Online Advanced Methods for Cost-Effectiveness Analysis

Presentation 4: Populating Models: Costs and Outcomes
4.5: Costing Methods: Two Controversies

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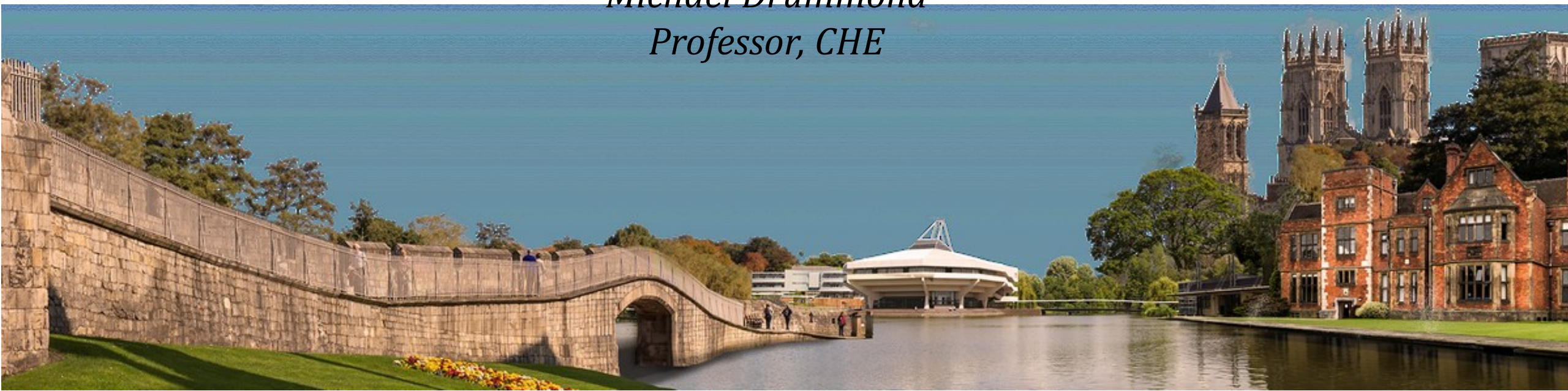


Objectives

- To discuss the role, relevance and measurement of productivity costs in economic evaluation
- To understand the arguments for and against including, for future years:
  - Related health care costs
  - Unrelated health care costs
- To determine how analysts should proceed, given these controversies

Methodological controversies in costing

- Two major controversies addressed here:
  - productivity costs
  - costs in added years of life
- Controversies relate both to *relevance* (i.e. should they be included in the evaluation) and to *measurement* (i.e. estimation of quantities and valuation)

Productivity costs

These arise from:

- short-term absence from work*
- long-term absence from work
- loss of productivity whilst at work
- premature death (during working age)

* We normally think of paid work, but in principle unpaid work could be considered also

Controversies with productivity costs (1)

- The extra-welfarist approach to economic evaluation predominates in healthcare
- Under this approach health outcomes are main focus, rather than broader effects on the economy
- However, changes in productivity can effect expenditure on health care, and therefore maybe relevant to the extra-welfarist approach
- Olsen and Richardson (*Social Science and Medicine* 1999) argue that part of the value of productivity effects may be included to the extent that it results in increased resources available for health care

Controversies with productivity costs (2)

- Valuing changes in productivity is generally based on individuals' wage rates
- This may result in services which benefit the more highly paid being favoured
- Considering productivity gains *net* of consumption raises ethical issues (i.e. it would imply that priority be given to services for those who produce more than they consume!)
- However, one person's consumption is another person's job!

Policy relevance of productivity changes: Summary

- As a result of treatment, the patient or a member of their family may be able to return to work, or be more productive at work
- If the person is in paid work, a proportion (*x*) of their earned income will be used to finance their own consumption activities. (The impact of this may or may not be captured in the QALYs gained.)
- In addition, the remainder (1-*x*) will benefit other individuals in society, through taxation and redistribution
- If a health programme delivering more productivity benefits costs more than the alternative, the impacts on health and productivity of the displaced treatments would also need to be considered
- Whether or not we consider productivity changes to be relevant depends on whether we feel healthcare expenditure is to maximise health gain, or welfare more generally

Systematic approaches to measurement

- Measurement typically *ad hoc:*

  e.g. how many days have you taken away from paid work in the last six weeks?

- Often part of questionnaires relying on patient recall

- Standardised questionnaires are now available*:
  - Work Productivity and Activity Impairment (Reilly *et al*, 1994)
  - Health and Labour Questionnaire (van Roijen *et al*, 1996)

- Issue of whether lost time is compensated for, by colleagues or when the individual returns to work

* The EU Horizon 2020 project PECUNIA, has undertaken a systematic review and classification of the available questionnaires, and produced a costing template.

Hakkaart-van Roijen L, Hubens K, Sajjad, A on behalf of the PECUNIA Group (2019): Standardised costing template for selected costing approaches: production loss of paid and unpaid work. Deliverable D3.4: PECUNIA project. Erasmus University Rotterdam, Netherlands. DOI: 10.5281/zenodo.4455444

Productivity losses due to presenteeism

- Most of the current measurement approaches do not address the potential productivity losses due to presenteeism
- The sick worker may be at work, but not able to perform their duties at the normal level
- Potentially, the performance of *other* workers could be affected
- An even tougher sell with payers than losses due to absenteeism!
- Useful references:

  - Pauly MV *et al. Health Economics* 2008; 17: 469-85
  - Schultz AB *et al. PharmacoEconomics* 2009; 27: 365-78
  - Despiégel N *et al. Value in Health* 2012; 15(8): 1148-61

Alternative valuation methods for productivity costs

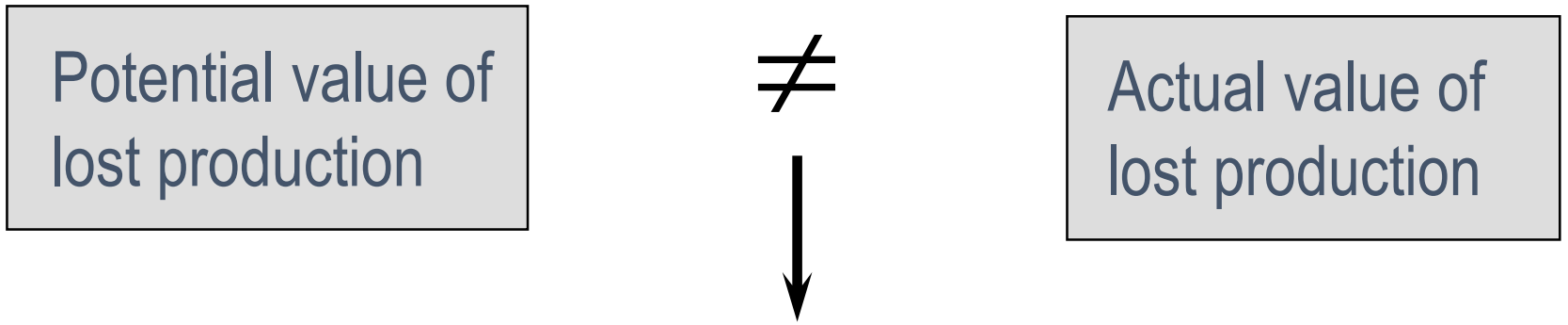
- Human capital
- Friction cost
- US Panel approach

Human capital method

- Valuation is based on gross wages
- Assumes all the worker's productivity is lost when they are absent
- Double counting issues:
  - if using to value life years lost through premature death, these are already reflected in the life-years or QALYs
  - lost leisure time may be reflected in the QALY
  - the valuation of lost working time may be reflected in the QALY

Friction-cost approach

(Koopmanschap *et al*, *Journal of Health Economics* 1995)



- Pool of involuntary unemployment
- Replacement of sick person
- Production losses during friction (replacement) period only
- Costs of recruitment and re-training

Human capital versus friction costs: The Netherlands (1988, billions of gilders)

Cost category	Human capital	Friction costs
Absence from work	23.8	9.2
Disability	49.1	0.15
Mortality	8.0	0.15
Total	89.0	9.5
% of net national income	18%	2.1%

Source: Koopmanschap *et al*. *Journal of Health Economics* 1995; 14: 171-89

Systematic review of friction cost estimates

- 46 studies located, from 12 countries
- 28 studies were from the Netherlands, which suggests this approach in its national guidelines
- 35 studies reported the length of the friction period used
- The friction cost methods used to estimate productivity costs varied in quality

Source: Kigozi J *et al. Eur. J Health Economics* 2016, 17: 31-44

(First) US panel approach

- Valuing mortality in monetary terms is double-counting if using life-years or QALYs
- The effect of morbidity on production could and should be valued in the QALY

Source: Gold *et al. Cost-Effectiveness Analysis in Health and Medicine*. New York: OUP, 1996

Income losses and quality of life measurement

- In general, the empirical evidence is very poor
- Tilling *et al (Value in Health* 2010; 13: 298-305) argue that avoiding mentioning income effects in health state valuations may induce a minority of respondents to include them, but the impact on results is minor
- Brouwer *et al (PharmacoEconomics* 2005; 23: 209-18) argue that worse health states may be associated with lower productivity

Do productivity costs matter?

- Krol *et al* (*PharmacoEconomics* 2011; 29: 601-19) reviewed 81 unique studies of treatments for adults with depressive disorders
- Approximately 69% ignored productivity costs, often to comply with national guidelines
- In those studies including productivity costs, these reflected an average of 60% of total costs per treatment arm
- Inclusion or exclusion of productivity costs had a substantial impact on incremental costs

Productivity costs in economic evaluations of expensive drugs

- Systematic review identified 249 economic evaluations of 33 drugs on the Dutch Expensive Hospital Drug List
- Only 22 studies included productivity costs related to paid work
- One study included unpaid productivity
- Exclusion of productivity costs could not be explained by study population age or health status
- National guidelines appeared to be influential

Source: Krol *et al. Eur J Health Economics* 2016; 17: 391-402

(Second) US panel on cost-effectiveness in health and medicine

- Acknowledged that there is little evidence that productivity gains are included in individuals' assessments of quality of life
- Recommended that these should be included the estimate of costs in the numerator, recognising that this might lead to some double-counting

Source: Sanders GD *et al. JAMA* 2016; 316(10): 1093-1103

So what should we do?

- Take into account any local methods guidelines for conducting economic evaluations
- Present productivity costs separately, in either the main analysis or a sensitivity analysis
- Use QALY estimates that are purged of income effects, or at least acknowledge the possibility of double-counting
- Be cautious about valuations using the human capital approach – consider using the friction cost approach or an average value for earnings

Costs in added years of life

- Meltzer (1997) developed a theoretical argument in favour of including costs in added years of life
- He considered all costs (including the difference between consumption and production)
- In health care the debate often focuses on *health care* costs in added years of life

Source: Meltzer D. *J. Health Econ*. 1997; 16: 33-64

Costs in added years of life

- Including *health care* costs in added years of life is bad news for prevention
- Including the difference between consumption and production improves the cost-effectiveness of life-saving programmes among younger individuals (Johannesson *et al*, *Medical Decision Making* 1997).

Categories of costs in added years of life

- Related healthcare costs (i.e. linked to the disease of interest or its treatment)
- Unrelated healthcare costs (i.e. costs of other diseases the person might have in the added years)
- Related non-healthcare costs (i.e. impacts on other production and consumption)
- Unrelated non-healthcare costs

Related healthcare costs

- Widespread agreement that these should be included
- The time horizon for the evaluation should be long enough to capture all relevant costs and cost-offsets
- But……!

Cellulose versus synthetic dialysers

- Synthetic dialysers were associated with a small additional cost and led to a gain in QALYs, mainly through extending survival ($5036 per QALY gained)
- However, including the additional dialysis during the extra survival increased the ICER to $83,501
- This is because the decision to provide dialysis in the first place was possibly marginally cost-effective
- Therefore, unless one were prepared to re-visit the earlier decision to provide dialysis it makes sense to implement a cost-effective improvement in therapy

Source: Manns *et al. Health Economics* 2003; 12: 949-58

Unrelated healthcare costs

- A majority of health economists feel these should be included in evaluations having a generic outcome measure (e.g. life-years gained, QALYs)
- The notion is that if evaluations assess the long term benefits, which include the effects of subsequent interventions, for balance they should also include the costs of those interventions
- Some argue against:
  - in principle (these costs relate to other decisions, which the current decision-maker cannot commit society to)
  - in practice (it could be hard to separate these costs out from related costs in routinely available data)

For a good discussion of the issues see Morton A *et al, Health Economics* 2016; 25: 933-938

Related and unrelated non-healthcare costs

- Arguments for and against inclusion mirror those for productivity costs (especially the equity arguments)
- In particular, the Olsen and Richardsen (1999) argument is relevant (i.e. be concerned about society's ability to pay for future healthcare)

Does inclusion of future costs make a difference?

- Kruse *et al* (*Eur. J. Health Economics* 2012; 13: 63-70) assessed the impact on the ICER of including the impact on production and consumption following a health care intervention that improves survival
- Net consumption varies greatly by age
- Omitting future costs may bias the ranking of interventions in favour of those aimed at older age groups

Second US panel on cost-effectiveness in health and medicine

- Health costs and benefits in the future should be included, regardless of whether they are related to the intervention of interest or not
- Proposed an ‘impact inventory’ which analysts should use to show which components of cost and benefit are included in their study

Source: Sanders GD *et al. JAMA* 2016; 316(10): 1093-1103

So what should we do?

- Take into account any local methods guidelines for conducting economic evaluations
- Include related health care costs
- Estimate unrelated healthcare costs in a sensitivity analysis
- Be cautious about the inclusion of non-healthcare costs, especially impacts on production and consumption

Summary

- In general, follow the local methodological guidelines in the setting where you are conducting your costing study

- Perform sensitivity analyses to deal with the controversial items

Further reading

- Neumann P et al. Cost-effectiveness in health and medicine. Oxford University Press, 2016
  - Chapter 3 Recommendations on perspective for the reference case
  - Chapter 8 Estimating costs and valuations of non-health benefits in cost-effectiveness analysis