The complexity of the allocation problem in health care: can current decision rules provide a useful guide?

Karl Claxton
Questions of fact and questions of value?

- When costs displace health ($\Delta c_h$)

$$\Delta h - \frac{\Delta c_h}{k} \geq 0 \quad \text{or} \quad \frac{\Delta c_h}{\Delta h} \leq k$$

- When costs displace consumption ($\Delta c_c$)

$$\Delta h - \frac{\Delta c_c}{v} \geq 0 \quad \text{or} \quad \frac{\Delta c_c}{\Delta h} \leq v$$

- Costs fall on both

$$\Delta h - \frac{\Delta c_h}{k} - \frac{\Delta c_c}{v} \geq 0 \quad \text{or} \quad \frac{\Delta c_h - k}{\Delta h} \frac{\Delta c_c}{\Delta h} \equiv 0$$

Fact:  $k = \text{how much health displaced by increased HCS costs?}$

Value:  $v = \text{how much consumption should we give up for health?}$
Question of value

• Specify a complete and legitimate SWF?
  – \( v \) is the measure of social welfare and presupposes a complete SWF
    • Health and consumption are the only arguments
    • or separable from other arguments
  – \( k \) is simply an inefficient nuisance preventing welfare maximisation

• Complete and legitimate specification of SW not possible?
  – Trade-offs still need to be and are made
  – Legitimate social process reveals something about a latent welfare function
  – Interpret shadow prices as revealed but partial expression of social value
    • \( k \) is a revealed expression of social value of health from collective health care
    • \( v \) is how much of their consumption individuals are willing to give up to improve their own health
  – So good reasons why \( k \neq v \)
  – Good reasons to suppose there are other non separable arguments

What it is and what it's not

An efficient NHS

Underestimate health effect of \( \Delta B \)
(i.e., \( k_1 \) is too high)

Current NHS

Average productivity would
overestimate health effect of \( \Delta B \)
(i.e., \( H_1/B_1 < k_1 \))

Current NHS

Underestimate health effect of \( \Delta B \)
(i.e., \( k_1 \) is too high)

Budget

Health

H1

1/k_1

1/k_1
A scientific question of fact

Martin et al 2008, 2009 and MRC/NIHR 2012

• Previously
  – Variations in expenditure and outcomes within programmes
  – Reflect what actually happens in the NHS by PBC

<table>
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<tr>
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<th>Cancer</th>
<th>Circulation</th>
<th>Respiratory</th>
<th>Gastro-int</th>
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• Need estimate the overall threshold:
  – How changes in overall expenditure gets allocated across all the programmes
  – How changes in mortality might translate into QALYs gained
  – More (all) programmes (types of QALYs displaced)
  – How uncertain is any overall estimate
  – How it changes with scale of expenditure change
  – How it changes over time
Budgetary policies and available actions

- Hard constraints with uncertain and variable costs and outcomes
  - Corner solutions or exogenous parameters
- Model budget, policy, information revealed and available actions
  - Current rules special case of soft constraint
  - No simple ex-ante rules – more cost-effective if hard constraint
- not meet budget at expectation or maximise expected health outcomes

Chalabi et al 2008, and McKenna et al 2010
Implications for the value of research

- How much budget give up to resolve uncertainty?
  - Underestimate value (hard constraints and less available actions)
  - Overestimate (soft constraint)
- EVI based on current decision rules are a special case
  - Soft constraint and buy as much health as you like at a constant rate \((k)\)
- Variability and uncertainty matters
  - Approval and research decisions
Irrecoverable (opportunity) costs

- Irrecoverable per patient treatment costs (NHE profile)
- Irrecoverable costs allocated over time (e.g., capital costs of equipment)

McKenna and Claxton 2011
and MRC/NIHR 2011

Irrecoverable per patient treatment costs (NHE profile)
Irrecoverable costs allocated over time (e.g., capital costs of equipment)
Irrecoverable (opportunity) costs

- Research is not possible with approval (incentives and ethics)
- Irrecoverable opportunity cost (value of information forgone)

Griffin et al 2011 and MRC/NIHR 2011
Where does this leave us?

• Cant fully specify SWF anyway
  – At best partial reflection of social value (can’t claim efficient/optimal)
  – Contribute to accountable decisions and progressive change

• No ‘optimal’ simple ex-ante rules
  – Depends on budget, policy, what is revealed and when, and remedial actions available
  – Problem of second best (problem for traditional CBA as CEA)
  – Understand the limitations and implications

• Account for irrecoverable opportunity costs (price thresholds)
  – Reject to approve (only relevant if no uncertainty)
  – Reject to OIR, OIR to Approve (research not possible)
  – Reject to OIR, OIR to AWR, and AWR to Approve