Rationalization of Innovation: The role of health-economic evaluation in improving the efficiency of mental health care

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Summary & General Discussion

Rationalization of Innovation: summary and general discussion

The previous chapters in this thesis covered 1) the need for a cost-effective mental health care system, 2) established methods for assessing cost-effectiveness, and 3) new approaches to improving cost-effectiveness. This summary returns to these topics.

The need for a cost-effective mental health care system

The need for a cost-effective mental health care system is driven by a large disease burden on the one hand and scarce resources on the other. Mental disorders have a prominent position on the global ranking of (non-fatal) disease burden (Vos et al 2012). In addition, health care only manages to partially reduce the disease burden due to mental disorders at population level (Andrews et al 2004; Chisholm et al 2004a). At the same time, available resources in the form of health care budgets and human resources are under pressure. Health care expenditure as a percentage of GDP has been steadily increasing over the last decade (OECD Stats) and demographic developments such as aging populations are expected to lower the number of people in the working population relative to the number of older people (United Nations 2013), who are generally associated with on average higher health care demand (Wong et al 2012). These developments emphasize the need for more cost-effective ways to alleviate disease burden under resource constraints, even more so when taking developments like the economic downturn into account.

Improving cost-effectiveness generally starts with acknowledging the disease burden and the economic consequences of disorders. Both individual as well as population disease burden are important for deciding where health care budgets should be directed. From a health economic perspective, it is important to understand that highly prevalent disorders such as social phobia could put just as much pressure on population health as individually highly disabling but less prevalent disorders such as schizophrenia, as a modest disease burden on individual level combined with high prevalence and a long duration could amount to a larger population disease burden than a more severe individual disease burden applying to a smaller group of people would.

Chapter 1

A typical starting point for health care innovation is therefore to describe both the individual and population level disease burden. Chapter 1 describes the non-fatal disease burden due to mental disorders in the Netherlands, at both the individual and population level. It is shown that from a population level, it is not the individually disabling disorders such as bipolar disorder or schizophrenia that drive disease burden, but simple phobia, social phobia and dysthymia which are all characterised by individual disease burden combined with a high prevalence and long disease duration.

Established methods for assessing cost-effectiveness

There are various methods for economic evaluation that are commonly used to evaluate the (relative) cost-effectiveness of interventions with respect to a comparator condition. Broadly these methods can be categorized in trial-based economic evaluation and economic evaluation using decision analytic modelling, see Drummond et al. (2005) and Briggs et al. (2006) for more detail. These methods are commonly used methods today, and their application is presented in chapters 2 – 4.

Chapter 2

Chapter 2 presents a cost-effectiveness analysis of a trial with four arms concerning the treatment of patients with (symptoms of) depression and/or anxiety. The trial investigates the effectiveness of an online intervention with varying degrees of therapeutic support in reducing symptoms of anxiety and depression. Data on costs and effectiveness were gathered over a period of 12-months. By performing a multi-arm bootstrapping method, we found that the intervention condition with no support has a high probability of having a more favourable cost-utility ratio than the active control condition of non-specific chat or email support. Although high dropout rates make our conclusions only tentative, it is hopeful that higher levels of support do not necessarily seem to lead to the most favourable outcomes, as availability of human resources in health care can be expected to become an increasingly important constraint in the future.

Chapter 3

Chapter 3 presents a decision analytic model that assesses the population-level effect of adding online interventions onto a health care system for alcohol use disorders. For this purpose, the health care system for alcohol disorders in the Netherlands was modelled for the target groups defined in terms of abstinence, moderate drinking, heavy drinking, hazardous use, harmful drinking and alcohol dependence, following

the terminology introduced by the World Health Organization (1994). The health economic modelling shows that care as usual is associated with a benefit-to-cost ratio of €1.08, which can be improved by adding online interventions yielding a health care system with an overall benefit-to-cost ratio of €1.62. Results relate to the short-term of one year and assume a steady state after full implementation of the alternative health care system (i.e. with e-health interventions added). This explicitly disregards implementation costs (i.e. training health care professionals) as well as the time required to move the health care system from the old to the new equilibrium.

Chapter 4

Improvements in terms of cost-effectiveness often require additional health care budget, as new interventions are added to the current intervention mix. Chapter 4 investigates how health care substitution can compensate for steadily increasing health care expenditure due to adding new interventions to the current package of interventions. In this chapter we look at the amount in which coverage rates of existing interventions need to decrease in order to improve health effects without increasing the budgetary ceiling.

To that end, we used Markov modelling to assess the impact on cost-effectiveness when adding preventive telemedicine to the health care system for major depression in the Netherlands. The Markov model investigates the longer-term (five-year) impact in terms of costs and health effects. To this end, the epidemiology of major depression in the Netherlands was modelled, taking into account yearly incidence and prevalence rates while distinguishing between subclinical, mild, moderate, severe and chronic depression. The current mix of interventions, where all interventions are aimed at treatment, is associated with a benefit-to-cost ratio of €1.30, meaning that every euro invested is expected to generate €1.30 in terms of health benefits. Interventions aimed at prevention are associated with a more profitable benefit-to-cost ratio of €1.60 and are therefore considered more cost-effective than the current intervention mix. When adding realistic levels of preventive interventions to the current intervention mix with, the overall benefit-to-cost ratio increases from €1.30 to €1.32 over a five-year period. The results do not take implementation costs into account.

Adding prevention increases the overall required health care budget with 7%. This increase is relatively low as successful prevention saves treatment costs at a later stage. When downscaling the interventions aimed at treatment in order to arrive at a budget-neutral scenario, overall budget does not change, while offering relatively more cost-effective interventions (prevention) results in more health effects.

This again increases the benefit-to-cost ratio from €1.30 to €1.32, but this time with no change in overall budget. As budgets are not easily increased in times of economic downturn, it is important to explore different approaches to improve the cost-effectiveness of mental health care.

After five years of prevention, a new equilibrium of patients needing treatment is not yet achieved. Prevention decreases the amount in which treatment is needed, so as long as a new epidemiological equilibrium is not achieved, each additional year of prevention will be associated with an overall more favourable benefit-to-cost ratio.

It is worth mentioning that for this thesis the Markov model presented in chapter 4 was updated with respect to the model presented in the publication of Lokkerbol et al. (2014a) in terms of the underlying epidemiology, which is now based on Nemesis-2 which employed the CIDI/DSM-IV (de Graaf et al 2012b) and no longer on Nemesis-1 which was based on CIDI/DSM-III-R. The new version of DepMod is also updated with respect to the evidence-base regarding prevention (van Zoonen et al 2014). The conclusions, however, are similar: prevention is cost-effective.

New approaches to improving cost-effectiveness

Health economic modelling is an evolving field. As our understanding of health economic modelling increases, it becomes possible to pursue different routes to innovation. Chapters 5 and 6 present two new approaches to improving the cost-effectiveness of the health care system, that is, approaches that are different from adding new, presumably more cost-effective interventions to the health care system, but for example incorporate mixtures of investing and disinvesting in competing interventions for the same diagnostic target group. Furthermore, these approaches differentiate themselves from commonly used approaches in the sense that they do not investigate one specific, new intervention. Rather, they investigate the range of existing health care interventions in order to provide a list of options to improve the health care system overall. These approaches are therefore best seen as algorithms that systematically scan the current health care system in order to identify options to improve cost-effectiveness. The list of options is meant to provide policy-makers with input regarding system innovation, which can be assessed from normative perspectives other than cost-effectiveness, such as equity, acceptability, appropriateness, feasibility and strength of evidence.

Chapter 5

Chapter 5 investigates the potential for improvement of mental health services in the primary care setting in the Netherlands by systematically scanning the impact on the health care system of local improvements in either coverage, adherence, effectiveness or costs of each target group – intervention combination. Each of these parameters plays a role in the cost-effectiveness of the overall health care system. Scanning the target group – intervention – parameter combinations for their ability to leverage the overall cost-effectiveness of the health care system enables innovation to be geared towards those areas where it is expected to have the largest impact. As the potential of an intervention to improve the cost-effectiveness of the health care system is largely determined by the absolute size of the target group it serves, the list of interventions with the most improvement potential when improving coverage, adherence, effectiveness or cost is mostly dominated by highly prevalent interventions, such as pharmaceutical interventions.

Increasing the coverage rates of interventions in order to improve the cost-effectiveness of the health care system can be considered reaping the benefits of already cost-effective interventions. Increasing the adherence or the effectiveness of interventions, or decreasing the intervention's costs can be considered favourable investment strategies meant to unlock the potential for improvement in these areas. As the proposed improvements are mostly conjectural, critically examining these improvements from a broader perspective is again necessary.

Chapter 6

Chapter 6 takes a health care substitution approach to improving the cost-effectiveness of a health care system by analysing the impact of investing in relatively cost-effective interventions while simultaneously disinvesting in relatively cost-ineffective interventions. An algorithm is developed that systematically scans the potential of each intervention pair to constitute a health care system that generates at least as much health effects under equal or less budget (a dominant health care configuration), by investing in one intervention and simultaneously disinvesting in the other. It is shown that in general there are as many possibilities to create a dominant health care configuration, as there are different intervention pairs in a health care system. As the number of possible intervention pairs increases substantially when the number of interventions increases, this algorithm can provide policymakers with a long list of options for improvement that do not require investment in new interventions.

The algorithm is applied to major depression in the Netherlands, using the same health economic (Markov) model as in chapter 4. It is shown that there are 11 different intervention pairs with the potential to create a more efficient health care system. The algorithm is not restricted to specific (e.g. Markov) models or the mental health care setting per se, but is a generally applicable tool. As outcomes do not involve an increase in budget but do involve disinvesting, this approach could shift the political discussions from financial to feasibility and ethics.

Broader perspectives

For the economic evaluations presented in this thesis, and for economic evaluations in general, it often holds that proposed innovations are expected to lead to a more cost-effective health care system. Of course, these innovations should not be implemented straight away, as health economic modelling can never be seen as an autopilot for innovation. The economic evaluations in chapters 2 – 6 approach the health care system from a cost-effectiveness point of view. Whether proposed changes are desirable from a societal perspective depends on other factors as well. Therefore, a second-stage filtering process should follow the results of health economic modelling, where preferably criteria such as equity, appropriateness, acceptability, feasibility and strength of evidence should be taken into account. This normative second-stage filtering process is desirable for most health economic evaluations, but is even more needed for the algorithms discussed in chapters 5 and 6, where many possible improvements are listed requiring second-stage filtering. In order to increase alignment with criteria other than cost-effectiveness, the process of health economic modelling is preferably guided by input from the clinical, patient and policy perspective. The development of multidisciplinary clinical guidelines, where clinicians and patients can actively participate in the development of the (conceptual) framework of the health economic model, is a good example of this.