Key Concepts in Health Economics

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This lecture should enable you to:

- Describe the concepts of efficiency, opportunity cost and marginal analysis
- Understand why these concepts are important in health economics
- Appreciate how they underpin ‘the market’ (as a prelude to lectures 3, 4 and 5)
Economics is about …

- Limited resources
- Unlimited “wants”
- *Choosing* between which ‘wants’ we can ‘afford’ given our resource ‘budget’
Personal choice...

For lunch I could have a...

- Whopper meal deal (small)
- Tall latte and blueberry muffin (to go)
- Tuna sandwich & cracked pepper crisps
- Pint of Guinness & packet peanuts
Government choice...

Government could fund one IVF course or...

One-third of a cochlear implant

1 heart bypass operation

11 cataract removals

150 MMR vaccinations

One-thousandth of a Challenger 2 tank
Economists view of the world...

- Pessimist: bottle $\frac{1}{2}$ empty
- Optimist: bottle $\frac{1}{2}$ full
- Economist: bottle $\frac{1}{2}$ wasted

inefficient!
Concept 1: efficiency

Efficiency = making most of what we’ve got!

- **Technical Efficiency** = producing maximum benefit (outputs) from given inputs (resources), or given level of benefit from least inputs
- **Economic Efficiency** = producing maximum benefit from given budget, or given level of benefit at least possible cost (value of resources)
- **Allocative Efficiency** = producing the mix of benefits (from a given set of resources) that is most highly valued
Example of efficiency

Primary care clinic combines inputs to provide ‘health’ for a population:

- consultation rooms, treatment rooms, office space, doctor time, nurse time, etc.

Different possible combinations of inputs:

- a larger waiting area and fewer treatment rooms, or more nurses and fewer doctors, etc.

Technically efficient:

- not possible to provide ‘health’ to any more patients without using more of at least one input (nurse time, doctor time, etc.)
Example of efficiency (cont.)

- Technical efficiency doesn’t consider cost:
  - hour of nurse time vs hour of doctor time
  - different input combinations may be technically efficient but not all have the same overall cost

- Economically efficient:
  - combine inputs to provide ‘health’ at lowest cost

- Even if primary care clinic is economically efficient, may produce too much or too little

- Allocatively efficient:
  - no other mix of primary and (for example) secondary care that is more highly valued
Concept 2: opportunity cost

How do we choose between which ‘wants’ we can ‘afford’ given our resource ‘budget’ to ensure we are being ‘efficient’?

- Assessment of the relative benefits that each course of action will produce

The ‘cost’ is therefore the ‘opportunity cost’:

“The value of forgone benefit which could be obtained from a resource in its next-best alternative use.”
# Opportunity cost and health(care)

<table>
<thead>
<tr>
<th>Choice faced</th>
<th>If we decide to...</th>
<th>The opportunity cost is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much to spend on health care</td>
<td>To increase health care spending</td>
<td>Benefits foregone as a result of less education, defence, transport etc. spending</td>
</tr>
<tr>
<td>How much to spend in each health region</td>
<td>To increase spending in one region</td>
<td>Benefits foregone as a result of spending less in other regions</td>
</tr>
<tr>
<td>How much to spend on each service</td>
<td>To spend more on cancer</td>
<td>Benefits foregone as a result of spending less on maternity services</td>
</tr>
<tr>
<td>How much to spend on each patient group</td>
<td>To spend more on the young</td>
<td>Benefits foregone as a result of spending less on the elderly</td>
</tr>
</tbody>
</table>
Example of opportunity cost

<table>
<thead>
<tr>
<th>Paediatric Care (‘000 children treated)</th>
<th>Care of Elderly (‘000 elderly treated)</th>
<th>Opportunity Cost (‘000 elderly not treated if treat children)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>28</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>
Implications of opportunity cost

- Deciding to *do* A implies deciding *not* to do B (i.e. value of benefits from A>B)
  - Eg deciding to *do* more breast cancer screening same as deciding *not* to do more prostate cancer screening
    - Critical is whether benefits from doing more ‘A’ are greater than benefits lost from not doing ‘B’

- Cost can be incurred without financial expenditure (as long as there is some value in the benefits foregone)
  - Eg informal sector, volunteer staff
Economics and money (again!)

- Remember from last lecture, money is...
  - Common store of value
  - Convenient means of exchange

- People convert goods they produce into other goods they value, such as food or clothing, through the medium of money.

- The price we observe is the ‘exchange rate’ between goods, and *may* be used to value goods (as it gives us (opportunity) ‘costs’).

- But having no *price* does not necessarily mean there is no (opportunity) *cost*!
Concept 3: ‘marginal’ analysis

- Efficiency is achieved only by producing/consuming something to the point where the (opportunity) cost of the last unit is no greater than the benefit derived from that unit.

- Choice over which course of action will be ‘efficient’ therefore requires assessment of relative (opportunity) costs and benefits of each marginal addition (or reduction):
  - in consumption (which underpins demand)
  - in production (which underpins supply)
Achieving efficiency using marginal analysis: an example

- Two goods we can allocate our budget to: Mars Bars and crisps
- How do we allocate this budget to maximise benefits (utility)?
  - Take each unit in turn and decide whether to consume *that unit*
  - Look at additional (marginal) benefit each unit adds, as marginal utility *diminishes* as more units are consumed
Diminishing Marginal Utility
Achieving efficiency using marginal analysis: an example

Imagine we have a budget which means we could consume *either* 3 bags of crisps or 3 Mars Bars or some combination.

- Which would we choose?

Allocate our budget one unit at a time until \( MB_{\text{Mars Bar}} = MB_{\text{Crisps}} \).

- As cost is ‘opportunity cost’, \( MC_{\text{Mars Bar}} = MB_{\text{Crisps}} \) and so at this point \( MC_{\text{Mars Bar}} = MB_{\text{Mars Bar}} \).
Diminishing Marginal Utility

To maximise my utility (ie efficiency) I do not allocate my budget to 3 Mars Bars, but to 2 Mars Bars & 1 packet of crisps (total benefit = 19)
An example of transplantation

<table>
<thead>
<tr>
<th>Number of transplants</th>
<th>Total cost</th>
<th>Total benefit</th>
<th>Average cost</th>
<th>Average benefit</th>
<th>Marginal cost</th>
<th>Marginal benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>500</td>
<td>100</td>
<td>500</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>900</td>
<td>75</td>
<td>450</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>3</td>
<td>180</td>
<td>1200</td>
<td>60</td>
<td>400</td>
<td>30</td>
<td>300</td>
</tr>
<tr>
<td>4</td>
<td>230</td>
<td>1400</td>
<td>58</td>
<td>350</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>330</td>
<td>1500</td>
<td>66</td>
<td>300</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>530</td>
<td>1550</td>
<td>88</td>
<td>258</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>1030</td>
<td>1600</td>
<td>147</td>
<td>229</td>
<td>500</td>
<td>50</td>
</tr>
</tbody>
</table>

Represents benefits forgone elsewhere (remember $MB_B = MC_A$, so $MC_A = MB_A$)
Marginal analysis and ‘the market’

- Marginal benefit and marginal cost lie behind the concepts of demand (lect. 3) and supply (lect. 4) which in turn are important in understanding the importance of ‘the market’ (lect. 5)

- Demand curve shows the quantity (in a specified time period) that an individual will be willing to buy at different prices
  - Amount an individual is willing to pay for a unit will depend on the marginal benefit from consuming it
  - MB falls the greater the quantity consumed
  - Demand curve thus slopes down from left to right
Demand curve

- Price
- $1.50
- 2
- 4
- 2
- 1.50
- No. Mars Bars
- D=MB
Marginal analysis and ‘the market’

- Supply curve shows quantity producers willing to supply at different prices (at a given time)
- Marginal cost increases as output increases (because of *diminishing* marginal returns)
  - contribution of an input (e.g., nurses) to output (product) depends on levels of other inputs (e.g., beds)
  - as more nurses added to fixed number of beds the contribution of marginal nurse to output starts to fall, and marginal cost of producing output starts to rise
  - producers will then only be willing to produce greater amounts if compensated by a higher price
  - supply curve thus slopes upward from left to right
Supply curve

\[ S = MC \]

<table>
<thead>
<tr>
<th>No. Mars Bars</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.50</td>
</tr>
<tr>
<td>2</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Diagram showing the supply curve with points at (0, 1.50) and (2, 2.00) and the condition S = MC marked on the graph.
‘The market’ equilibrium: demand (MB) = supply (MC)
Health economics is concerned with the efficient allocation of scarce (health care) resources

- Maximising benefit (health) for resources available
- Requires technical, economic and allocative efficiency

‘The market’ is important because:

- Firms only able to remain if technically and economically efficient (otherwise others undercut price)
- Allocative efficiency is also achieved as for each good consumption/production is where MC=MB
  - as MC=marginal opportunity cost (MB foregone), resources are allocated such that MBs are equated across all available goods

‘The market’ ensures we get the most benefit for the resources we have... when it works!