Economic evaluation and scale-up

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Overview

• Introduction to health economic concepts
• Data and methodological considerations
• GACD case study: FRESH AIR
Why we need health economics

Money can be spent only once: If we do not spend it on a new drug (vaccin, device), we can spend it on e.g. more nurses, more administrative support for doctors, or even: better salaries for primary school teachers.

Healthcare spending as % GDP in 2017 (source: OECD)
Value for money

• The fourth hurdle (quality, safety, efficacy)
• Application:
  - Reimbursement decisions (e.g. drugs)
  - Government decisions (new vaccin)
  - Guidelines for professionals

• Central question: Is it worth it? (=cost per unit health gain)
• But also: if we do this, what will be the total costs? (=budget impact)
Cost-effectiveness, the fourth hurdle?
Health economics definition

• Health economics is the science concerned with allocating scarce resources in health care
• Pharmacoeconomics focuses on drugs
• Assuming a fixed healthcare budget, we aim to receive the maximum health per amount of money spent
• Cost-effectiveness analysis most widely adopted by decision makers

• In addition, we need to know the total economic burden before we can design cost-effective interventions
## Cost drivers COPD

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical admissions</td>
<td>€ 77 M</td>
<td>19%</td>
</tr>
<tr>
<td>Nursing and care</td>
<td>€ 63 M</td>
<td>15%</td>
</tr>
<tr>
<td>Specialty care</td>
<td>€ 36 M</td>
<td>9%</td>
</tr>
<tr>
<td>Lung transplantation</td>
<td>€ 3 M</td>
<td>1%</td>
</tr>
<tr>
<td>Daycare</td>
<td>€ 0.4 M</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Secondary care Total</strong></td>
<td><strong>€179 M</strong></td>
<td><strong>44%</strong></td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>€ 40 M</td>
<td>10%</td>
</tr>
<tr>
<td>Primary care</td>
<td>€ 25 M</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Primary care Total</strong></td>
<td><strong>€65 M</strong></td>
<td><strong>16%</strong></td>
</tr>
<tr>
<td>Medication</td>
<td>€ 148 M</td>
<td>35%</td>
</tr>
<tr>
<td>Oxygen therapy</td>
<td>€ 18 M</td>
<td>4%</td>
</tr>
<tr>
<td>Influenza vaccination</td>
<td>€ 4 M</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td><strong>€170 M</strong></td>
<td><strong>40%</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>€415 M</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

RIVM 2013
Cost-effective: what do we mean?

Incremental cost-effectiveness ratio (ICER)

\[
\text{ICER} = \frac{\text{Costs}_{\text{new}} - \text{Costs}_{\text{old}}}{\Delta \text{Effects}} = \frac{\Delta \text{Costs}}{\Delta \text{Effects}}
\]

Common misconceptions:
1) The goal is to reduce healthcare costs (no, we assume a fixed budget)
2) It only concerns costs – savings (also balance with quality of life!)
3) It only concerns medical costs (also work productivity!)
4) If it’s cheaper, it’s cost-effective (not if we gain less quality of life)
Cost-effectiveness plane

- **Incremental costs**
  - Cost money, Improves health
  - Cost money, Worsens health

- **Incremental effects**
  - €20,000 per QALY

**Zero:**
- Standard treatment without intervention

**Saves money, Worsens health**
- (No therapeutic value)

**Saves money, Improves health**
- (Therapeutic value)
Methodological issues: “classical CEA”

- Perspective: healthcare payer vs society?
- Time horizon: trial to lifelong?
- Population: representative for real-world scale-up?
- Comparators: usual care (!)
- Costs to include: next slide
- Outcomes to include: 1. disease specific vs generic & 2. surrogate vs hard endpoints
- Alongside study vs modeling: available resources/expertise?
- Sensitivity & scenario analyses: very important!

Country guidelines differ, see:
https://tools.ispor.org/peguidelines/
Costs in payer vs societal perspective

<table>
<thead>
<tr>
<th></th>
<th>Within healthcare</th>
<th>Outside healthcare</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct costs</strong></td>
<td>Medication</td>
<td>Travel expenses</td>
</tr>
<tr>
<td></td>
<td>Dispense fee</td>
<td>Home adaptations</td>
</tr>
<tr>
<td></td>
<td>Diagnostics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hospital admissions</td>
<td></td>
</tr>
<tr>
<td><strong>Indirect costs</strong></td>
<td>Medical costs in LYG</td>
<td>Work productivity losses, juridical costs,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>special education</td>
</tr>
</tbody>
</table>
Specific vs generic outcome

Appendix: The EQ-5D instrument

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.

Mobility
I have no problems in walking about
I have some problems in walking about
I am confined to bed

Self-Care
I have no problems with self-care
I have some problems washing or dressing myself
I am unable to wash or dress myself

Usual Activities (eg work, study, housework, family or leisure activities)
I have no problems with performing my usual activities
I have some problems with performing my usual activities
I am unable to perform my usual activities

Pain/Discomfort
I have no pain or discomfort
I have moderate pain or discomfort
I have extreme pain or discomfort

Anxiety/Depression
I am not anxious or depressed
I am moderately anxious or depressed
I am extremely anxious or depressed

Caveat: not very sensitive to clinically relevant change…
QALY: Conceptual representation

Figure 4.2. QALYs gained from an intervention.
• Model allows long-term estimates, scenario & sensitivity analyses
• Special expertise required (or use existing model)
When is an intervention “cost-effective”?

• At cost savings
  • (Notice that cost savings might be realized in other columns or are macro-economical not measured)

• At higher costs and higher health gains?
  • Thresholds: €20.000- €80.000 per QALY

• US: $50.000 - $100.000
• Netherlands: €20.000 / €50.000
• UK (NICE): £20.000 - £30.000
• WHO:
  1 GDP per DALY prevented (very cost-effective)
  3 GDP per DALY prevented (cost-effective)
Funded by GACD through the European Commission (Horizon2020)
Countries: Uganda, Vietnam, Kyrgyzstan & Greece

Aim: “To improve the prevention, diagnosis and treatment of chronic lung diseases in low and middle income countries”

- Funded by GACD through the European Commission (Horizon2020)
- Countries: Uganda, Vietnam, Kyrgyzstan & Greece

Interventions and implications

- Awareness program (primary prevention)
- Smoking cessation (secondary prevention)
- Pulmonary rehabilitation (treatment)
- Making the case for action: Economic impact CLD

“Classical CEA” not sufficient/feasible: MCDA?
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Decision making tool for the prioritisation of

A self-assessment tool that helps inform commissioners by using Multi-Criteria Decision Analysis to look at value for money of interventions and services across priority areas.

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Priority Areas

Context (incl. priority areas input)

- Why are you doing this?
- What is the scope of the prioritisation?
- Whom might you involve?
- What is your focus on reducing health inequalities?

Up to 8 priority areas

- What are the interventions/services?
- What are their costs?
- What are their benefits?
- Weblinks & resources

Weighting

- How effective are interventions in different areas?
- How much do you value health gains to different population segments?

Error check

Outputs and reports

The lab
STAR

• 1) Context analysis: defines the reasons & scope of the prioritization and identifies potential stakeholders.
• 2) Describe intervention: costs (per patient, what if?) and benefits (who, what, how many) are estimated
• 3) In the weighting process, specific attention is being paid to several pre-identified population segments (e.g. poor versus richer communities)
• Visual outputs and qualitative reports from the perspectives of different stakeholders and does this in a collaborative workshop
• Gaps in knowledge assessment
Approach used in FRESH AIR

• STAR method for scale-up
• Literature review/burden of disease (?)
• Health economic workshops
• Cost sheets of interventions
Gaps: Primary data collection

• Cross-sectional, observational study
• Surveys administered to random patients from clinical registries with *diagnosed* asthma and/or COPD in Uganda, Vietnam, Kyrgyzstan and rural Greece (total N>1000)
• Data collected: demographic, clinical & socio-economic data and health status (MRC, CCQ/CAT, EQ-5D, WPAI)
• Primary outcomes:
  (1) Healthcare utilization & co-payments
  (2) Work productivity (WPAI)
Healthcare utilization & payment

Van Boven et al. ERS 2017
## Cost sheets for interventions

**H2020 Fresh Air WP 5.2 Expenditure for delivery 2 VBA sessions in Binh Tan and Ben Luc**

Not included: collecting data (pre-post test and follow-up)

<table>
<thead>
<tr>
<th>Training materials</th>
<th>Unit</th>
<th>Quantity</th>
<th>Cost per item (VND)</th>
<th>Cost per item (EUR)</th>
<th>Total cost (VND)</th>
<th>Total cost (EUR)</th>
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<tr>
<td>Stationary</td>
<td>person</td>
<td>80</td>
<td>22.500</td>
<td>0.94</td>
<td>1.800.000</td>
<td>75.37</td>
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<td>Printing VBA training materials</td>
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<td>30.000</td>
<td>1.26</td>
<td>2.400.000</td>
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<tr>
<td>Medication (champix, nicotine gum, patch)</td>
<td>box/tablet</td>
<td>6</td>
<td>500.000</td>
<td>20.94</td>
<td>3.000.000</td>
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<td>Photocopy, certificates</td>
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<td>Transportation</td>
<td>trip (2 round way)</td>
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<td>71.19</td>
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<td>83.75</td>
<td>4.000.000</td>
<td>167.50</td>
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<td>Backdrop</td>
<td>backdrop</td>
<td>2</td>
<td>500.000</td>
<td>20.94</td>
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<td>41.87</td>
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<td><strong>Refreshments</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Water</td>
<td>person</td>
<td>80</td>
<td>15.000</td>
<td>0.63</td>
<td>1.200.000</td>
<td>50.25</td>
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<td>Teabreak</td>
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<td>30.000</td>
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<td>Lunch</td>
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<td>2.09</td>
<td>4.000.000</td>
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<td>Per diem expenses per trainee</td>
<td>person</td>
<td>60</td>
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<td><strong>Administrative expenses</strong></td>
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<td>Obtain national data</td>
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<td>Organization team</td>
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<td>Time to prepare training materials</td>
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<td>300.000</td>
<td>12.56</td>
<td>3.000.000</td>
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<td>Sending invitation</td>
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<td>100</td>
<td>10.000</td>
<td>0.42</td>
<td>1.000.000</td>
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<td>Contact person</td>
<td>person</td>
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<td>400.000</td>
<td>16.75</td>
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<tr>
<td>Telephone</td>
<td>person</td>
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<td>200.000</td>
<td>8.37</td>
<td>800.000</td>
<td>33.50</td>
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<tr>
<td>Report</td>
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<td>10</td>
<td>500.000</td>
<td>20.94</td>
<td>5.000.000</td>
<td>209.37</td>
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<td><strong>Trainer expenses</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Time to deliver VBA training</td>
<td>day</td>
<td>6</td>
<td>2.000.000</td>
<td>83.75</td>
<td>12.000.000</td>
<td>502.49</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>82.300.000</td>
</tr>
</tbody>
</table>
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7 8

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Weblinks & resources
Thank you!
Questions?
Email: jobvanboven@gmail.com