IMPACT OF DISCOUNTING IN PHARMACOECONOMIC MODELING. A CASE STUDY

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Would you prefer €100 now?

OR

€150 five years from now?
Discounting adjusts future costs/benefits and expresses all costs and monetary benefits in terms of their present value

 PV = FV/(1+r)^t
Case

- Markov model for the cost-effectiveness evaluation of the different antihypertensive treatments in the prevention of CVD complications
- What is the impact of discounting on the choice of cost-effective therapeutic strategy?
Methodology 1/3

- Hypothetical cohort: 55 years old patients with HT without other CVD complications or risk factors
- Comparator strategies: antihypertensive groups of medicines present in clinical practice (diuretic, beta blocker, Ca channel antagonist and ACE inhibitors)
- All therapeutic strategies were compared with strategy “no intervention”
Complications of HT (AMI, AP, stroke and their combinations) and total mortality were observed as outcomes.

Only direct costs were considered (costs of medications, office visits to physicians, hospitalizations, surgical interventions, etc).

Utility measure included in the analysis was quality-adjusted life years (QALY).
• Analyses were performed from the third-party payer perspective
• Results are presented as ICER (€/QALY)
• Annual discount rate of 5% was applied at all future costs and effects.
## Results 1/3

- **Undiscounted costs and effects**

<table>
<thead>
<tr>
<th>Comparator</th>
<th>Cost (€)</th>
<th>Δ cost (€)</th>
<th>Effective. (QALY)</th>
<th>Δ effectiv. (QALY)</th>
<th>C/E (€/QALY)</th>
<th>ICER (€/QALY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No intervention</td>
<td>867.7</td>
<td></td>
<td>16.42</td>
<td></td>
<td></td>
<td>52.85</td>
</tr>
<tr>
<td>ACE inhib.</td>
<td>2284.2</td>
<td>1416.5</td>
<td>45.98</td>
<td>29.86</td>
<td>49.68</td>
<td>47.92</td>
</tr>
<tr>
<td>Diuretic</td>
<td>2315.1</td>
<td>30.9</td>
<td>42.94</td>
<td>-3.04</td>
<td>53.91</td>
<td>dominated</td>
</tr>
<tr>
<td>Ca channel blocker</td>
<td>2372.0</td>
<td>87.8</td>
<td>39.95</td>
<td>-6.03</td>
<td>59.37</td>
<td>dominated</td>
</tr>
<tr>
<td>Beta blocker</td>
<td>2386.8</td>
<td>102.6</td>
<td>49.00</td>
<td>3.02</td>
<td>48.72</td>
<td>33.97</td>
</tr>
</tbody>
</table>
## Results 2/3

- **Discounted costs and effects (discount rate: 5%/year)**

<table>
<thead>
<tr>
<th>Comparator</th>
<th>Cost (€)</th>
<th>Δ cost (€)</th>
<th>Effective. (QALY)</th>
<th>Δ effectiv. (QALY)</th>
<th>C/E (€/QALY)</th>
<th>ICER (€/QALY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No intervention</td>
<td>484.7</td>
<td></td>
<td>11.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACE inhib.</td>
<td>1000.6</td>
<td>515.8</td>
<td>13.71</td>
<td>2.03</td>
<td>72.98</td>
<td>253.68</td>
</tr>
<tr>
<td>Diuretic</td>
<td>1033.4</td>
<td>32.8</td>
<td>13.76</td>
<td>0.05</td>
<td>75.13</td>
<td>680.66</td>
</tr>
<tr>
<td>Beta blocker</td>
<td>1076.9</td>
<td>76.3</td>
<td>13.51</td>
<td>-0.25</td>
<td>79.68</td>
<td>dominated</td>
</tr>
<tr>
<td>Ca channel blocker</td>
<td>1092.1</td>
<td>15.3</td>
<td>11.25</td>
<td>-2.51</td>
<td>97.10</td>
<td>dominated</td>
</tr>
</tbody>
</table>
Results 3/3

Extended dominance:

- $0.084 \leq k \leq 0.122$
Effect of discounting

- Higher discount rates increases cost/QALYs regardless of the intervention considered.
- The ranking of the strategies were changed after the discounting. Discounting dampens the relative importance of costs and benefits occurring in future.
Discounting change the choice of cost-effectiveness therapeutic strategy and change the order in ranking of the antihypertensive strategies in the prevention of CVD complications.
Thank you

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