Incorporating Health Economics into Grant Proposals

Health Economics Short Course

For more information and course dates, please visit our website: http://go.unimelb.edu.au/i8ba
Or email us: health-economics@unimelb.edu.au

Modelling
Extrapolation and Modelling Longer Term Outcomes and Costs

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Extrapolation - Outcomes

We need to work out the area between these curves.

Normally the primary outcome is compared at a particular point in time for significance.

But to find the benefit of an intervention versus standard practice we need to know the difference at all points in time.

Extrapolation - Costs

Costs are no different to outcomes – there may be large cost savings in the difference between treatment arms post follow-up.

So it could be important to extrapolate.

Our new treatment might be expensive in the short run but save resources in the long run.

But we don’t just want to know the benefit until the end of the follow-up but also the benefit of the intervention post follow-up.

The benefit post follow-up can be as big if not bigger than the within follow-up benefit.

End of follow-up

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

QALYs

Months

Standard practice  treatment

Standard practice (P)  treatment (P)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Cost per month $’s

Months

Standard practice  treatment

Standard practice (P)  treatment (P)
Intervention to reduce youth binge drinking?

- QALYs in the short-term often do not change much
- Most of the health gains are unlikely to be seen for many years
- So there is a need to estimate/predict them
- We need to make sure we have a way to change short-term changes in risk factors into long-term changes in health
- Often if we are improving long-term health this also means we are reducing long-term health expenditure (or at least delaying this expenditure) and so modelling the long-term cost implications of this is also important to determine the most approach treatment decision

Modelling

- Conceptually extrapolation into the future makes sense...
- ...similarly translating intermediate outcomes into final outcomes
- ...but how do we do it?
- Ideally we want to predict the differences between the new treatment and standard practice for both costs and outcomes until death (for a lifetime)

Modelling Outcomes

- Extrapolation
  - Parametric modelling of survival analysis
  - Regression modelling
  - ‘Big data’ predictive approaches
- Translate impact on intermediate outcomes into final outcomes using:
  - Estimates from the literature e.g. relative risks on morbidity (QALYs) and mortality
  - Information from other data sources e.g. registries or longitudinal studies
  - Microsimulation modelling – combine evidence from a range of sources to model life-course

Modelling Costs

- Often costs may be driven by health outcomes
  - once we have extrapolated outcomes we can link this to costs e.g. cost of a CVD event such as a stroke
- Observational data sets are also very useful to estimate the resource implications of particular health outcomes
  - predict the costs (healthcare utilisation) associated with different stages of COPD using routinely collected data sources
- Recruit an observational sample of those treated in the past (using standard practice) to better understand future cost (& health) implications of the disease
• Modelling into the unknown often means that there is considerable uncertainty (so we need to make sure we capture and present this)

• But not predicting into the future means that we have biased estimates and we are simply ignoring this uncertainty in terms of benefits & costs

• So when we are designing a study we need to think about data which are going to help us predict into the future