

Australian standard costs & consequences of four chemotherapy adverse events

chemotherapy adverse events

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Introduction and Aim

Adverse events are an important cost component of chemotherapy. However, they have typically been poorly modelled in economic evaluations. **This work aimed to develop rigorous models of the Australian costs of four common chemotherapy adverse events (AEs): diarrhoea, vomiting, anaemia and neutropenia.**

Methods

Decision analytic modelling was used to identify the costs and consequences of AEs. These models can stand alone or form decision tree sections to be incorporated into larger models of overall chemotherapy cost effectiveness.

Model structures incorporated AE treatment efficacy, and the impact of AEs on quality of life and chemotherapy dose. Literature reviews identified clinical inputs and costs of treatment came from standard Australian sources such as Pharmaceutical Benefits Schedule. Costs are in Australian dollars.

The models of diarrhoea and anaemia required case studies of AE incidence to run. 5FU/leukovorin chemotherapy was used for the diarrhoea model while rates from the Australian Cancer Anaemia Survey was used for the anaemia model.

Results

The base case average cost per patient receiving chemotherapy of diarrhoea ranged from \$19 (mild AE) to \$4,821 (severe AE); those for anaemia ranged from \$51 (mild AE) to \$17,100 (moderate AE) depending on the type of chemotherapy and anaemia treatment. Vomiting prevention base case costs ranged from \$0.84 (low risk chemotherapy) to \$157.55 (high risk chemotherapy requiring breakthrough and refractory management). Neutropenia base case costs ranged from \$2,235 (outpatient management) to \$12,054 (intensive care required). Where possible, the impact on quality of life and chemotherapy total dose was also modelled. Table 1 displays the summary results for each of the 5 models developed.

Figure 1. Modelling process

Define decision problem

- Clinical treatment pathways based on best practice guidelines

Define model boundaries

- Health-service perspective
- Cost per event
- Short time horizon

Structure the model

- Decision-tree structure
- AE specific models

Identify & synthesise evidence

- Literature reviews
- Top-down data inputs

Deal with uncertainty

- One-way sensitivity analysis

Conclusions

Estimates of AE costs vary widely in the literature, however our estimates appear consistent with studies of similar methodology.

The five models presented represent best-practice modelling techniques for chemotherapy AEs. Each has been designed to provide estimates of the Australian costs and consequences of AEs. In addition, these models can be incorporated into larger models of chemotherapy cost effectiveness. This allows model builders to incorporate rigorous, Australian-specific estimates of the costs and consequences of chemotherapy AEs into models of chemotherapy cost effectiveness, which in turn has the potential to improve policy decision making.

Table 1. Modelled standard costs and consequences of four chemotherapy adverse events

	Diarrhoea	Nausea (high risk chemo)	Anaemia (curative)	Anaemia (palliative)	Neutropenia
Cost	\$688	\$156	\$37	\$5393 to \$6838	\$4913
Sensitivity analysis - range	\$350 to \$1800	\$125 to \$185	\$26 to \$46	\$3250 to \$10,000	\$2500 to \$8000
Sensitivity analysis - driver(s)	Probability GIII/IV diarrhoea	Cost of aprepitant	Probability GII anaemia	Probability GII anaemia	Probability of treatment failure
Quality of life	-0.11	-0.12	-0.68	-0.64 to -0.58	-0.09
Dose modifications	Yes	Yes	No	No	No
Multiple events	Consecutive, not concurrent	Consecutive, not concurrent	Consecutive, not concurrent	Consecutive, not concurrent	Consecutive, not concurrent

Further information

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