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## Supporting effective and efficient policies: the role of economic analysis

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## *chapter* two

# **Supporting effective and efficient policies: the role of economic analysis**

*David McDaid, Franco Sassi  
and Sherry Merkur*

Chapter 1 has set out the scope, conceptual framework and structure of this book. This chapter and the next provide a detailed overview of how economic approaches are used for the evaluation of policy interventions in the areas of health promotion and disease prevention. Here, in Chapter 2, we provide an introduction to how economic analyses can be used as a tool to help inform decision-making processes on different potential investment choices for the promotion of better population health and well-being. Chapter 3 then goes on to look in detail at how outcomes and costs are assessed in economic evaluation. Both of these chapters are intended to provide readers with an understanding of the role of economic tools to help interpret the evidence reviewed in the rest of the book, and also to offer guidance to those who intend to contribute to the economic evidence base on health promotion and chronic disease prevention.

Chapter 1 highlighted the considerable challenges that policymakers face in promoting and protecting health around the globe. New estimates of the global burden of disease for noncommunicable diseases, including heart disease and stroke, diabetes, cancer, chronic lung diseases, low back pain and poor mental health, indicate that they account for more than 80 per cent of the burden of disease in Europe (Institute of Health Metrics 2013). Moreover, while average life expectancy at birth has been increasing, reaching 76.7 years in 2011, there are substantial disparities across countries. In 2011, life expectancy in the 15 countries that were European Union (EU) members before May 2004 was 81.3 versus 76.0 in the 13 countries joining the EU since 2004, and just 69.8 for countries in the Commonwealth of Independent States (WHO Regional Office for Europe 2014).

The importance of addressing these challenges is recognized in the new health policy framework and strategy of the WHO European Region, *Health 2020* (WHO Regional Office for Europe 2013). This is focused on improving the health and well-being of populations, reducing health inequalities, strengthening public health and ensuring the sustainability of health systems. This builds on

an ever mounting body of literature emphasizing the importance of tackling the social determinants of health over which individuals may have little or no control (Commission on Social Determinants of Health 2008; Braveman et al. 2011). It takes a whole-of-government and whole-of-society perspective, emphasizing the importance of actions which go well beyond the traditional boundaries of the health sector and ministries of health.

Chapter 1 has also set out the economic rationale for investing in health promotion and disease prevention; a lack of intervention by government is likely to lead to a sub-optimal allocation of resources to these activities. It may also serve to widen inequalities in health. The challenge then is to determine just how to intervene, with the core question for policymakers in Europe and elsewhere being the extent to which investments in both upstream interventions that target the circumstances that produce adverse health behaviours, and downstream actions that aim to change adverse behaviours, represent a good use of the limited resources at our disposal.

From an economic perspective, how do different interventions stack up when compared with each other or against investment in the treatment of health problems? For example, are there potential gains to be made by reducing or delaying the need for the consumption of future health care resources? Are they more cost-effective for some population groups than others and, if so, will this widen inequalities in health? Might they limit some of the wider costs of poor health to society, such as absenteeism from work, poorer levels of educational attainment, higher rates of violence and crime and early retirement from the labour force due to sickness and disability?

To answer these questions, information is needed on both the effectiveness and cost-effectiveness of different actions in different contexts, taking into account some of the challenges associated with effective implementation. Economic analysis can help address many of these questions and as we shall go on to indicate it is now being increasingly used to look at the case for health promotion and disease prevention.

## **Resource scarcity and the role of economic analysis**

If resources were limitless it would be relatively straightforward to argue for investment in disease prevention and health promotion actions of proven effectiveness. Resources are, however, scarce and careful choices have to be made. These decisions may be even more important in any downward phase in an economic cycle in countries, where public finances including health, social care and education budgets are under even greater pressure. Evidence on effectiveness alone is insufficient for decision-making; in addition to knowing what works and in what context, information on the economic impacts of these choices is required. Such economic evidence is increasingly a formal element of decision-making processes, and can be compelling in putting forward a case for policy change.

There are at least four key economic questions that can be helpful to decision-makers in the difficult task of allocating resources (Knapp and McDaid 2009) (see Box 2.1). In this chapter we will focus in particular on the third question, that

**Box 2.1** Economic questions to inform policymaking and practice

*The costs of inaction:* What are the economic consequences of not taking action to promote and protect the health of the population?

*The costs of action:* What would it cost to intervene by providing a promotion or preventive measure?

*The cost-effectiveness of action:* What is the balance between what it costs to intervene and what would be achieved in terms of better outcomes – e.g. emotional well-being, physical health, improved quality of life, educational performance?

*The levers for change:* What economic incentives can encourage more use of those interventions that are thought to be cost-effective and less use of those interventions which are not?

of classical economic evaluation – that is, establishing the cost-effectiveness of alternative policy options for health promotion and disease prevention. We now will briefly look at these four questions, then describe different approaches to economic evaluation, including how economic modelling tools can be used. We will then look at how the economic evidence base on health promotion and disease prevention has evolved.

***The cost of not taking action***

Economic methods can be used to assess the costs of *not taking action*. In the case of health promotion and disease prevention, this would include not only quantifying the resources needs and costs of delivering health and other services to treat what would have been preventable health problems, but also quantifying the broader impacts of risky behaviours and poor health. In the case of alcohol-related harm, for instance, this would include costs to the criminal justice system of alcohol-related crimes and the costs of alcohol-related road traffic accidents and workplace injuries (Anderson et al. 2013). At an even broader level this could also include estimating the costs of stigma and discrimination associated with some avoidable health problems such as HIV/AIDS (Brent 2013) or behavioural problems in children (Scott et al. 2001; Colman et al. 2009; McDaid et al. 2014).

***Estimating the costs of intervention***

A second question that economics can address is to determine the costs of intervention. This can include all the initial implementation costs associated with putting in place the necessary infrastructure for a health promotion programme, as well as the ongoing maintenance costs for that programme. This can go beyond costs to government or other programme funders; there may be further costs to society as a whole, for instance out-of-pocket costs that must be incurred

by members of the population if they wish to make use of a health promotion programme or activity. One example of this, for instance, is the cost to families of purchasing bicycle helmets following the introduction of legislation on their mandatory use (Taylor and Scuffham 2002; Hendrie et al. 2004).

### ***Informing the allocation of resources***

Answering these first two questions provides valuable information to decision-makers, but it does not provide guidance on how best to allocate resources to promote and protect health. This is something that can be addressed by the third question which implies the use of economic evaluation techniques. Widely used in the health care, environmental and transport sectors, economic evaluation can be considered ‘the comparative analysis of alternative course of action in terms of both their costs and consequences’ (Drummond et al. 2005). It acknowledges that scarcity is an endemic feature of all societies and implies that investment in one specific public project will mean a lost opportunity to use these resources for another purpose. Even in the absence of long-term effectiveness data, as we shall discuss later, economic evaluation can use modelling techniques to assess the long-term costs and effects and/or identify the level of effectiveness a strategy would have to achieve to be considered cost-effective.

Economic evaluation techniques compare incremental changes in costs with incremental changes in outcomes for two or more policy options. If, using economic evaluation techniques, a new intervention is both less costly and more effective than the existing situation, then the decision is usually straightforward – invest in the new intervention. If it has poorer outcomes and costs more, it will also be rejected. But if an intervention is both more effective and more costly (or in theory less effective and less costly), then policymakers must make a value judgement as to whether it is worthwhile.

Care has to be taken in interpreting the results of economic evaluation. The resources and infrastructure available will influence that what may be deemed cost-effective in Ireland or France may not be in Tajikistan or Georgia. Something that is cost-effective when only looking at the impact to the health system may appear cost-ineffective when costs to the economy as a whole are considered. Furthermore, an intervention that does not appear cost-effective over a 12-month period may appear highly cost-effective if a longer time horizon is considered. Guidelines on the ways in which economic studies should be reported have been published (Husereau et al. 2013) and there are some databases, most notably, the NHS Economic Evaluation Database at the University of York, that provides independent critical appraisals of the quality of these studies.<sup>1</sup>

For all of these reasons the results of economic evaluations should not be used in isolation, and other factors will need to be taken into consideration as part of any decision-making process. Investment in the most cost-effective intervention might conflict with other policy goals, such as reducing inequality in health or non-health outcomes between social groups. Other economic inputs taken into deliberation may include the budgetary impact of implementing an intervention, the need to address any inequalities in outcomes between population sub-groups, issues of fairness in access to services and support,

and the economic impacts on the wider local economy of a population health measure, such as banning smoking in pubs and restaurants and local political concerns.

### ***Using economic incentives to influence behaviour***

The fourth question in Box 2.1 is concerned with how different economic incentives can be used as levers to encourage more use of those interventions that are demonstrated to be cost-effective, and less use of those interventions which are not. This might, for instance, involve looking at how the level of flexibility in the ways in which budgets are allocated influences the development of partnerships to deliver health promotion services across sectors (Johansson and Tillgren 2011; McDaid 2012). This is an issue that is discussed in detail in Chapter 14. It might also look at how different payment mechanisms and financial incentives in service contracts can influence the success of health promotion and disease prevention activities. The role of financial and other incentives to encourage a target population group to participate and/or sustain health promoting activities is another area of research that may be examined (Thomson et al. 2012). This fourth question also covers the long history of research looking at the links between taxation policy within one country or even across international boundaries and risky behaviours (Johansson et al. 2009; Doran et al. 2013; Johansson et al. 2014). In recent years, there has also been a growing interest in looking at how tools from behavioural science can be used to influence individual behaviours; one example of this is work looking at whether commitment contracts which financially reward individuals for achieving a health behaviour goal, such as losing weight or quitting smoking, really do lead to long-term sustained change (John et al. 2011; Relton et al. 2011; Allan et al. 2012; Loewenstein et al. 2012; White et al. 2013).

### **Approaches to economic evaluation**

Having briefly looked at each of the four questions in Box 2.1, we now focus on approaches to economic evaluation. A number of authors have looked at the strengths and weaknesses of different economic evaluation methods for health promotion and disease (Kelly et al. 2005; Cookson et al. 2009; McDaid and Needle 2009; Weatherly et al. 2009; Lorgelly et al. 2010; Marsh et al. 2012; McDaid and Suhrcke 2012). Chapter 3 discusses these issues in detail. Here we briefly introduce the main types of economic evaluation. They have much in common – for instance, they share a common approach to the conceptualization, definition and measurement of costs, but there are important differences in how they define and assess outcomes, primarily because they seek to answer slightly different questions.

If the question to be addressed by an economic evaluation is essentially about improving some specific aspect of health, information will be needed on the comparative costs of the different health promotion actions available (and also on the cost of a no-action option). The comparative outcomes may be

measured using some specific measure of health status. This would be known as cost-effectiveness analysis. While it is easy to understand it can be of limited use as the outcome measures used would vary from study to study, meaning that little could be said at a macro level about how best to use resources in a health promotion budget.

An alternative approach would be to measure all health-related outcomes using a common metric such as the quality-adjusted life-year (QALY) (see Chapter 3 for more on this). This approach is known as cost-utility analysis. Using a common metric, health system decision-makers can compare cost per QALY gained for very different health promotion and health care interventions. They can then take this information into account when making decisions on how to allocate their budgets.

However, throughout this volume many of the interventions that are described are likely to be delivered outside of the health system, for instance by ministries responsible for food standards, transport or education. In these cases, using even broader measures of impact that are relevant across all of these public policy areas can be helpful. The usual approach for such a broad impact measure is to value all outcomes in terms of money, leading to a form of evaluation called cost-benefit analysis.

These choices on economic evaluation technique do not have to be mutually exclusive: a single study can support more than one approach if the right combination of evaluative tools is used. However, guidelines from health technology assessment bodies tend to recommend the use of cost-utility analysis. In England, public health guidance developed by the National Institute for Health and Care Excellence (NICE) allows the use of cost-consequences analysis as an addendum to cost-utility analysis (Kelly et al. 2010). This approach can present cost per change in a range of natural health and non-health outcomes, such as heart attacks avoided or a reduction in crime rates. It is then up to policymakers to assess which outcome (if any) may be most important. Public health guidance from NICE also enables a broader perspective on costs than the conventional consideration of costs to the health and social care system seen in many health technology assessment systems elsewhere. It can, for instance, also examine the effects of workplace health promotion programmes on the costs to business of absenteeism and reduced productivity levels.

Cost-benefit analysis is widely used in the assessment of the economic case for health promoting actions in the fields of transportation and the environment, but is unusual in the health sector. The challenges of eliciting accurate monetary values for outcomes and negative public perceptions of valuing health in monetary terms, as illustrated in Chapter 3, may have limited the use and acceptability of cost-benefit analysis in the health sector (Rush et al. 2004; Kelly et al. 2005; McDaid and Needle 2009).

## **How can economic modelling help?**

Economic modelling techniques are widely used in making the case for health promotion and disease prevention interventions. There are many different reasons for making use of economic models (Box 2.2). Paramount is the need



to reduce any uncertainty about the strength of evidence on the effectiveness and costs of different interventions. Such uncertainty increases the likelihood of making a sub-optimal policy decision. One key cause of uncertainty is that many of the impacts of health promoting actions go well beyond the time frame covered by conventional evaluative studies. Modelling is often the only way of estimating the impacts of an intervention over the long term. For instance, many of the health-related benefits of avoiding the onset of obesity will not be manifest for several decades (Sassi 2010).

As subsequent chapters in this volume will show, economic models are very widely used to estimate benefits over many decades for disease prevention and health promotion (e.g. Wang et al. 2002; Wang et al. 2003; Chisholm et al. 2004; Cobiac et al. 2009; Cecchini et al. 2010; Cobiac et al. 2010). Most trials or longitudinal studies only follow up participants for no more than a few years at best (Hodgson et al. 2007). Readers should also be aware that judging the success of investing in a health promotion programme based solely on the outcomes, say of a 12-month controlled study, may be misleading and very different from a study with the same programme evaluated over much a longer follow-up period (Haji Ali Afzali et al. 2012).

Models can extrapolate information from trials and literature to provide estimates of longer-term cost-effectiveness. They can make different assumptions, for instance on the persistence of effectiveness of any intervention, as well as the need for ongoing or booster sessions. These longer-term models can also be designed to take account of the risk of future negative events and patterns of disease progression. For instance, in the case of chronic mental disorders this may involve looking at the risk of a relapse or how past suicidal behaviour impacts on the risk of further suicidal events (McDaid 2014).

Models are also used to look at the impacts of adapting the evidence on effective interventions to different contexts and settings. Economic models are always prepared to inform deliberations at NICE, in England, on public health guidance (Kelly et al. 2010). These models often take effectiveness and resource use data reported in non-United Kingdom settings and adapt this to a United Kingdom context. Models might also be used to look at the minimum level of engagement and continued use of an intervention that would be needed for one to be considered cost-effective in everyday conditions.

**Box 2.2** The role of economic modelling for health promotion and disease prevention

- Addressing uncertainty in the results of any one trial.
- Synthesizing data from multiple trials and effectiveness studies on different costs and effects of interventions, often using different head-to-head comparators rather than relying on findings from one study alone.
- Modelling the costs and effectiveness of different interventions for longer time periods than seen in most evaluative studies.
- Modelling potential intervention pathways, and their effectiveness and costs in contexts and settings where local empirical evidence is unavailable.



- Modelling the costs and effectiveness of interventions for specific sub-population groups.
- Modelling the cost-effective implications of differing rates of coverage, uptake and continued engagement with different interventions.

A discussion of the strengths and weakness of different modelling approaches goes beyond the scope of this chapter, but this has been widely discussed in the literature (Barton et al. 2004; McDaid 2014), including in the context of health promoting interventions (Barton et al. 2011). Different modelling approaches involve different levels of complexity and time to develop. Some models can be constructed relatively quickly and do not require investment in expensive computing equipment. At the other end of the spectrum there are complex macro-simulation models that have been used to model some packages of preventive interventions, e.g. for obesity, diet and physical activities (Cecchini et al. 2010). These complex models, while in theory being more precise, can take a team of researchers many months to build. They can also require a large amount of computational power using mainframe computers – something which may not be available.

### **Growth in the use of economic evaluation to assess health promotion and disease prevention interventions**

Many European countries have formally made use of economic evidence when considering whether to reimburse new *health care* interventions and procedures for some years (McDaid and Cookson 2003). Historically, less attention has focused on the strength of the evidence for most health promotion and disease prevention strategies. Although many complex health promotion and public health interventions do not lend themselves easily to evaluation through randomized controlled trials, the real challenge may not lie in scepticism over methodologies of evaluation, but rather in the very limited levels of resources available for evaluating many public health and health promoting interventions that do not have an obvious commercial appeal. This is particularly the case for those interventions focused on the social determinants of health that play a major role in influencing population health.

Without solid evidence on effectiveness it is nigh on impossible to determine the cost-effectiveness of any action. With little private sector motivation to invest in public health, research is largely reliant on funding from government and charitable foundations. Budgets for public health research are often modest, and until recently there appear to have been few incentives to undertake economic evaluations of public health and health promoting interventions (Hale 2000; Godfrey 2001; Holland 2004; Kelly et al. 2005; McDaid and Needle 2009).

Therefore health technology assessment agencies and other comparable organizations have focused on the case for reimbursing what are often expensive new pharmaceuticals and technologies. Early assessments of the economic case for preventive actions focused on technologies that may have been more straightforward to evaluate, such as screening and vaccination policies, as well as assessing interventions to tackle already established poor health behaviours

such as smoking (McGhan and Smith 1996) and risky sexual practices (Wang et al. 2000). The impacts of changes in pricing policies and taxes on harmful behaviours have been examined for decades (Levy and Sheflin 1983; Ornstein and Levy 1983). Many interventions have also been evaluated within the context of decision-making processes in other sectors, as in the case of the economic appraisal of road safety interventions (Elvik et al. 2009).

In recent years there has been a growth in both the absolute number of economic evaluations that have been undertaken and the types of intervention that they cover (McDaid and Needle 2009; Weatherly et al. 2009; Saha et al. 2010; Sassi 2010; Vos et al. 2010; McDaid and Suhrccke 2012; Owen et al. 2012; Alayli-Goebbels et al. 2013). Chapters 4 to 11 in this volume will go on to look at much of this evidence. There is increasingly a greater focus on complex interventions, including evaluations of combinations of interventions and some evaluation of behaviour change interventions. The increased availability of sophisticated modelling software has also allowed much more intricate analysis to be conducted, taking a very long-term or even lifetime perspective (Cecchini et al. 2010; Ortegon et al. 2012).

There has also been an increase in the use of economic evidence to inform formal decision-making processes at national and regional level, with actions identified in countries such as Australia, Belgium, Canada, Denmark, England, Finland, the Netherlands, New Zealand, Norway, Sweden and the US (McDaid and Suhrccke 2012). In Europe, NICE in England has been a pioneer on the use of economic evidence for decisions on health promotion and public health interventions delivered outside of the health system. It has been assessing the economic case for these interventions since 2005, publishing guidance which has been influenced by mandatory economic modelling work and systematic reviews of economic evidence (Owen et al. 2012). This guidance should be followed by health care system stakeholders and is discretionary for other relevant interested parties such as local government and private sector employers (Kelly et al. 2010).

## **Moving forward**

The economic evidence base for health promotion and disease prevention continues to grow, and the importance of assessing the economic case for prevention is acknowledged in many health policy circles. Potentially, the economic benefits of investing in health promotion and disease prevention could be high, but it is important that well-designed evaluations are undertaken prior to large-scale investment. Adding an economic dimension retrospectively to those areas of public health where evidence on effectiveness is strong may be one pragmatic and relatively rapid way of helping to expand an evidence base which, as we shall see, is still dominated by studies from a handful of countries. Modelling techniques can also be used to help expand the evidence base and look at potential costs and benefits over different time periods, making different assumptions on effectiveness and resource configuration, in different geographical contexts and from the perspective of different budget holders or the economy as a whole.

Many challenges lie ahead, including the ways in which outcomes will be measured. This is discussed fully in Chapter 3, but one issue for economic evaluation is to develop appropriate metrics to be able to compare improvements in health outcomes with improvements in well-being, where this is defined as being over and above the absence of illness. Well-being, for instance, has also been discussed in terms of the capability approach which suggests that well-being should be measured not according to what individuals actually do (functioning), but what they can do (capabilities) (Lorgelly et al. 2010). More can also be done to take on board equity, as well as efficiency concerns, when looking at health promotion and disease prevention; this challenge will be explored in Chapter 12. Another challenge will be to better translate economic evidence messages into implemented actions (Chapter 13), both within and beyond the health system. Chapter 14 will examine what more can be done to overcome barriers to more intersectoral working.

We have indicated in the first two chapters of this volume that there is much interest at a policy level on the potential for adopting health promotion and disease prevention strategies, but this interest does not always appear to be matched by investment. Recent analysis from the Organisation for Economic Co-operation and Development (OECD) found that more than three-quarters of OECD countries reported a cut in real-term spending on prevention programmes in 2011 compared to 2010, and half spent less than in 2008. There were cuts to spending on effective prevention programmes on obesity, harmful use of alcohol and smoking (OECD 2013). This is why it is vital to further strengthen the evidence base and communicate findings effectively. Cuts to health promotion and disease prevention budgets may reduce the pressure on health care finances in the short-term, but the longer-term impacts of poorer health are likely to have a much greater impact on future health care finances.

## Note

- 1 <http://www.crd.york.ac.uk/CRDWeb/>

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