

Key Drivers of Cost-effectiveness of Anti-cancer Drugs

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INTRODUCTION

Health economic models are often complex, with numerous parameters. Here, the intention is to give some insight in to the sensitivity of cost-effectiveness to various parameters that routinely appear in economic models.

I draw upon five NICE health technology assessments, for which I led the economic analyses, over the period 2008 – 2013. In the light blue boxes, I discuss the parameters that were contentious. In the Discussion, I highlight the sensitivity of cost-effectiveness to a fuller list of parameters, on the basis of the example assessments.

Sunitinib for gastro-intestinal stromal tumours

nice.org.uk/guidance/ta179/resources/evidence-review-group-report2

- Adjustment of overall survival for treatment switching in underlying RCT had a huge impact on cost-effectiveness.
- Cost-effectiveness sensitive to utility after progression.

Cetuximab, panitumumab for metastatic colorectal cancer

nice.org.uk/guidance/ta242/resources/colorectal-cancer-metastatic-2nd-line-cetuximab-bevacizumab-and-panitumumab-review-assessment-report2

- Mean duration of cetuximab treatment was a key parameter.
- Cost-effectiveness moderately sensitive to costs of medical management after progression.

Bosutinib for chronic myeloid leukaemia

nice.org.uk/guidance/ta299/resources/chronic-myeloid-leukaemia-bosutinib-evaluation-report4

“Evidence Review Group Report”

- Overall survival, in particular, time post progression was very contentious, and strongly affected cost-effectiveness.
- Cost-effectiveness moderately sensitive to costs of medical management.

Dasatinib, nilotinib and imatinib for 1st-line chronic myeloid leukaemia

nice.org.uk/guidance/ta251/resources/leukaemia-chronic-myeloid-first-line-dasatinib-nilotinib-and-standarddose-imatinib-assessment-report5

- Method of estimating overall survival highly contentious.
- Cost-effectiveness sensitive to nature and costs of subsequent lines of treatment.
- Medical management affected cost-effectiveness moderately.

Bendamustine for chronic lymphocytic leukaemia

<http://www.nice.org.uk/guidance/ta216/resources/leukaemia-lymphocytic-bendamustine-evidence-review-group-report2>

- Assumptions for frequency of blood transfusions (medical management) contentious.
- Overall survival extrapolation contentious.
- Little data on health state utilities, and cost-effectiveness sensitive to these.
- Disagreement about dose intensities, but only slight impact on cost-effectiveness. In other assessments, dose intensities has had major impact on cost-effectiveness.

CONCLUSIONS

Cost-effectiveness is generally very sensitive to:

- Mean overall survival,
- Adjusting overall survival for treatment switching,
- Mean treatment duration,
- Drug cost per month,
- Utilities (quality of life) on and off treatment.
- Type and costs of subsequent lines of treatment.

Cost-effectiveness tends to be sensitive to:

- Cost of drug administration,
- Drug dose intensity,
- Medical management costs,
- Discount rate for chronic diseases,
- Vial wastage,
- Mean progression free survival.

Cost-effectiveness is generally insensitive to:

- Costs of adverse events,
- Disutilities of adverse events,
- Cost of blood & biochemistry tests,
- Discount rates for acute diseases,
- Costs of death.