

Perspective and multi-sectoral effects

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All effects of social value should count

- Costs and benefits fall on different sectors
- Budget set by a socially legitimate higher authority
- No consensus on how trade off
 - Health, consumption and other social arguments
 - No complete, legitimate and explicit SWF
- Even if willing to impose a SWF
 - Non marginal effects
 - Displaced wider effects
 - Dynamic effects
 - Social consensus and other social objectives
- Multi sector effects and compensation tests

Conceptual framework

- Two sectors
 - Budget constrained Health system
 - Rest of the economy
- Impacts on the health care system
 - Health gained Δh
 - Costs falling on the health care system Δc_h
 - Health forgone $\frac{\Delta c_h}{k}$
- Wider impacts
 - Costs falling on patients carers Δc_c^c
 - External effects on the wider economy Δc_c^e
 - Net consumption costs/benefits $\Delta c_c = \Delta c_c^c + \Delta c_c^e$
- Social values
 - k = Cost effectiveness threshold (how much health give up within HCS)
 - v = How much (individual) consumption willing to give up to improve their health

Questions of fact and questions of value?

- When costs displace health (Δc_h)

$$\underbrace{\Delta h}_{\text{Health gained}} - \underbrace{\frac{\Delta c_h}{k}}_{\text{Health forgone}} \geq 0 \quad v \cdot \Delta h - \frac{v}{k} \Delta c_h \geq 0, \quad \text{or} \quad \frac{\Delta c_h}{\Delta h} \leq k$$

- When costs displace consumption (Δc_c)

$$\Delta h - \underbrace{\frac{\Delta c_c}{v}}_{\text{Consumption forgone}} \geq 0 \quad v \cdot \Delta h - \Delta c_c \geq 0, \quad \text{or} \quad \frac{\Delta c_c}{\Delta h} \leq v$$

- Costs fall on both

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

Fact: k = how much health displaced by increased HCS costs?

Value: v = how much consumption should we give up for health?

Effects outside health - spectrum of policies

Possible Policy	Net health benefit	ICER
A. Ignore effects (NICE 2008)	$\Delta h - \frac{\Delta c_h}{k} > 0$	$\frac{\Delta c_h}{\Delta h} < k$

Biases of policies (marginal changes)

Type of Technology	A. Ignore wider costs		B. Costs on budget		C. Ignore constraint	
	Bias	Decision	Bias	Decision	Bias	Decision
More effective						
Net consumption costs						
Positive costs (NHS)	+	FP	-	FN	+	FP
Cost saving (NHS)	+	FP	-	FN	-	FN
Net consumption benefits						
Positive costs (NHS)	-	FN	+	FP	+	FP
Cost saving (NHS)	-	D	+	D	-	D
Less effective						
Net consumption costs						
Positive costs (NHS)	+	D	-	D	+	D
Cost saving (NHS)	+	FP	-	FN	-	FN
Net consumption benefits						
Positive costs (NHS)	-	FN	+	FP	+	FP
Cost saving (NHS)	-	FN	+	FP	-	FN

- Bias in different directions depending on context
- Incentive for technologies to have positive health care costs
 - Positive bias due to non marginal change
 - Policy D may no longer be the best (A when benefits, B when costs)

Implications for policy

- Questions of value
 - Formal prescription
 - Requires specification of a complete SWF
 - v is the measure of social welfare and presupposes a complete SWF
 - k is simply an inefficient nuisance preventing welfare maximisation
 - Deliberative approach
 - Trade-offs still need to be made
 - k is an expression of social value of 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 $k \neq v$

Implications for policy

- Questions of fact
 - Cost-effectiveness threshold
 - Is a change non marginal?
 - Impact relative to budget (single and a series of decisions)
 - How does k change with budget impact?
 - Consumption value of health
 - Requires social and scientific value judgements
 - Net consumption benefits
 - Cost of care not borne by NHS
 - Effects on wider economy (external to patient and carers)
 - QALYs include consumption effects?
 - Measurement and valuation requires social and scientific value judgements

Other critical considerations

- Displaced external effects
 - Compare to external benefits forgone
 - Danger of doubly false positive decisions
 - Improved health on average offers benefits to the wider economy
 - On average a HCS perspective is sufficient!
 - Is a proper assessment of exceptions possible?
- Dynamic effects
 - Price to appropriate any net consumption benefits
 - External benefits become internal costs
 - Investment Incentives (technologies, disease and populations)
 - Impact relative to budget (single and a series of decisions)
 - Spend less of on health care more on payment of rent (reduce health)
- Social consensus
 - Potential conflict and long run credibility
 - Static and dynamic conflicts with social policies and NHS principles

Benefits and costs on multiple sectors?

- Multiple sectors
 - Health (H) and Education (E)
 - choose proportion (x) of population i that receives intervention j within programme k
 - Each jk impact on outcomes and costs in each sector
- Need a SWF
 - Arguments H and E
 - Weights
- Welfarist CBA
 - Compensation (WTP)
 - Not shadow price costs
- Problems for CEA and CBA
 - Full information
 - Estimates of respective thresholds

$$\max_{\Psi} \left(\sum_{k=1}^K \sum_{j=1}^{J_k} \sum_{i=1}^{I_k} (H_{ijk} + \delta \cdot E_{ijk}) x_{ijk} \right)$$

$$\Psi = (x_{ijk}, i = 1 \dots I_k, j = 1 \dots J_k, k = 1 \dots K)$$

or

$$\max_{\Psi} \left(\sum_{k=1}^K \sum_{j=1}^{J_k} \sum_{i=1}^{I_k} (B_{ijk}^H + B_{ijk}^E) x_{ijk} \right)$$

$$\Psi = (x_{ijk}, i = 1 \dots I_k, j = 1 \dots J_k, k = 1 \dots K)$$

sto

$$\sum_{k=1}^K \sum_{j=1}^{J_k} \sum_{i=1}^{I_k} c_{ijk}^H x_{ijk} \leq C_H$$

$$\sum_{k=1}^K \sum_{j=1}^{J_k} \sum_{i=1}^{I_k} c_{ijk}^E x_{ijk} \leq C_E$$

$$0 \leq x_{ijk} \leq 1 \quad i = 1 \dots I_k, j = 1 \dots J_k, k = 1 \dots K$$

$$\sum_{j=1}^{J_k} x_{ijk} = 1 \quad i = 1 \dots I_k, k = 1 \dots K$$

What can we know?

- How much does it cost to produce health or education outputs
 - Estimate the shadow prices, i.e., sector specific thresholds
- Specify a complete SWF?
 - Value health and education output in terms of consumption
 - Account for the constraints in project selection
- Complete and legitimate SWF not possible?
 - Allocation of resource through legitimate social process reveals something about a latent welfare function
 - Interpret shadow prices as revealed but partial expression of social value
- Common numeraire(s)
 - Sector specific output
 - Sector specific resources
 - Private consumption (individual preferences)

A multi sectoral perspective

Sector	Net benefit	Outputs	Resources	Consumption
Health	ΔNB_H	$\Delta H - \Delta C_H / k_H$	$\Delta H \cdot k_H - \Delta C_H$	$v_H(\Delta H - \Delta C_H / k_H)$
Education	ΔNB_E	$\Delta E - \Delta C_E / k_E$	$\Delta E \cdot k_E - \Delta C_E$	$v_E(\Delta E - \Delta C_E / k_E)$

	Health	Education		Decision	Compensation
1	$\Delta NB_H > 0$	$\Delta NB_E > 0$	$\Delta NB_H + \Delta NB_E > 0$	Accept	Non required
2	$\Delta NB_H > 0$	$\Delta NB_E < 0$	..	.. Jamie's school dinners	0 - ΔNB_E from H to E
3	$\Delta NB_H < 0$	$\Delta NB_E > 0$	..	.. Ritalin for ADHD	0 - ΔNB_H from E to H
4	$\Delta NB_H < 0$	$\Delta NB_E < 0$	$\Delta NB_H + \Delta NB_E < 0$	Reject	Non possible
5	$\Delta NB_H > 0$	$\Delta NB_E < 0$	..	..	H cant compensate E
6	$\Delta NB_H < 0$	$\Delta NB_E > 0$	..	..	E cant compensate H

- Sector specific effects at values implied by resource allocation
- Pay compensation for each project?
- Some accounting to inform next round of public expenditure decisions