checking
• Double-bounded with follow-up if “No-No”
• Interval regression – STATA 7.0
• Face validity; construct validity checking by regression
• International comparison – PPP/CPI adjusted
Symptom specification

- “We are going to ask your willingness to pay for avoiding a one day episode of the symptom. Please assume that money can help you to avoid the symptom and you can pay for it from your own pocket: that is, you will have less to spend on other goods or services. Please take a moment to think about the pain and suffering caused by the symptom.” (a 5 second break)
“Now assume that you would experience one day of such [shortness of breath], the most troublesome you mentioned, are you willing to pay $X to avoid one day of this symptom?” [If the person says “No”] “What about $X/2?” or [if the person say “yes”] “What about $X * 2?” (back translated from the Chinese version)
Estimating WTP

Log-normal specification:

\[ WTP_i = \exp(X_i \beta + u_i) \quad u_i \sim N(0, \sigma^2) \]

Median WTP = \( \exp(\bar{X} \hat{\beta}) \)

Mean WTP = \( \exp(\bar{X} \hat{\beta} + \hat{\sigma^2}/2) \)
## Open-ended pilot data

<table>
<thead>
<tr>
<th>wtp for the worst symptom</th>
<th>Freq.</th>
<th>Percent</th>
<th>Cum.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3</td>
<td>5.45</td>
<td>5.45</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>1.82</td>
<td>7.27</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>1.82</td>
<td>9.09</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>1.82</td>
<td>10.91</td>
</tr>
<tr>
<td>40</td>
<td>2</td>
<td>3.64</td>
<td>14.55</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>3.64</td>
<td>18.18</td>
</tr>
<tr>
<td>100</td>
<td>8</td>
<td>14.55</td>
<td>32.73</td>
</tr>
<tr>
<td>150</td>
<td>5</td>
<td>9.09</td>
<td>41.82</td>
</tr>
<tr>
<td>200</td>
<td>10</td>
<td>18.18</td>
<td>60.00</td>
</tr>
<tr>
<td>250</td>
<td>1</td>
<td>1.82</td>
<td>61.82</td>
</tr>
<tr>
<td>300</td>
<td>3</td>
<td>5.45</td>
<td>67.27</td>
</tr>
<tr>
<td>500</td>
<td>7</td>
<td>12.73</td>
<td>80.00</td>
</tr>
<tr>
<td>600</td>
<td>1</td>
<td>1.82</td>
<td>81.82</td>
</tr>
<tr>
<td>1000</td>
<td>5</td>
<td>9.09</td>
<td>90.91</td>
</tr>
<tr>
<td>5000</td>
<td>1</td>
<td>1.82</td>
<td>92.73</td>
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<tr>
<td>10000</td>
<td>2</td>
<td>3.64</td>
<td>96.36</td>
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<tr>
<td>100000</td>
<td>1</td>
<td>1.82</td>
<td>98.18</td>
</tr>
<tr>
<td>500000</td>
<td>1</td>
<td>1.82</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Total | 55 | 100.00

Percentile:
- ~10%
- ~20%
- ~33%
- ~60%
- ~66%
- ~80%
- ~90%
- ~93%
Double bounded dichotomous choice

HK$X = bid

WTP $ X ?

Yes

WTP $ 2X ?

Yes

WTP_i > $2X

No

$X < WTP_i < $2X

No

$X/2 < WTP_i < $X

Yes

$X/2 > WTP_i or

$ actual value
Age structure of male

Age group

Proportion (%)

Sample
Population

<table>
<thead>
<tr>
<th>Age group</th>
<th>Sample</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24 (15-24)*</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>25-34</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>35-44</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>45-54</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>55-64</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>&gt;=65</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>
The bar chart illustrates the age structure of females. The x-axis represents different age groups: 18-24, 25-34, 35-44, 45-54, 55-64, and >=65. The y-axis represents the proportion (%) of females in each age group.

- **18-24 (15-24)**: The female sample has a higher proportion compared to the female population.
- **25-34**: Both female sample and female population have similar proportions.
- **35-44**: The female sample has a significantly higher proportion compared to the female population.
- **45-54**: The female sample and female population have similar proportions.
- **55-64**: The female sample has a higher proportion compared to the female population.
- **>=65**: Both female sample and female population have a similar proportion.

Legend:
- **Blue Bars**: Female sample
- **Pink Bars**: Female population
Comparison of gender proportion

Sample  Population

Female  Male
Ranking of troublesome symptoms:

- **Sinus**:
  - Proportion rank 1st (%): 50

- **Throat**:
  - Proportion rank 1st (%): 40

- **Eye**:
  - Proportion rank 1st (%): 50

- **Fever**:
  - Proportion rank 1st (%): 50

Selected symptoms: Sinus, Throat, Eye, Fever.
## Coefficient estimates

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>β</th>
<th>S.E (β)</th>
<th>σ</th>
<th>Log-likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>coughing</td>
<td>1385</td>
<td>5.1883*</td>
<td>0.04</td>
<td>1.4968*</td>
<td>-2077.8</td>
</tr>
<tr>
<td>shortness of breath</td>
<td>1379</td>
<td>5.5808*</td>
<td>0.05</td>
<td>1.6952*</td>
<td>-2016.2</td>
</tr>
<tr>
<td>sinus congestion</td>
<td>367</td>
<td>4.9315*</td>
<td>0.09</td>
<td>1.5077*</td>
<td>-518.6</td>
</tr>
<tr>
<td>congested throat</td>
<td>341</td>
<td>4.9804*</td>
<td>0.09</td>
<td>1.4657*</td>
<td>-529.5</td>
</tr>
<tr>
<td>itching eyes</td>
<td>355</td>
<td>5.3545*</td>
<td>0.1</td>
<td>1.6425*</td>
<td>-542.3</td>
</tr>
<tr>
<td>Fever (HK) / Headache (US/Norway)</td>
<td>321</td>
<td>5.3165*</td>
<td>0.09</td>
<td>1.3611*</td>
<td>-425.68</td>
</tr>
</tbody>
</table>
WTP for avoiding symptom

Symptom

US$ (ppp, cpi adjusted)

coughing
shortness of breath
sinus congestion
congested throat
itching eyes
fever (HK) / headache (US/Norway)

Hong Kong
US
Norway
Limitation and potential extension

- Reconcile international variation
- Strengthen the construct validity
- Need symptom incidence for full CBA
- Any econometric extension