Cost-effectiveness & Choosing the right interventions

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Suzan G. Komen for the Cure
Choosing interventions

Package for hygiène: €9
Malaria bednet: €12
Bicycle for access: €53
Training a midwife: €69
Train HIV-volunteer: €75
Basic medicine: €90
Water for village: €1080
Two schoolbooks: €5
Ten chicken: €15
Outline

- Choosing the right intervention, but how?
- Estimating a cost-effectiveness ratio
- WHO initiative on cost-effectiveness analysis: WHO-CHOICE
- Using results
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Choosing the right interventions…. but how?(i)

- According to burden of disease...

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Eastern Europa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>1</td>
</tr>
<tr>
<td>Neuropsychiatric conditions</td>
<td>2</td>
</tr>
<tr>
<td>Unintentional injuries</td>
<td>3</td>
</tr>
<tr>
<td>Malignant neoplasms</td>
<td>4</td>
</tr>
<tr>
<td>Intentional injuries</td>
<td>5</td>
</tr>
<tr>
<td>Digestive diseases</td>
<td>6</td>
</tr>
<tr>
<td>Infectious and parasitic diseases</td>
<td>7</td>
</tr>
<tr>
<td>Sense organ diseases</td>
<td>8</td>
</tr>
<tr>
<td>Musculoskeletal diseases</td>
<td>9</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>10</td>
</tr>
</tbody>
</table>
Choosing the right interventions… but how?(ii)

.. and according to cost-effectiveness

- Burden of disease signifies size of problem… … but is silent on what can be done to reduce the problem
  - E.g. dementia may be major problem in Estonia, but should a large share of resources be spend on it?

- To achieve most health gain, interventions need to be evaluated on effectiveness and costs
  - ‘value for money’, ‘bang for the buck’ or ‘cost-effective’

- Deliver those services that are cost-effective
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What is a cost-effectiveness ratio?

\[ \text{CER} = \frac{\text{Costs of an intervention}}{\text{Effects of an intervention}} \]
Example: provision of malaria bed nets

Which costs would you include?

- Which health effects would you include?

- How would you collect data on costs and health effects?

- How would you calculate the cost-effectiveness ratio?
Costs to include:

- Related health care costs:
  - bed nets itself, distribution costs etc

- Related non-health care costs:
  - time costs of people collecting bed nets, seeking treatment of malaria

- Unrelated (non) health care costs:
  - (non) health care consumption in added years of life
Health effects to include

- **Mortality:**
  - deaths averted and years of life saved

- **Morbidity:**
  - enhanced quality of life because of reduced malaria episodes

- Can be expressed in DALYs averted
Effects: measuring disability

Visual Analogue Scale:
Requires respondent to assign each health state to one number, on a scale from 0 (least desirable or death) to 100 (most desirable or perfect health)

Variants: horizontal or with cards
Calculation of cost-effectiveness ratio (i)

\[
CER = \frac{\text{costs with bed nets} - \text{costs without bed nets}}{\text{health with bed nets} - \text{health without bed nets}}
\]
Calculation of cost-effectiveness ratio (ii)

- Costs without bed nets = 18 million US$
- Health without bed nets = 600,000 DALYs lost
- Costs with bed nets = 20 million US$
- Health with bed nets = 500,000 DALYs lost

\[
\text{CER} = \ldots \text{US$ / DALY averted}
\]
Calculation of cost-effectiveness ratio (iii)

\[
\text{CER} = \frac{20 \text{ million US$} - 18 \text{ million US$}}{500,000 \text{ DALYs lost} - 600,000 \text{ DALYs lost}}
\]

\[
\text{CER} = \frac{2 \text{ million US$}}{100,000 \text{ DALYs averted}} = 20 \text{ US$/DALY averted}
\]
Example: TB treatment

- **Costs**
  - TB drugs and tests: US$8
  - Health centre visits: US$40
  - total costs: US$48

- **Effects:**
  - If 20 TB sufferers take medication, 1 life is saved
    - some die despite medication, some would have survived anyway
    - this person would otherwise die at 33 years old, now lives up to 65 years: 32 years saved

- **Cost-effectiveness:**
  - Costs: $20 \times 48 = US$ 960; Life years saved = 32
  - Ratio = 960/32 = US$ 30 / life year saved
Living on cruise ships is cost effective for elderly people

Janice Hopkins Tanne New York

Living on a cruise ship provides a better quality of life and is cost effective for elderly people who need help to live independently, according to a study published in the Journal of the American Geriatrics Society (2004;52:1-4).

Elderly people often choose assisted living facilities, nursing homes, 24 hours a day home caregivers, or family support. Living on a cruise ship might be a better choice, says Lee Lindquist, instructor of medicine at Northwestern University's Feinberg School of Medicine in the past two years, almost every other week,” she said.

Dr Lindquist compared the amenities and costs in assisted living facilities with accommodation on cruise ships, using a Markov analysis. Both cruise ships and assisted living facilities offer single room apartments with a private bathroom, a shower with easy access, some help, cable television, security services, and entertainment.

Cruise ships, however, have superior health facilities—one or more doctors, nurses available...
How to use CERs

- CER to be calculated for many interventions
- Start implementation of interventions with lowest CER, then next-best etc...
  - Till budget is exhausted
  - Then maximization of health within budget
How cost-effectiveness analysis? summary

- **Costs**
  - Related health care costs

- **Effects**
  - disability-adjusted life years

- **Cost-effectiveness ratio**
  - Dividing costs by health effects
  - Implements interventions with lowest ratio
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Why WHO-CHOICE?

- Very limited data on the costs & effects of different health care interventions with which to support investment decisions
- Not feasible or affordable to generate all evidence needed via empirically-based CEA trials
- Current analyses typically only evaluates new interventions. Hardly any evidence on cost and effects of current interventions
WHO-CHOICE

- Started in 1998,
  - team of medical doctors, epidemiologists, health economists
- Evaluation of a comprehensive set of interventions (>500)
- Modeling approach
  - On basis of costs and effect estimates from literature
  - Quicker, o.k. for ‘order of magnitude’ results
- Use of a common set of tools and methods
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

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Cost-effectiveness results for an African sub-region
(Afro D, with a total population of 294 million)
WHO-CHOICE: summary

- Can improve efficiency of health sector by choosing *which* interventions to deliver
- Compares 500+ interventions
  - New and current
- Standardized approach
- Allows country-adaptation
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Use of CEA in policy

- Results show which choice of interventions can improve health system efficiency

- CEA should **NOT** be used formulaically, but enters the policy debate

- Decision makers should weight CEA against other goals of the health system:
  - reducing health inequalities;
  - improving responsiveness;
  - reducing inequalities in responsiveness
Thank you for your attention