Exploerring the impact of structural uncertainty in partitioned survival models for oncology

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Key Messages

- Model structure can impact the cost-effectiveness estimates obtained from economic evaluations.
- Economic analysis of cancer drugs must consider scenarios that address structural uncertainty.
- More research is needed to resolve the optimal approach for modelling using partitioned survival.

Approach

A partitioned survival model was built with simulated times to progression and death for two cohorts. We looked at the difference in overall survival between two treatments using different options:

<table>
<thead>
<tr>
<th>Variable</th>
<th>PFS</th>
<th>Progressed</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival curves</td>
<td>Exponential</td>
<td>--</td>
<td>Lognormal</td>
</tr>
<tr>
<td>New drug cost</td>
<td>$6,000</td>
<td>$1,500</td>
<td>--</td>
</tr>
<tr>
<td>Comparator cost</td>
<td>$2,000</td>
<td>$1,500</td>
<td>--</td>
</tr>
<tr>
<td>Utility</td>
<td>0.8</td>
<td>0.5</td>
<td>--</td>
</tr>
</tbody>
</table>

Difference in overall survival between two treatments

Continuing benefits

ICER = $116,000/QALY gained

Diminishing benefits

ICER = $167,000/QALY gained

Difference

Standard

Observed benefits

In practice

Discussion

"Continuing benefits" may overestimate and "observed benefits" underestimate effects of new treatment.

Many ways to model "diminishing benefits":
- Equal hazard rates?
- Look for equal time in progressed state?

Other questions: How do risks change? Changing risk of progression as well as death?

How do results compare with those of Markov models?

Further research is needed to determine the best approaches for addressing the long-term benefits in partitioned survival models.

Acknowledgements

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