The economics of preventing drug use: An introduction to the issues

Richard Fordham, Lisa Jones, Harry Sumnall, Jim McVeigh and Mark Bellis
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CONTACT

National Collaborating Centre for Drug Prevention Centre for Public Health Liverpool John Moores University Castle House North Street Liverpool L3 2AY E-mail: NCCDPinfo@ljmu.ac.uk www.drugpreventionevidence.info

Lead Authors

Dr Richard Fordham, Senior Lecturer in Health Economics School of Medicine Health Policy & Practice University of East Anglia E-mail: r.fordham@uea.ac.uk Tel: +44 1603 593 543

Lisa Jones, Senior Researcher Author for correspondence NCCDP E-mail: l.jones1@ljmu.ac.uk Tel: +44 151 231 4543

Additional Authors

Dr Harry Sumnall, Senior Research Fellow NCCDP E-mail: h.sumnall@ljmu.ac.uk Tel: +44 151 231 4545

Jim McVeigh, Reader in Substance Use Epidemiology NCCDP E-mail: j.mcveigh@ljmu.ac.uk Tel: +44 151 231 4512

Professor Mark Bellis, Director NCCDP E-mail: m.a.bellis@ljmu.ac.uk Tel: +44 151 231 4511

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Document purpose

- To introduce and discuss key issues in the economics of drug prevention.
- To describe the utility of data derived from economic evaluation of drug prevention interventions.
- To encourage economic evaluation of drug prevention interventions in the UK.

Target audience

- Government officials and policy makers.
- Executives, senior managers, commissioners and budget holders.
- Academics, designers, planners and evaluators of drug prevention projects.

Description

- The use of economic evidence is growing in popularity as a basis for decision-making, particularly in curative areas.
- Economic evaluation offers the opportunity for planners of drug prevention policy and services to be more efficient with, and to prioritise, the finite resources available for implementation.
- This document provides an overview of the health economics of drug prevention and discusses different methods of conducting such analyses.

Reader objectives

- Learn about key issues in economic evaluations.
- Understand how economics can be applied to drug prevention.
- Gain an overview of previous studies in this area.
- Develop an understanding of good practice in economic evaluation, in addition to acquiring relevant critical appraisal skills.
- Understand the importance of incorporating economic evaluation into drug prevention policy-and decision-making.
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Glossary

**Benefit-cost ratio**
The benefits of a programme divided by its costs. One way of presenting the results of a cost-benefit analysis.

**Commodities**
Either goods or services.

**Cost-benefit analysis**
An economic evaluation technique in which outcomes are presented in monetary terms.

**Cost-effectiveness analysis**
Economic evaluations with outcomes measured in natural units.

**Cost-offset method**
A technique of counting the value of avoided or deferred costs/benefits.

**Cost-of-illness studies**
An analysis of the total costs incurred by society due to a specific disease or condition.

**Costs**
The value of resources used (usually in monetary terms).

**Costs, intangible**
Costs which cannot be directly quantified in monetary terms (e.g. pain and suffering).

**Cost-utility analysis**
Economic evaluations where the outcomes are measured in health utilities, usually a composite measure of quality of life and years of survival.

**Cross-price elasticity**
Refers to a situation where the demand for a product depends on the price of another product.

**Discount rate**
The rate at which future costs and outcomes are discounted to account for time preference.

**Discounting**
A method for adjusting the value of costs and outcomes which occur in different time periods into a common time period, usually the present.

**Drug prevention**
Interventions that prevent the onset, delay the initiation, promote cessation and reduce the harms associated with drug use. There are generally three overarching types of prevention models; universal prevention is targeted to the whole population regardless of individual levels of risk; selective/targeted prevention targets subsets of the population that are identified as having a higher than average risk of drug use; indicated prevention targets those that may have already initiated drug use and are considered to be at greater risk of dependence.

**Economic evaluation**
The systematic assessment and interpretation of the costs and benefits of a health care intervention.

**Efficiency**
The condition in which no productive resources are wasted in the production of a certain product.

**Externality**
Cost or benefit arising from an individual’s production or consumption decision, which indirectly affects the well-being of others.

**Merit good**
A good which society determines to be beneficial.

**Net present value (NPV)**
The benefits of an intervention minus its costs, taking into account the discount rate.
**Net social benefit (NSB)**
An NPV, which considers social benefits.

**Opportunity costs**
The value of the next best alternative forgone and its associated benefits as a result of the decision made.

**Prevalence**
The epidemiological measure of the number of people with a particular disease in a population at a given time or period of time.

**Quality adjusted life year (QALY)**
A year of life adjusted for its quality or value. A year of perfect life is considered equal to 1.0 QALY.

**Return on investment**
The point at which benefits begin to exceed costs.

**Time preference**
A person’s preference for consumption (or use of resources) now rather than later because they value present consumption more than the same consumption in the future.

**Uncertainty**
A state in which the true value of a parameter is unknown.

**Utility**
The well being a person gains from consuming a commodity.

**Willingness to pay (WTP)**
A method of measuring the value an individual places on reducing the risk of developing a health problem or gaining an improvement in health.

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**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BCR</td>
<td>Benefit-cost ratio</td>
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<tr>
<td>bn</td>
<td>Billion</td>
</tr>
<tr>
<td>CBA</td>
<td>Cost-benefit analysis</td>
</tr>
<tr>
<td>COI</td>
<td>Cost-of-illness</td>
</tr>
<tr>
<td>COPD</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>CUA</td>
<td>Cost-utility analysis</td>
</tr>
<tr>
<td>ECAS</td>
<td>European Comparative Alcohol Study</td>
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<tr>
<td>GNP</td>
<td>Gross national product</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<td>m</td>
<td>Million</td>
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<td>NEW-ADAM</td>
<td>New English and Welsh Arrestee Drug Abuse Monitoring</td>
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<td>NHS</td>
<td>National Health Service</td>
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<td>NIDA</td>
<td>National Institute on Drug Abuse</td>
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<td>NPV</td>
<td>Net Present Value</td>
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<td>NSB</td>
<td>Net Social Benefit</td>
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<td>NTORS</td>
<td>National Treatment Outcomes Research Study</td>
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<td>ONS</td>
<td>Office for National Statistics</td>
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<tr>
<td>QALY</td>
<td>Quality-adjusted life-year</td>
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<tr>
<td>TOPS</td>
<td>Treatment Outcome Prospective Study</td>
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<tr>
<td>UKATT</td>
<td>UK alcohol treatment trial</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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<tr>
<td>WTP</td>
<td>Willingness to pay</td>
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Introduction

The consequences of illicit drug use cost the UK economy billions of pounds each year and divert resources away from other productive uses (Godfrey et al., 2002). Costs are not only incurred by individuals, but also by the NHS, social services, and the Police and criminal justice system. From an economic point of view, the drug problem has an important opportunity cost, the diversion of money, which could have been spent on desirable alternatives (e.g., regeneration, investment). Economic thinking is a relatively recent innovation in drug policy and to date, few good economic evaluations of drug prevention strategies have been undertaken. This is despite opportunity costs and the associated trade-offs often being very apparent in policy making (e.g., choosing whether to spend more on drug prevention or enforcement measures). Economic evaluation provides a means for assessing the cost-effectiveness of specific interventions, which can in turn inform future spending decisions. As well as deciding the best use of resources it can also help with finding the best mix of drug prevention programme inputs (e.g., universal versus targeted prevention) as well as the optimal level of programme output (e.g., cessation versus reduction of drug use). As more drug prevention programmes are implemented, it is becoming increasingly important to determine which programmes make the best use of resources.

Personal and external costs of drug use

The nature of both personal (e.g., health) and external (e.g., criminal justice) costs is central to drug policy and it is important to understand their range and significance before employing specific economic evaluation techniques. For example, changes in patterns of consumption of illegal drugs, alcohol and tobacco can determine the demands made on the healthcare system related to treatment and ill health. In addition, drug and alcohol use has third-party consequences (e.g., victims of drug-related acquisitive crime); in economic terms these are called external costs. The costs of drug and alcohol use may also include wider, intangible costs such as fear about drugs and crime in the community.

Drug markets follow similar economic principles to normal markets and price in particular acts on both the supply and the demand for drugs. Like conventional consumers, drug users are sensitive to changes in price of their drug of choice and the relative prices of other drugs (both legal and illegal). However, other aspects of drug use mean that additional economic considerations have to be made when examining ‘drugs’ as a commodity. For example, some population groups, (e.g. young adults with childhood diagnosis of ADHD), show a greater preference for drugs than others. Greater popularity within particular populations may mean that conflict arises with traditional economic theories, as with normal market goods individuals are assumed to look after their own personal well-being and possess the full information to do so. Due to their illicit nature, such information is not always available regarding the dangers and problems that can arise from taking drugs. Drug dependence also goes against classic economic theory, as dependent individuals may consume beyond the point where the personal cost exceeds the benefits.

Preventing drug use raises some interesting dilemmas for economic evaluation. Individuals may feel that there is no need for prevention and in economic terms this may lead to under-demand for prevention goods such as information leaflets or personalised interventions, but prevention is also sometimes seen as a merit good (a good that society thinks people should consume or receive, e.g. drugs education). In addition, the timing of prevention poses a problem, as unlike drug treatment, the benefits of success are not (relatively) immediate or visible (e.g. prevention of problematic drug use in adulthood). Economic analysis treats future costs and benefits differently to present ones and so this may work against analyses of prevention.
Economic evaluation

There are four main types of economic evaluations, cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis and cost-minimisation analysis (an alternative form of cost-effectiveness analysis). The results of all types of evaluation are sensitive to the ways in which costs and outcomes are measured, and caution should be applied when comparing results across studies. Health practitioners often favour cost-effectiveness analysis, but it can sometimes be difficult to determine which measure is most representative of an improvement in outcome. The results of cost-utility analysis (a method derived from cost-effectiveness analysis) are usually expressed as a cost per Quality Adjusted Life Year (QALY) gained, and QALYs can be a useful tool in helping to select efficient programmes. The numbers of economic evaluations in the field of drug prevention is presently small, and most originate from the US. This literature has been variable in quality and difficult to interpret in the UK context. A common method used to evaluate drug prevention studies is cost-benefit analysis. This usually provides a ‘return on investment’ estimate, in the form of a benefit-cost ratio, which can be useful for investment decisions (although such ratios can be misleading). Cost-benefit analysis also relies on the conversion of all benefits into monetary values, which has a number of difficulties. The further development of willingness to pay (WTP) techniques, a method of assessing the value an individual places on reducing the risk of developing a health problem or gaining an improvement in health, is hoped to address these issues.

This topics discussed in this report highlight the importance of incorporating economic evaluation into drug prevention. However, there are still a number of unresolved issues and challenges which may continue to hinder the development of economic evaluation in the drug prevention field, particularly around determining suitable programme outcomes, and which costs and benefits to include in evaluations. Further investment in research into the economics of drug prevention may help to address such issues. There is the need for clear guidance on which techniques to use and in what circumstances to evaluate the costs and benefits of drug prevention programmes. Policy and decision makers in the field should be encouraged to develop an understanding of good practice in economic evaluation, in addition to acquiring relevant critical appraisal skills. The methodology for undertaking evaluations of healthcare interventions is well developed and is applicable to public health interventions such as drug prevention.
Section 1

Introduction

Overview

Illicit drug use costs the UK economy billions each year and diverts resources away from other productive uses. This section considers how economics and health economics may be applied to drug prevention, and how it may be used as a basis for policy making and priority setting.

1.1 Economic burden of drug use

It is estimated that illicit drug use costs the UK economy between £15.3 billion (bn) to £16.1bn per year (with costs incurred by the NHS, criminal justice system and benefit system in the region of £4bn to £7bn) (Godfrey et al., 2002; Gordon et al., 2006). Problematic Class A drug use is responsible for the major part of this cost (£15.3bn; 99%), whilst recreational drug use by younger people costs the economy around £52 million (m; <1%) a year (Gordon et al., 2006). The cost of drug abuse in the United States has been estimated to be in the region of US$180bn (Miller & Hendrie, 2005). The costs of illegal drug and alcohol dependence and abuse adversely affect national output. Drug use is estimated to divert between 2% to 8% of Gross National Product (GDP) in European countries from other productive uses (Swedish Council on Technology Assessment in Health Care, 2002). Costs include not only personal expenditure to drug users, but also the cost incurred by other agencies (e.g. the NHS, social services, Police and the criminal justice system, and customs authorities) as well as the costs incurred by the families and relatives of drug users (Pudney, 2003).

Box 1. Opportunity costs

The concept of opportunity cost is central to economic thinking. It represents the true welfare value of consumption reflecting all lost or foregone ‘opportunities’ incurred in a decision that could have been obtained in other ways. In formal terms the opportunity cost is the value of the ‘next best use of resources’, (e.g. drug treatment versus drug prevention) although in the case of drug prevention it is not always clear what that next best use may be. Just as opportunity costs may be measured in individuals’ personal lives (‘the money we could have used to do other things’) the same can also be done with social investments. It may be simpler to express the opportunity cost as the monetary value of the resources tied up in their current uses. Expression in monetary terms is also more generic and portable, but paradoxically, because markets do not readily exist for many goods and services, few benefits in health are measured in such terms. Willingness to pay studies (a method of assessing the value an individual places on reducing the risk of developing a health problem or gaining an improvement in health), are a means of eliciting such values but these are rare and this makes the explicit consideration of opportunity cost difficult (Donaldson & Shackley, 2002).

Note that this reportson the cost estimates in 2003/04, and is the most recent analysis.
1.2 What is health economics?
Economics has been defined as “the science which studies human behaviour as a relationship between given ends and scarce means which have alternative uses” (Robbins, 1935). Hence, economics is concerned with how society uses the resources at its disposal to improve the welfare of individuals among infinite competing potential uses. Health economics is the branch of economics applied to health and health care. It encompasses several distinct areas of theoretical investigation (summarised by Williams, 1987, see Figure 1.1), all of which apply to drug prevention.

At its simplest, economic appraisal asks whether an investment of all resources will be less than the stream of benefits that are predicted to flow from it. If this is the case then social welfare is improved by such an investment, provided the resources used could not be better used elsewhere. Economic appraisal is supported by economic evaluations conducted after the implementation of a policy, and which involves the systematic assessment and interpretation of the costs and benefits of a health care intervention.

**Figure 1.1 Schematic presentation of the main elements in health economics.** (Adapted from Williams, 1987)

1.3 Economic appraisal and evaluation as a basis for policy making and priority setting
The use of economic evidence is growing in popularity as a basis for decision-making, particularly in curative areas. However, in his review of the NHS, Wanless (2004) highlighted the paucity of cost-effectiveness evidence in public health generally. In particular, economic thinking is a recent innovation in drug policy and to date few good economic evaluations of drug prevention strategies have been undertaken. Another issue may be that economic thinking per se has not yet permeated into policy-making circles as far as legal, moral and ethical issues have already done.

Opportunity costs and the associated trade-offs are often very apparent in policy making. Governments incur opportunity costs whenever they choose one programme over another, and the same is true of other regional and local agencies, although they may not always be given explicit consideration. Firstly, it is desirable to know where current resources are being used before some redistribution is made. Assuming that these resources are used to full capacity, the relevant economic question is deciding, at the margins of current spending patterns, whether this is in fact the best use of resources or whether some other allocation would improve overall benefits from available resources. Reallocation expenditure can be looked at in this way. For example, knowing the likely trade-off (‘opportunity cost’) between spending more on a drug prevention programme than enforcement may be worthwhile. There has been relatively less investment in drug prevention compared to other ways of addressing drug problems in the UK, with the largest proportion of investment channelled towards drug treatment. Figure 1.2 shows the Government’s direct annual expenditure on meeting the aims of the Updated Drug Strategy.

Many decisions are still made with implicit assumptions about benefits and without recourse to consideration of the actual opportunity cost. Apart from issues of reallocation of resources, opportunity costs can also be used in the context of productive or technical efficiency. For example, if unnecessary resources are designated for a particular programme, there may be other ways of producing the same output (e.g. reduction of drug use) with fewer or different combinations of resources. Also, if there is a wasteful use of resources, there could be unnecessary opportunity costs incurred, and moving wasted resources to other more productive uses can improve allocative as well as technical efficiency. While efficiency is a major consideration, equity, which considers the fair distribution of resources, is also important (see Box 2).
Efficiency and equity

Efficiency is the relationship between input of resources, and outputs achieved with them, in terms of satisfying human wants and needs. Economics distinguishes two types of efficiency of resource use, namely technical and allocative.

Technical efficiency is subject to a specific programme goal (e.g. to reduce health problems resulting from needle sharing) and is defined as obtaining the highest possible outcomes using the least cost methods. Allocative efficiency (also termed Pareto efficiency) involves deciding at a more macro level whether to allocate resources to programme X or programme Y based on which programme generates the highest level of utility relative to the resources it consumes. In theory by switching resources from programmes with low output to those with higher outputs efficiency will improve.

In general terms, equity relates to ethical judgements about, amongst other things, the fairness of income and wealth distributions, cost and benefit distributions, and the accessibility of health and social care services (Culyer, 2005). In health economics, there are two general equity concepts, horizontal equity and vertical equity.

Horizontal equity refers to the “equal treatment of equals” (e.g. people with the same level of income) and vertical equity refers to fairness in the treatment of apparent unequals (e.g. people with a different level of income).

Economic evaluation offers an opportunity to be more efficient with the resources available for drug policy. In addition, much potential exists to improve priority setting with the incorporation of economic analysis. As well as deciding the best use of resources it can also help with finding the best mix of programme inputs as well as the optimal level of programme output. It will become increasingly important to determine which programmes make the best use of resources as more drug prevention programmes are implemented and compete with drug treatment and other approaches. However, firstly it is important to consider in what way economics, and its concepts more generally, are relevant to the drug prevention field.
Overview

The nature of both personal and other costs is central to drug policy and it is important to understand their range and significance before employing specific economic evaluation techniques. This section examines the personal and social costs that arise as a result of drug use. In addition, the economics of prevention are considered and some general economic dilemmas that have the potential to hinder the introduction of health promotion programmes. Finally, the economic characteristics of prevention goods are explained. In addition, two relevant models of health behaviour, the model of rational addiction and the household production model of health are discussed.

2.1 Economic consequences of drug use on health and society

2.1.1 Costs of drug use on health

Classical economic theory rests on assumptions that improvement in social welfare takes place when individuals maximise their own utility (sometimes known as their ‘utility function’). A typical consumer’s utility function might include the consumption of a set of preferred goods and services, but may also include non-consumption activities such as savings and investments, as well as altruistic goods and services, such as gifts to others. In a free society where drugs are available (although not necessarily legally obtainable) these preferences can also include the consumption of illegal or controlled goods. It has been estimated that in 2005, 36% of the UK adult population reported using illicit drugs at some stage in their lives and 11% in the previous year (Roe, 2005).

Consumption of illegal drugs, alcohol and tobacco has a bearing on patterns of health, especially long-term health, and can determine future demand made on the healthcare system. Alcohol and tobacco have long been officially sanctioned (and taxed) by government, and the private and public costs incurred by their use are reflected in the patterns of health care utilisation. For example, currently, 40% of all A&E admissions are alcohol-related (Mulvihill et al., 2005). Although not all substance use results in major harm there are some significant costs in terms of personal life expectancy and quality of life as well as morbidity requiring treatment by the health service. Rates of death from cirrhosis of the liver are presently increasing in the UK, which may be attributed to increasing drinking levels, especially in the young (Fullard et al., 2005). The cost of smoking-related illness to the NHS is estimated to be £1.7bn a year and a long-term smoker has a life expectancy on average of about 10 years less than a non-smoker (Doll et al., 2004). In addition, smokers can expect to live with diseases such as chronic obstructive pulmonary disease (COPD) and cardio-vascular disease for many years before death.

2.1.2 Demand and supply of drugs

The Office for National Statistics (ONS) survey of family spending for 2003/04 revealed that on average, British households spend £11.70 each week on alcoholic drinks, tobacco and illicit drugs (ONS, 2004). Excessive alcohol consumption is common and in 2003/04, 40% of men in England reported drinking more than the recommended daily amount (3-4 units per day) on at least one day in the previous week (Department of Health, 2004). Also, 26% of the UK population smoke (ONS, 2003). A twenty cigarette a-day smoker spends about £1,600 per year on smoking related consumables, which for many may be a significant proportion of their income. Results from the first year of the New English and Welsh Arrestee Drug Abuse Monitoring (NEW-ADAM) research programme found that the average weekly expenditure on illegal drugs among arrestees (who reported using and spending money on drugs in the last 12 months) was £169 (around £9,000 per year). Heroin and cocaine/crack-using arrestees reported significantly higher expenditure at £290 per week (around £15,000 per year) (Bennett, 2001).
2.1.3 Cost of drug use to society
Harmful drug use requires social expenditure in treating its consequences. The true economic cost is the ‘opportunity cost’ (amongst others) of other foregone (beneficial) social uses of these resources. Much drug and alcohol consumption also has ‘third-party’ consequences (see Box 3), (sometimes of considerable magnitude) which makes it of special interest to economists and policy makers.

Box 3. Who bears the cost of drugs use in society?
At least five groups can be identified that bear the costs of drug use:
• Users themselves (who bear the physical, social, and psychological costs);
• Other individuals (e.g. passive smokers, victims of drug related acquisitive crime);
• Businesses (with resultant production losses);
• Government (who fund health care for those who become ill from drug use);
• Other countries (who bear costs associated with production of illicit drugs/changes in other government’s policies).

(from Single et al, 1998)

With regard to alcohol-related social harm, the European Comparative Alcohol study (ECAS) identified that the UK reported above the European average for rates of adverse consequences of alcohol use (Norström, 1999). These included getting into fights, having accidents whilst under the influence of alcohol and regretting things said and done when drunk. In addition, approximately 5% of UK respondents to the ECAS survey reported that alcohol had affected their work/studies, harmed their home-life or marriage as well as friendships. In the same way, misuse of drugs may be linked to other social problems, especially crime, although the links are by no means precisely understood (Hough et al., 2000).

Drug-related social costs or ‘externalities’ (see Box 4) are imposed on society when users and traffickers involved in drug trading have negative impacts on unrelated third-parties. Crime, violence, threatening or anti-social behaviour, environmental pollution, noise and other forms of social disruption come into this category. This may include worry and family disruption caused to loved ones and friends by drug users. Wider, intangible costs can also include fear about drugs or crime levels in the community, which may have a negative impact on the quality of life of many individuals and communities even if no actual effects arise. For example, one study conducted in Waltham Forest, London reported that 53% of those surveyed said their main concern about quality of life was related to crime levels (London Borough of Waltham Forest, 2003).

Box 4. External Costs and Benefits
During normal private market economic transactions (‘buying and selling’), other costs and benefits may also fall on ‘third parties’. These are usually other consumers, unrelated individuals, the community as a whole and the environment generally. They can be positive or negative. Negative externalities are generally of greater concern as they may impose costs on others, although these need not always be monetary costs, for example, psychological costs or feelings of loss of quality of life can be experienced by third-parties. Typical examples of relevance to drug prevention might be hazardous by-products such as syringes discarded in public places; fear caused by groups of youths hanging around residential areas; or general anxiety of becoming a victim of drug-associated crime.

In relation to the intangible and externally imposed costs of drug consumption, Cohen (1994) emphasised the ‘peace of mind’ benefits that drug prevention programmes can bestow. These ‘peace of mind’ benefits occur not only in potential drug users, but also in family and friends and the community at large. This protection is similar to cover provided by an insurance policy. Although these ‘peace of mind’ benefits are seldom valued in monetary terms they potentially could be, and added to the tangible financial benefits of prevention programmes.

2.1.4 Benefits of drug use
Any examination of the costs and benefits of drug use is incomplete without considering the ‘positive’ effects that it may have on health and society. For example, in their examination of the impact of drug dealing on local communities, May et al (2005) commented that it is “…a failure of the imagination to think that [drug dealing markets] are only socially destructive and economically damaging”. Across four, largely deprived, communities examined, they found that drug markets stimulated the market for stolen goods, which in turn was beneficial for people living in extreme poverty. In addition, they found that the more sellers were embedded in their local community, the more money they put back into the community (for example, by supplementing incomes or by giving money to family and friends).

Also in terms of health effects, drug use may be perceived to have some benefits. For example, while...
there is growing evidence about both the probable and possible acute and chronic adverse effects of cannabis use (Hall, 2000), not all the effects of cannabis are adverse. There are claims that cannabis may be of medical benefit for many disorders, including multiple sclerosis and pain and some patients obtain cannabis for self-medication (see Baker et al., 2003 for further discussion on the therapeutic potential of cannabis). In addition, cannabis users may benefit from the acute effects of cannabis use. Hathaway (2003) found that long-term cannabis users were capable of weighing the costs and benefits of their cannabis use, with the results of the study indicating the predominance of positive over negative consequences. The most prevalent reasons to use cannabis were for relaxation and “enhancement of leisure activities”. The study also highlighted the use of cannabis as a coping mechanism during time of stress.

2.2 Demand and supply of drugs

2.2.1 Demand and consumption

The demand for any drug is determined, like most consumables, by (for example) consumers’ tastes, attitudes, social conditions, and peer pressure. Economics does not have any specific theories about why consumers prefer one product to another, only general theories of consumer behaviour. The complexities of patterns of drug taking for primarily intoxicating purposes are beyond the scope of this publication (see Boys et al., 2001; Sumnall et al., 2005 for further discussion). However, at its simplest it may be sufficient to say ‘drug consumers like drugs’ and hence there is always likely to be a demand for them (Gerstein & Harwood 1990). Even if they are prohibited, there is a strong positive preference for drugs, especially among some population groups (e.g. young adults).

Traditional utility maximising theory suggests that value is obtained by directly consuming goods and services or as a result of the secondary effects of consumption (e.g. the convenience of driving a car). It is more complex in the drug field where utility and health may conflict. With normal market goods individuals are usually assumed to look after their own personal well-being and posses the full information to do this. Drug taking may be in the pursuit of happiness but information is not always available regarding the dangers and problems that can arise. Some positive ‘utility’ may be obtained through the immediate sensation of drug use and some may even claim longer-term performance enhancement through some drugs [e.g. cocaine use at work (Carlson et al., 2000; Couper et al., 2002)]. Dasgupta (2001) has argued that classic utilitarian theory ignores the experiential state of ‘happiness’ for its own sake, which can be momentarily strong and real for individuals but which may not yield ultimate satisfaction or be necessarily in one’s best interests. As he states, “one could be in a happy frame of mind under the influence of drugs and yet be in a bad state” (Dasgupta, 2001).

Although many aspects of substance use can be analysed in the same way as the demand and supply of every day goods, there are obviously some important differences in the markets, especially for illegal drugs, in particular the consequences of consumption. In unregulated markets the potential magnitude for harm (some irreversible) is significant as information about the content and quality of illegal drugs is very limited. It is not only the addictive qualities of drugs but also the imperfect information and supplier monopolies that weaken ‘consumer sovereignty’ in illegal markets.

Price in particular is a strong signal (as it is in most markets) and affects both the supply and the demand for drugs. Like conventional consumers, drug users are sensitive to price. Assuming that the majority of drug users are not dependent, price sensitivity may exist when the price of their drug changes. For example, studies have shown that the demand for cannabis and methamphetamines are both sensitive to price and are consumed more at times when their prices are low (Abt Associates Inc., 2000). The demand for one particular drug may also depend on changes in the price and availability of another (legal or illegal; termed cross price elasticity, see Box 5) (Sumnall et al., 2004). In recent years, informal surveys have suggested that the price of some illegal drugs has fallen relative to alcohol and tobacco such that it may be as cheap or cheaper to obtain a ‘unit’ of an illegal drug (e.g. tablet of ecstasy, or line of cocaine) (Druglink, 2005).
As evidenced by increasing or stable prevalence rates, demand for drugs has been rising and some analysts in the USA have claimed that the price effect accounts for much of the observed changes in increased demand for cigarette smoking, (binge) alcohol drinking and cannabis use by high school students (Grossman, 2004). They argue that supply is necessarily sensitive to enforcement and localised trading conditions, and this will affect prevailing retail prices too. When enforcement is stringent, street prices rise and as demand theory predicts, this can lead to a decrease in the level of demand. Consumer’s search costs also increase and some buyers may become deterred because of higher risks of prosecution. However, it is also possible that a reduction in supply will lead to a reduction in the purity of a drug as dealers dilute their products or add excipients. Under these circumstances, this would not necessarily lead to an increase in drug price.

The size of the change in demand is sensitive to price (measured by what economists call the ‘elasticity of demand’). Whilst some users will reduce their level of demand, others are simply willing to pay more or adapt gradually to the change after an initial fall in demand. When elasticity of demand is low, or unresponsive, to price then suppliers increase their total revenue and profits from sales. If this is the case then enforcement may have the perverse effect of both attracting more drug suppliers into markets with higher prices and with the possible result that more crime may occur (as consumers look to illegal ways of continuing to fund their habit). This has led to the call for the legalisation of drugs in some quarters as it can be more a more economically efficient and equitable way to offset the costs of drug use to society (Becker et al., 2004).

2.2.3 Dependence

There is of course the major issue of dependence, which breaks conventional axioms of ‘consumer sovereignty’ in economic rationalism whereby an individual consumes up to a point where the personal costs exceed the benefits. However, the issue of dependence is usually assumed not to occur with normal goods. Dependence is seen from an economic perspective as future levels of consumption being dependent on current consumption levels (with possible increases over time due to tolerance); it is assumed that truly dependent individuals have little control over their personal levels of consumption. In reality, this may not be the case and some dependent users may report that drug taking is counter productive (e.g. in terms of employment, family relationships) even if they find the acute drug experience satisfying. It may even be counter productive to the experience of the happiness-seeking component itself. However, there may be more individuals (who have been described as ‘rational addicts’) who consciously consume drugs beyond an optimal point in the short-run, whilst in the long-run moderating, or even ceasing their consumption altogether (Grossman & Chaloupka, 1998). Rational addiction (see Box 5) helps explain apparent paradoxical consumer behaviour and is relevant to recreational drug use arguments.

### Box 5. Demand theory and elasticity

As evidenced by increasing or stable prevalence rates, demand for drugs has been rising and some analysts in the USA have claimed that the price effect accounts for much of the observed changes in increased demand for cigarette smoking, (binge) alcohol drinking and cannabis use by high school students (Grossman, 2004). They argue that supply is necessarily sensitive to enforcement and localised trading conditions, and this will affect prevailing retail prices too. When enforcement is stringent, street prices rise and as demand theory predicts, this can lead to a decrease in the level of demand. Consumer’s search costs also increase and some buyers may become deterred because of higher risks of prosecution. However, it is also possible that a reduction in supply will lead to a reduction in the purity of a drug as dealers dilute their products or add excipients. Under these circumstances, this would not necessarily lead to an increase in drug price.

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### Box 6. Rational addiction

Becker and Murphy (1998) developed the rational model of addiction, which assumes that addicts behave rationally. It is a controversial theory but their model emphasises the interdependency of past, current, and future consumption of an addictive good. The main element of this and other models of addictive behaviour is that an increase in past consumption of an addictive good raises the marginal utility of current consumption and therefore raises current consumption. A key feature of the model is that addicts are rational or farsighted in the sense that they anticipate the expected future consequences of their current actions (for further reading see Grossman & Chaloupka, 1998).
2.3 The economics of drug prevention

Many activities can be considered to be beneficial to health and can be seen as so-called ‘prevention goods’. They can be ‘purchased’ without much direction from experts, usually out of self-interest, for example, picking up an information leaflet. However, there are more complex prevention goods about which people need advice, for example, theory based interventions. These must normally be provided by ‘experts’ because some interpretation of the prevention model to an individual’s personal circumstances is required.

Health advice and related information (for example, health campaigns or one-on-one advice from a GP) about drugs and alcohol are not easily purchased on the open market. Such consultations are often founded on an ‘asymmetry’ of information (where information held by the buyer or seller is unequal; less is held on the consumer’s part in the case of drugs). This makes it less likely that an individual will know enough about the consequences and effects of drugs to make an informed decision by themselves. Where such professional advice is not accessed or unavailable it can lead to under-demand for prevention goods since the consumer is unaware of what they need in the first place (see Box 7).

These types of markets are likely to fail in a ‘normal market’ situation because there are few inherent property rights necessary to turn prevention into a marketable good and few would be willing to supply it. In these circumstances a third-party (normally government, or a charity) can intervene. Prevention, therefore, is sometimes seen as a merit good, or something that is exogenously defined as being desirable because it is ‘good for us’, in spite of our own irrational preferences and desires. Most primary prevention and health promotion campaigns take this form as can individual advice from health professionals when no apparent disease yet exists (i.e. initiation of drug use).

Box 7. Under-demand for prevention goods

Behaving healthily imposes choices and costs on the individual they would perhaps prefer not to make. The implication is that there is an opportunity cost involved with staying healthy which might be the sacrifice of other more pleasurable things. One implication is that if these opportunity costs are perceived to be greater than the potential benefits, individuals might not adopt lifestyle changes. Another implication is that these measures, although health producing, may be welfare reducing. Economists would go further and say that the way people actually make personal consumption choices in practice demonstrates that there are, in fact, many things that command greater priority than being in a state of perfect health (and these may even conflict with remaining healthy). It has been shown that the weight or importance placed by individuals on their own health (and that of others) varies according to an individual’s value system and possibly in relation to ‘life-cycle’ (Wright, 1986). To put these types of behaviour into economic terms, the wider benefits of consuming drugs, alcohol or smoking may often outweigh the personal costs of changing, at least in the short-term (Kan and Tsai, 2001).

2.3.1 The dilemma of prevention

Preventing disease (or drug use) raises some interesting dilemmas for economic evaluation. With the fixed limited resources at the disposal of government and health professionals, investment in prevention must de facto reduce resources for current uses such as treatment and reducing supply. Of course, both prevention and treatment are desirable, and some optimal balance between present and future needs must be struck.

There may be more risk attached to prevention than treatment. The adverse outcomes are further away in time and may not eventuate as intended as other intervening factors (such as unemployment, or parenthood) may affect the desired outcomes. Secondly, prevention may not always change long-term behaviour. There is less of a direct relationship between the ‘method of action’ and the outcome than may be assumed, for example, with a pharmaceutical intervention. One key choice in determining the cost-effectiveness of prevention programmes is whether to undertake a universal or a targeted approach to prevention (Gerstein & Harwood, 1990; Canning et al., 2004).

2.3.2 Timing issues

Timing of benefits is an essential aspect of any preventive measure. The benefits of prevention usually fall at some stage in the future after an initial investment designed to ‘kick-start’ the programme. Awaiting the returns from such investments is crucial, and the usual convention to take account of delayed benefits and costs is to discount...
them (i.e. reduce in value), in order to reflect the social value of time. Individuals are usually assumed to have a positive time preference, which implies they would rather have benefits now than in the future (see Box 8).

**Box 8. Prevention and ‘positive time preference’**

Several economic factors may work against the adoption of prevention. One of the most important of these is society’s time preference. Society generally has a positive time preference, which means that most people prefer some immediate benefit compared to expected benefits in the future, but also immediate costs as more important than those that occur in the future. This is because people discount delayed rewards or benefits when they are not immediately incurred. Additionally, there is a personal or social opportunity cost to forgoing present consumption or investment because of the lost utility of consuming these same resources in the present. However, discounting is still controversial and some argue that discounting favours present over future generations, as it implies that less value is placed on future health outcomes. Partly responsible for the inherent economic bias against prevention is the discount rate (see Box 9) used to value any future costs and benefits to derive their present value. Assuming that society has a positive time preference the further away in time benefits occur the less they are worth. This also means that the value of something increases the closer it occurs to the present. Costs as well as benefits may also fall into future periods. Some prevention programmes may require continuous development or recurrent ‘top-up’ of efforts (e.g. ‘booster sessions’) to reap rewards (White and Pitts, 1998).

**Box 9. Discounting**

Any programme or intervention, which lasts for longer than 12 months, requires discounting. Discount calculations are the inverse of compound interest. Unlike compound interest, which ensures that amounts get exponentially greater with time, discounting reduces monetary values exponentially in the opposite direction. This means it has a differentially greater effect on the final value the longer the time period. For example, using a discount rate of 3% applied to a ten-year programme worth £1m in health benefits (equal to savings in utilisation of health services) will reduce this sum to £744,000 in present value terms. The discount rate is set by the Treasury, and is currently 3.5% for both costs and benefits (in some circumstances other rates may be applicable).

**2.3.3 The demand for health**

One economic theory in particular that helps explain the demand for health and offers ways of improving take-up of healthier life-styles has been put forward by Grossman (1972) in his ‘household production’ model of health. Although developed in the 1970’s when the family was represented as a single coherent unit, Grossman’s model still has much relevance today. It presupposes that households ‘produce’ health (as well as ‘invest’ in it for the future) for the utility that health brings to enable enjoyment of all other things.

**Box 10. Grossman’s Household Production model**

In this model, households are seen as mini-workforces akin to a small family business. Health is an intermediate input (not an output in itself), creating the means for enjoyment or satisfaction of all other things (which could include food, cigarettes, alcohol etc.). Unlike the public health viewpoint where personal health is central to everything else (if not the most important thing), Grossman accepts that enjoyment of other things irrespective of the health impact is possible. He calls this the ‘derived’ demand for health. The model likens an individual’s health to a ‘stock’ of ‘human capital’. As with any capital item, the capital gets diminished over time with use unless measures are taken to maintain it. Central to this is the idea that the relative cost of ‘health investments’ will determine how much health (versus other things) that a family unit will produce within their limited resources.
As the relative cost of investing in health producing activities falls, demand theory predicts that consumption will rise. Therefore, the cheaper the access to health care and related activities (e.g. cheap gym membership), the more household consumption patterns will switch to health-related activities. It follows that the more education households possess in general (and consequently about health in particular), the greater their ‘marginal efficiency of capital’ will become, that is, the family converts resources into healthy outcomes more efficiently. Grossman also argued that if wages in the household are low this will act as a disincentive to invest in health as the return on healthy days obtained will be less.

This model holds some important lessons for drug prevention. The model predicts that if the acquisition costs of health promoting activities are prohibitively high (relative to income), poorer families will not take them up. Additionally, lower income families may face a disincentive to be healthy if investments in health producing activities do not provide much prospect of additional income.
Section 3

Economic evaluation of drug prevention programmes

Overview

Economic evaluation is the comparative analysis of alternative courses of action in terms of both their cost and consequences; this may include private costs (e.g. to the drug user and their family), social costs (e.g. those in the community affected by drugs) and psychological costs. This section considers the main types of economic evaluation: cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis. Each of the types of evaluation measure outcomes in different ways and it is these outcomes that distinguishes one method from another. There is still debate concerning which type of method should be used to evaluate drug prevention programmes.

3.1 Introduction

Economic evaluation may be defined as the “comparative analysis of alternative courses of action in terms of both their costs and consequences” (Drummond et al., 1997). All methods of economic evaluation follow the same three steps; first, the costs and benefits must be identified, then they must be measured using appropriate physical units, and finally they must be valued.

3.1.1 Identifying costs and benefits

In Chapter 2 the broad range of costs and benefits applicable to the evaluation of drug and other types of prevention programmes were considered. This included private costs (e.g. to the drug user and their family), social costs (e.g. those in the community affected by drugs) as well as psychological costs and the ‘induced harms’ resulting from efforts to control, regulate or reduce illegal drug use. In general, costs and benefits fall into three categories.

1. Direct costs are those arising from the implementation of a programme or intervention. Direct health care costs are those associated with the implementation, delivery and continuation of an intervention or programme. Non-health care costs are resources that are not exclusively from the health sector. This would include costs from the participant’s point of view such as travel costs.

2. Indirect costs are related to productivity losses, which arise as a result of the intervention or health problem (e.g. days of missed work due to ill health or days missed through programme attendance).

3. Intangible costs are more difficult to measure and include, for example, outcomes such as pain and suffering, increases in self-efficacy.

Economists have proposed a comprehensive framework for the inclusion of costs and benefits (averted costs) of programmes. The WHO (2002) expert group on which costs and benefits should be included in national accounting and cost-of-illness studies (COI) reached consensus recently. COI studies (see Box 11) show the total private and social cost (minus any tangible private and social benefits) of drug consumption and are widely used to prioritise drug problems.

Box 11. Cost-of-Illness studies

Cost-of-illness (COI) studies investigate both the direct and indirect costs incurred due to an illness or condition from a societal perspective. The main reason for this type of study is to demonstrate the ‘size of the problem’ to policy-makers. Caulkins and Reuter’s (1997) have stated “the overall goal [of drug policy] ought to be to minimise the harm associated with the production, distribution, consumption, and control of illicit substances” and COI studies often take a broad view of the financial impacts of harm (Caulkins, 1996).

However, COI studies must be interpreted carefully (Single et al, 1998). A COI study will not necessarily illuminate the consequences of a particular drug strategy or how much it will cost to address the problem. This type of study can be misleading as they often over-estimate the benefit of prevention programmes primarily concerned with decreasing the incidence of cases not the prevalence. COI studies may suggest, quite wrongly, that with appropriate actions all future harm may be eliminated. This type of counter-intuitive scenario is unrealistic in the case of drugs as it is likely that some level of drug use will inevitably remain or be at too high a cost to society to remove altogether.
3.1.2 Valuing costs and benefits

Health programmes and interventions have costs and benefits that affect different parts of society. The relative value of the costs and benefits of a programme may depend on the perspective from which the analysis is done, that is from which point of view the evaluation is considered. For example, evaluations may consider the perspective of the patient, health care system, Government and public sector, or society as a whole. Considering the evaluation from a societal perspective means that all the costs and benefits of a programme or intervention are taken into account if possible, while narrower perspectives may only include some of the costs and benefits. For example, a participant’s travel costs are a cost from the point of view of the participant and society, but not a cost from the Governments’ point of view. An additional consideration for valuing costs and benefits is that they may accrue at different times. Therefore the valuation of future benefits need adjusting using the technique known as discounting which was discussed in relation to prevention in the previous chapter (see Box 9).

3.1.3 Dealing with uncertainty

All economic evaluations are characterised by some degree of uncertainty or ignorance about the future cost of events. Sensitivity analyses should be undertaken to assess the robustness of findings of evaluations by varying the assumptions underlying the estimates of the costs and benefits.

3.2 Types of economic evaluation

There are four main types of economic evaluation: cost-effectiveness analysis, cost-benefit analysis, cost-utility analysis, and cost-minimisation analysis (see Box 12). There is still debate concerning which type of method should be used to evaluate drug prevention programmes, and different methods may be appropriate at different levels of decision-making. The following sections describe each type of economic evaluation and discuss the advantages and disadvantages of each method with examples from the drug prevention and treatment field. Cost-minimisation (choosing least cost options) is considered to be a special form of cost-effectiveness analysis and will not be considered further here.

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**Box 12. The main types of economic evaluation (from Hoch & Dewa, 2005)**

Each of the types of evaluation measure outcomes in different ways and it is how these outcomes are treated that distinguishes one method from another.

| Name                     | Measurement units for effect(s) | Strengths                                      | Limitations                                                                 |
|--------------------------|--------------------------------|------------------------------------------------|----------------------------------------------------------------------------|---|
| Cost-effectiveness analysis | One effect measured in natural units | There is one outcome, measured in natural units | Only one outcome will represent the effects of a programme or intervention; however other outcomes may be relevant |
| Cost-utility analysis     | Two effects (quality and length of life) whose product is taken as quality-adjusted life years (QALYs) | Patient outcomes involving both quality and length of life can be incorporated in the analysis | • QALY measures vary by method  
• QALY measures vary by respondent  
• Society may value a QALY for different patient groups differently |
| Cost-benefit analysis     | All effects measured in monetary terms | The net benefit (NB) is easy to interpret | • It is difficult to measure the value of all health outcomes in monetary terms  
• There may be moral objections about the impact of ability to pay in the process of valuing the effects |
| Cost-minimisation analysis | No effects measured | There is only a need to collect cost data | • Few treatments have identical outcomes  
• Effect data would need to be collected to verify the equivalence assumption |
3.3 Cost-effectiveness analysis

Cost-effectiveness studies use specific end-points and generally measure parameters in natural units (e.g. life years) to define ‘successful’ outcomes. The results of cost-effectiveness analyses are expressed as a cost-effectiveness ratio; the ratio of the costs divided by the health outcomes (e.g. cost per life-years gained, cost per prevented drug user). The lower the cost-effectiveness ratio, the more cost-effective the programme or intervention. As evaluation often occurs with programmes or interventions that are already in place, it is necessary to examine the additional costs that one programme or intervention imposes over another, compared with the additional effects, benefits or utilities it delivers. This is called incremental analysis and the output is the incremental cost-effectiveness ratio (ICER) (see Box 13). Comparison of cost-effectiveness ratios can be made across a broad range of programmes, but only if there is a common effect of interest (e.g. cost per life years saved) (Drummond, 1997).

**Box 13. Incremental cost-effectiveness ratios (ICERs)**

Average cost-effectiveness ratios are derived by dividing the average cost of treating patients by the average outcome per patient ($C_1/E_1$ or $C_2/E_2$) and incremental cost-effectiveness ratios are derived by dividing the incremental cost (denoted by $\Delta C$) by the incremental benefit ($(C_2-C_1)/(E_2-E_1)$).

It can sometimes be difficult to know which measure is likely to be most representative of a general improvement in outcome as some indicators may conflict (e.g. change in a behaviour now may not result in the actual prevention of drug use in the future). Therefore, a single effectiveness measure does have limitations and there may be other outcomes that are just as relevant.

3.3.1 An example of a cost-effectiveness analysis

The Midwest Prevention Project (MPP) was a large, US community-based prevention trial funded by the National Institute on Drug Abuse (NIDA) involving communities and schools in the states of Kansas, Missouri and Indiana. Briefly, the programme consisted of a mass media campaign, a school programme, a parent programme, community organisation and local policy changes.

The costs and effects of the MPP compared to usual drug education are shown in Table 3.1. The cost was estimated at about $31 per family unit per year compared to ‘traditional drug education’ which was estimated at $6 per student per year. The effects of the MPP were reported at 5 year follow-up; there was a 12% reduction in daily smoking, 2.5% reduction in monthly drunkenness and a 2.5% reduction in heavy cannabis use. Traditional drug education was assumed to have little or no effect on these outcomes.

<table>
<thead>
<tr>
<th>Variables</th>
<th>MPP</th>
<th>Traditional drug education</th>
<th>Extra cost</th>
<th>Extra effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost</td>
<td>C</td>
<td>$31</td>
<td>$6</td>
<td>$25</td>
</tr>
<tr>
<td>Average effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in daily smoking</td>
<td>E_1</td>
<td>12%</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Reduction in monthly drunkenness</td>
<td>E_2</td>
<td>2.5%</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Reduction in cannabis use</td>
<td>E_3</td>
<td>2.5%</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Incremental analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICER_1</td>
<td>$\Delta C/\Delta E_1$</td>
<td>$25/12 = $2.08</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICER_2</td>
<td>$\Delta C/\Delta E_2$</td>
<td>$25/2.5 = $10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ICER_3</td>
<td>$\Delta C/\Delta E_3$</td>
<td>$25/2.5 = $10</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3.1. Results from a cost-effectiveness analysis of the Midwest Prevention Project (Pentz, 1998)
From the evaluation above the ICER is equal to $2.08 per net reduction in daily smoking, $10 per net reduction in monthly drunkenness and $10 per net reduction in heavy cannabis use. Therefore this estimate indicates that, compared with usual drug education, the Midwestern Prevention Programme costs an average of $2.08 additional dollars to achieve a net reduction in daily smoking, $10 additional dollars to achieve a net reduction in monthly drunkenness and $10 additional dollars to achieve a net reduction in heavy cannabis use.

### 3.4 Cost-utility analysis

An alternative to cost-effectiveness analysis, but derived from it, is cost-utility analysis (CUA). In this form of evaluation the consequences of programmes are adjusted by health state preference scores or utility weights (see Box 14). Utility is used to signify what a person expects to gain from the consumption of goods and services and more specifically, health utilities are preferences for specific health states or treatments.

**Box 14. Measuring health state preferences**

There are three main methods for deriving health state preference scores (or utility weights). The simplest approach is the rating scale method where subjects are asked to place his or her current health status on a line that goes from 0 (death) to 1 (perfect health). The second approach is time trade-off measurement in which the subjects, on the basis of a hypothetical health state (e.g. a chronic illness), have to decide how many years of his or her remaining life expectancy they would like to exchange for perfect health. The final approach is the standard gamble measurement, based on utility theory, in which individuals have to choose between living the rest of life in a hypothetical state of health (e.g. a chronic illness) or a gamble, which, if won, will mean perfect health and if lost, will signify death. The probability of the gamble paying off is changed until the individual shows no preference between the probability of the two events (i.e. gambling or remaining in the current state). This probability expresses the individual’s preference for the hypothetical health state. These preferences are used to construct weighted measures of consequences such as the quality adjusted life year.

Measuring preference for health outcomes, as described in Box 14, is a time consuming and complex task (Drummond et al., 1997). To address this, health status classification systems with preference scores have been developed. A commonly used example is the EuroQol (EQ-5D), which generates a single score from the ability of the individual to function in five dimensions (mobility, pain/discomfort, self-care, anxiety/depression, and usual activities). For each dimension, a person is classified as having no problem, some problem, or major problems. Each health state is then valued on a scale from 0 (dead) to 1 (perfect health). Some health states are valued as worse than death and can be given a negative value.

A commonly used measure of utility is the quality adjusted life year (QALY, see Box 15). The advantage of cost-utility analysis is that it can be used to assess outcomes across drug interventions and programmes.

**Box 15. The quality adjusted life-year (QALY)**

The QALY is a multi-dimensional construct based on a composite of life years saved/gained and the quality of life of those remaining years. Both the quality and quantity of the years of life a patient is expected to have are assessed. QALYs are calculated by multiplying the value of preference (see Box 14) of being in a certain state by the length of time of being in that state, for example, 10 years in a health state with a utility value of 0.5 would result in 5 QALYs (equivalent to 5 years in perfect health).

Cost-utility analysis has been criticised for several methodological reasons (beyond the scope of this report), most frequently concerning the perception of the QALY as too simple an approach for assessing such a complex area. The method assumes that one QALY is the same as another. Some have argued that this depends on when it occurs and to whom, and that each QALY gained is independent of the remaining quality-adjusted lifespan. Others argue that QALYs favour programmes aimed at the young over the old (e.g. Stolk et al., 2005) because of the inherent bias towards the quantity of life years saved in calculating a QALY.

### 3.4.1 An example of a cost-utility analysis

A sample of participants in two Dutch heroin trials comparing co-prescription of heroin with prescription of oral methadone completed the EQ-5D at the beginning of the trial and after 6, 10 and 12 months of treatment to ‘score’ their health utilities (Dijkstra et al., 2005). Co-prescription of heroin generated 0.788 QALYs and methadone alone, 0.730 QALYs, giving a difference of 0.058 QALYs. This is equivalent to an additional 21 days of perfect health (0.058 x 365) for those receiving co-prescription of heroin. Compared to the prescription of methadone alone, co-prescription of heroin was cost saving as savings for law enforcement and victim damage offset the higher costs of treatment (total cost savings of €12,793). Therefore the co-prescription of heroin was found to be both cost saving and generate more QALYs compared to prescription of oral methadone alone.
3.4.2 QALY league tables

The outcomes of drug programmes, expressed as a cost per QALY, can be a useful tool for planning processes and helping to select efficient programmes. Miller and Hendrie (2005) derived a cost per QALY saved for 84 drug-related prevention programmes and Table 3.2 below illustrates a selection of them:

Table 3.2. Results from a cost-utility analysis of the co-prescription of heroin and methadone (Dijkgraaf et al., 2005)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Methadone plus heroin</th>
<th>Methadone alone</th>
<th>Extra cost (rC)</th>
<th>Extra effect (rE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost</td>
<td>€37,767</td>
<td>€50,560</td>
<td>-€12,793</td>
<td>-</td>
</tr>
<tr>
<td>Average effect (QALY)</td>
<td>0.788</td>
<td>0.730</td>
<td>-</td>
<td>0.058</td>
</tr>
<tr>
<td>Incremental analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICER1</td>
<td>ΔC/ΔE</td>
<td>&lt;€0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

△ is used to denote incremental costs and effects

Table 3.2 shows the cost per QALY saved for each programme; for example, it costs $6,200 to save a QALY by delivering the Midwest Prevention Programme compared to $150,000 for delivering the Syracuse 5-Yr Home Visits programme. A low cost per QALY is preferred, but it is the responsibility of the decision maker to judge what is an effective use of resources. When comparing QALYs across different studies caution must be applied because they may have used different discount rates, different methods for estimating health state preferences and considered a different range of costs and consequences.

3.5 Cost-benefit analysis

Cost-benefit analysis aims to compare all social costs and consequences across different interventions or a do nothing approach. For this reason a societal perspective is usually assumed when undertaking this type of analysis. Cost-benefit analysis relies on conversion of all benefits into monetary values, which provides a ‘common metric’ when comparing disparate programmes as well as the ability to judge the general economic performance of one strategy against another.

In simple terms, the goal of a cost-benefit analysis is to identify whether a programme’s benefits exceed its costs (Drummond et al., 2005). This may be expressed as a programme’s net present value or as a ratio of benefits to costs (see Box 16). A major problem encountered with this form of economic evaluation is the question of what costs and benefits to include, and how to translate benefits into monetary values. Some costs and benefits are easier to count than others, and some may even carry different weights or “salience” (Hawks and Lenton, 1998).

Box 16. Net present value or benefit-cost ratio?

The choice of whether to use a benefit-cost ratio (BCR) or net present value (NPV) as the expression of return on investment is perhaps a subjective one. The BCR is simply a ratio of benefits to costs, but BCRs can be manipulated to appear more or less favourable depending on which side of the equation they are put. The size of the ratio depends on what goes into the numerator and denominator, for example, whether consequences of a programme are included as benefits or cost-offsets (see Drummond et al., 1997). Subsequently, it may be difficult to compare ratios from different studies especially when the benefits are widely defined. The NPV is perhaps more straightforward, and is calculated by subtracting costs from benefits, taking into account the discount factor (where appropriate). An NPV>0 indicates that a programme is worthwhile. When social costs and benefits (i.e. not just those costs/benefits that normally fall on an investor) are included, NPVs become net social benefits (NSBs). However, both formulations rely on capturing all the relevant costs and benefits.

Table 3.3. An example of cost-utility analysis of drug and alcohol prevention programme

<table>
<thead>
<tr>
<th>Prevention Programme</th>
<th>Cost per QALY (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sobriety Checkpoints</td>
<td>&lt;0</td>
</tr>
<tr>
<td>Driving While Intoxicated offender car impoundment</td>
<td>190</td>
</tr>
<tr>
<td>Midwest Prevention Programme</td>
<td>6,200</td>
</tr>
<tr>
<td>Mandatory Server Training</td>
<td>16,000</td>
</tr>
<tr>
<td>Syracuse 5-Yr Home Visits</td>
<td>150,000</td>
</tr>
<tr>
<td>Install central reservation barrier</td>
<td>253,000</td>
</tr>
<tr>
<td>D.A.R.E (police lecture at school)</td>
<td>Infinite</td>
</tr>
</tbody>
</table>

(adapted from Miller and Hendrie, 2005)
3.5.1 Assigning monetary terms to health outcomes

As health outcomes are not traditionally valued in monetary terms, converting them can be difficult and the whole topic remains controversial (see Drummond et al., 1997). Approaches to valuation fall into two broad categories, the individual or societal preference, or human capital (Jefferson et al., 1996). The human capital approach to valuation is based on an individual’s worth to society calculated on the basis of his or her present and future earnings. The human capital approach is the traditional method for calculating indirect costs in the form of overall production losses. The friction-cost method is a modification of the human capital approach, which avoids the tendency of that approach to overestimate productivity losses. An alternative technique to valuing health outcomes in monetary terms is to count the value of avoided or deferred costs known as ‘cost-offsets’ (described in Box 17).

**Box 17. The cost-offset method**

The cost-offset method shows the extent of the net savings a programme makes in tangible offsets, like costs of policing or crime, after adjusting for the cost of the programme itself. For example, a successful intervention might mean that less time and money is spent on policing substance-associated incidents in young people. However, this approach ignores other many subtle benefits. This might be of concern where a programme does not show a positive net benefit in hard cash release but has intangible benefits to individuals, families or the wider community (e.g. fear of crime, anti-social behaviour). Without these benefits being included, such programmes might be abandoned or under-resourced.

A more valid technique for the valuation of benefits is the value to which individuals or society are prepared to pay for all benefits, financial or otherwise, by expressing preferences and choices in monetary units. This might include intangible costs and benefits, which are sometimes overlooked, by undertaking contingent valuation such as willingness to pay studies (see Box 18). However, most of the currently reported cost-benefit analyses in the drug field are still in terms of personal and social costs averted (e.g. cost-offsets).

**Box 18. Willingness to pay (WTP)**

The WTP approach is an evaluation method used to determine the maximum amount of money an individual is willing to pay to gain a particular benefit or to accept the avoidance of harm. This is achieved by directly eliciting individual preferences from samples of the general public.

**Example of a pilot WTP study**

A WTP study of two types of drug treatment programmes, one for all drug users and one focused on women, was conducted in North Carolina and New York (Zarkin et al., 2000). A total of 393 respondents were asked what was the maximum amount they were willing to pay for expanding the two programmes to treat more drug users each year. The mean WTP for both types of drug treatment programme was found to be approximately $37 per respondent.

The UK Treasury’s ‘Green Book’ (HM Treasury, 2003) calls for all public sector projects, including those in health care, to enumerate all relevant savings and costs and to calculate the potential ‘return on investment’ using the BCR method. Unfortunately, as WTP techniques for health care are still not well developed (Drummond et al., 1997) the difficulties with this technique are mainly concerned with the measurement of such benefits. Also the Treasury recognise several possible biases in using this method including ‘optimism bias’ (the exaggeration of benefits) which is a common shortfall in many studies.

3.5.2 Examples of cost-benefit analysis

There are many examples of cost benefit analysis in the drug treatment field. For example, in the USA the ‘Caldata’ study involving 3,000 alcohol and drug dependent participants under differing modes of care showed that treatment yielded a 7:1 return on each dollar spent (Gerstein et al., 1994). Benefits exceeded costs at one year, and more than doubled the benefits made during the treatment period.

Although not a formal economic evaluation, examination of the costs and consequences of drug misuse and treatment among clients recruited to the National Treatment Outcomes Research Study (NTORS) found that the ratio of consequences to net treatment investment varied from 18:1 to 9.5:1, depending on the assumptions made (Godfrey et al., 2004). This approximated to savings in consequences of between £14.2m and £27m. Another recent UK example, but concerning alcohol, was the UK alcohol treatment trial (UKATT Research Team, 2005). The study found that two types of treatment for alcohol problems, social behaviour and network therapy, and motivational enhancement therapy produced a saving in expenditure on health, social, and criminal justice services of 5:1, a mean saving of around £206 per client.
In the ‘Treatment Outcome Prospective Study’ (TOPS) conducted in the USA, Harwood and colleagues (1988) used a longitudinal survey of drug users to analyse the economic benefits of a methadone treatment programme. After undergoing the programme, drug users imposed lower rates of crime-related costs on society (Harwood et al., 1988). The BCR for the TOPS methadone treatment program was found to be 4:1 compared to Harwood’s conservative estimate of a return of 3.8:1 on the cost of reduced crime alone (Harwood et al., 1988). Given this BCR, the programme provided a return on the investment (that is, benefits exceeded costs) within the first two years of the programme.

Economic evaluation of drug prevention has, to date, mainly used cost-benefit analysis. In order to identify CBAs undertaken in the field of substance misuse prevention (including illicit drug, alcohol and smoking) a search of the literature was undertaken (see Appendix 1). Table 3.3 presents an overview of 12 prominent cost-benefit analyses. This literature is variable in quality and difficult to interpret in the UK context. All but one of these studies (the Focus on families programme) showed positive BCRs or NPVs, meaning that the benefits of the programme to society outweighed its costs. Table 3.3 also shows the different types of costs avoided and unit programme costs incurred. BCRs at the whole programme level ranged from 1.69 to 19.64 with NPVs of < 0 to ~$2,386. That is, for every dollar spent on prevention it is expected to save between $1.69 and $19.64 in benefits gained.

Table 3.4 is intended to give an overview of the cost-benefit analyses in the field of drug and alcohol prevention and examples of how costs and benefits are calculated. The variability in the savings arises because of (amongst other issues) the differences in how costs and benefits were calculated, which costs and benefits were included in the studies, and the differences in the populations targeted. For this reason the findings of the individual analyses should be not compared to one another or used as a means to select the most efficient programme.
<table>
<thead>
<tr>
<th>Study</th>
<th>Author(s)</th>
<th>Target substance(s) or consumer</th>
<th>Type of intervention</th>
<th>Reported BCR</th>
<th>Saving/benefit categories</th>
<th>Unit cost (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa Strengthening Families Programme</td>
<td>Spoth R et al., 2002</td>
<td>Alcohol (Parents and students)</td>
<td>Family skills training</td>
<td>$9.60 per $1</td>
<td>Not reported</td>
<td>$880/ familyb</td>
</tr>
<tr>
<td>Preparing for the Drug-Free Years</td>
<td>Health Outcomes International Pty Ltd</td>
<td>Alcohol (Parents)</td>
<td>Needle/Syringe Exchange</td>
<td>$5.85 per $12</td>
<td>HIV/HCV treatment costs avoided; QALYs gained</td>
<td>$710/ familyb</td>
</tr>
<tr>
<td>Needle and Syringe Programme in Australia</td>
<td>Heath Outcomes International Pty Ltd</td>
<td>Intravenous drug users</td>
<td>Needle/Syringe Exchange</td>
<td>NPV (A$million) 2386 (5% discount rate)</td>
<td>HIV/HCV treatment costs avoided; QALYs gained</td>
<td>Av: 0.72 A$cents/needle</td>
</tr>
<tr>
<td>Life Skills Training</td>
<td>Swisher J, 2001</td>
<td>Cigarette Smokers</td>
<td>Smoking cessation hypothetical model</td>
<td>19.64</td>
<td>Health care costs</td>
<td>$2,850</td>
</tr>
<tr>
<td>Community Trials Project</td>
<td>Holder H et al., 2000</td>
<td>Alcohol</td>
<td>Environmental control in local community</td>
<td>2.88</td>
<td>Legal, medical and administrative caused by RTAs (over 4 years)</td>
<td>Not reported</td>
</tr>
<tr>
<td>‘An ounce of prevention, a pound of uncertainty’</td>
<td>Caulkins J et al., 1999</td>
<td>Cocaine, cannabis &amp; alcohol</td>
<td>School-based drug prevention based on Alert &amp; LST programmes</td>
<td>2.40</td>
<td>Healthcare, productivity and crime</td>
<td>$150</td>
</tr>
<tr>
<td>‘Focus on Families’ programme (NIDA)</td>
<td>Plotnick R et al., 1998</td>
<td>Heroin</td>
<td>Prevention of relapse by methadone treatment using social development model</td>
<td>At 6 months NPV&lt;0</td>
<td>Healthcare, productivity, accidents, domestic violence, crime</td>
<td>~$3,400</td>
</tr>
<tr>
<td>Elmira Prenatal Early infant Project (PEIP)</td>
<td>Karoly L et al., 1998</td>
<td>All drugs</td>
<td>Home-based parental education by nurse</td>
<td>400</td>
<td>Productivity gains, tax revenue, crimes avoided, Social care savings</td>
<td>$14,700/ childb</td>
</tr>
<tr>
<td>Perry Preschool Project (PPP)</td>
<td>Karoly L et al., 1998</td>
<td>All drugs</td>
<td>Special educational activities in schools</td>
<td>2.0</td>
<td>Productivity gains, tax revenue, crimes avoided, Social care savings</td>
<td>$14,700/ childb</td>
</tr>
<tr>
<td>Macroscopic economic approach</td>
<td>Kim S et al., 1995</td>
<td>All illicit drugs</td>
<td>Regression and longitudinal analysis of US Household Survey data</td>
<td>15.0</td>
<td>Healthcare, crime, productivity and premature death</td>
<td>N/A</td>
</tr>
<tr>
<td>Mid-Western Prevention Programme (MPP) ‘Project Star’</td>
<td>Pentz M, 1998</td>
<td>Cigarettes, alcohol and cannabis</td>
<td>School-based drugs prevention programme in 200 communities over 6 yrs</td>
<td>At 5 yrs Cigarettes: 8.12 Alcohol: 1.69 Cannabis: 1.69</td>
<td>Savings based on standard costs per smoker, alcohol and marijuana abuser</td>
<td>$108/ participantb $800/ familyb</td>
</tr>
<tr>
<td>High/Scope Perry Pre-school</td>
<td>Schweinhart L et al., 1993</td>
<td>All drugs</td>
<td>School and home-based educational information for high-risk families</td>
<td>8.74</td>
<td>Productivity gains, tax revenue, crimes avoided, Social care savings</td>
<td>$12,356</td>
</tr>
</tbody>
</table>

aIn US$ of study year, unless specified.  
bExtracted from Miller & Hendrie (2005)
The US-based NIDA has made perhaps the most extensive study of the ‘social influences’ approach model on behaviour change linked with drug use (Werthamer, 1998). Based on the assumption that traditional drugs education has no effect on the reduction of smoking, drunkenness and cannabis use, the Mid-Western Prevention programme was found to be both cost-effective and cost-beneficial. The intervention cost around $31 per child per year and led to a 12% reduction in cigarette smoking, a 2.5% reduction in heavy cannabis use and 2.5% reduction in monthly drunkenness. The yield on every dollar spent varied depending on the type of drug addressed and related harm avoided. BCRs varied from 1.7:1 both for heavy cannabis use and drunkenness to 8.1:1 for daily tobacco smoking (Pentz, 1998).

The ALERT and Life Skills Training programme were designed to reduce cocaine use. The RAND Institute reported that these programmes reduced use by around 35% (25% came from reduced initiation of use and 10% from reduced use). The cost per participant was around US$67, and for every dollar spent, $2.40 was averted from social costs. However, this study recognised uncertainty surrounding this BCR (the low and high estimates of savings were $0.64 and $5.60, respectively). The researchers concluded that although affordable, prevention programmes should not be a substitute for supply and enforcement measures because their effect was too slow to eliminate cocaine use (Caulkins et al., 1999).

Miller and Hendrie (2005) recently undertook a comprehensive analysis of 84 drug and alcohol prevention programmes. This review included a variety of interventions to reduce harm from drug use (from physical environmental modifications to sanctioning and enforcement). The authors also adjusted and standardised many of the original published estimates of programme costs and benefits for differences in time of study and costing methods. The analysis found widely varying BCRs across the different types of approach. Table 3.5 shows the range of BCRs for eight types of drug and alcohol intervention approaches. Both clinical and criminal justice interventions showed consistently higher BCRs compared to others (e.g. sanctioning and social environment modification).

BCRs in other areas indirectly involving drug and alcohol consumption (e.g. personal protective devices such as children’s car seats, bicycle helmets, and anti-drowning devices) were much higher at 4.0 - 2045 for their cost. It is clear that the range of BCRs is extremely wide, even with similar prevention approaches (with the exception of BCRs for social environment modification and sanctioning). However, the length of time to achieve a financial return for each programme is not known, as this was not specified in the included studies.

### 3.6 Measuring benefit

Benefit measurement is especially critical in most health areas and drug interventions are no different. Outcomes can be measured in many different ways but it is ultimately the usefulness (or utility) of an intervention in terms of personal quality of life that is important economically. Quality of life status and life years extended are now widely accepted as the best end-points by which to measure the cost-effectiveness of healthcare interventions (Bowling, 1997). For example, it is less useful knowing that a programme reduces consumption of drugs when there is no information about resultant quality of life (e.g. users may simply switch from illegal to legal drugs). However, measuring final utility in this way is still not widely undertaken in the drug field.

### Table 3.5. Range of BCRs for eight types of alcohol and drug intervention approaches

<table>
<thead>
<tr>
<th>Intervention approach*</th>
<th>BCR Max</th>
<th>BCR Min (excluding ≤2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical environmental modification (7)</td>
<td>607</td>
<td>2.6</td>
</tr>
<tr>
<td>Personal protective devices (9)</td>
<td>2,045</td>
<td>4.0</td>
</tr>
<tr>
<td>Social environment modification (10)</td>
<td>9.6</td>
<td>2.8</td>
</tr>
<tr>
<td>Behavioural modification (18)</td>
<td>101</td>
<td>2.3</td>
</tr>
<tr>
<td>Legislation (15)</td>
<td>61</td>
<td>2.6</td>
</tr>
<tr>
<td>Enforcement (4)</td>
<td>84</td>
<td>7.6</td>
</tr>
<tr>
<td>Sanctioning (8)</td>
<td>5.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Clinical (9)</td>
<td>73</td>
<td>3.2</td>
</tr>
</tbody>
</table>

*The number of programmes assessed in each group is in brackets in column one. (adapted from Miller and Hendrie, 2005)
Critical appraisal of published economic evaluations

In order to judge the validity of the results from an economic evaluation, the methods used to produce the evidence should be closely examined. The methodology for undertaking evaluations of healthcare interventions is well developed and is applicable to public health interventions such as drug prevention. A summary of the relevant questions to ask about an economic evaluation is presented in Box 19. Applying the checklist to published evaluations allows the reader to systematically identify and assess the strengths and weaknesses of that evaluation.

**Box 19. Checklist for assessing economic evaluations (Drummond et al., 1997)**

1. **Was a well-defined question posed in an answerable format?**
   1.1. Did the study examine both costs and effects of the service(s) or programme(s)?
   1.2. Did the study involve a comparison of alternatives?
   1.3. Was a viewpoint for the analysis stated and was the study placed in any particular decision-making context?

2. **Was a comprehensive description of the competing alternatives given?**
   2.1. Were any important alternatives omitted?
   2.2. Was (Should) a do-nothing alternative (be) considered?

3. **Was the effectiveness of the programme or services established?**
   3.1. Was this done through a randomised, controlled trial? If so, did the trial protocol reflect what would happen in regular practice?
   3.2. Was effectiveness established through an overview of studies?
   3.3. Were observational data or assumptions used to establish effectiveness? If so, what are the potential biases in results?

4. **Were all the important and relevant costs and consequences for each alternative identified?**
   4.1. Was the range wide enough for the research question at hand?
   4.2. Did it cover all relevant viewpoints?
   4.3. Were capital costs, as well as operating costs included?

5. **Were the costs and consequences measured accurately in appropriate physical units?**
   5.1. Were any of the identified items omitted from measurement? If so, does this mean that they carried no weight in the subsequent analysis?
   5.2. Were there any special circumstances (e.g. joint use of resources) that made measurement difficult?

6. **Were the costs and consequences valued credibly?**
   6.1. Were the sources of all values clearly identified?
   6.2. Were market values employed for changes involving resources gained or depleted?
   6.3. Where market values were absent, or market values did not reflect actual values, were adjustments made to approximate market values?
   6.4. Was the valuation of consequences appropriate to the question posed?

7. **Were the costs and consequences adjusted for differential timing?**
   7.1. Were costs and consequences which occur in the future “discounted” to their present values?
   7.2. Was any justification given for the discount rate used?

8. **Was the incremental analysis of costs and consequences of alternatives performed?**
   8.1. Were the additional (incremental) costs generated by one alternative over another compared to the additional effects, benefits, or utilities generated?

9. **Was allowance made for uncertainty in the estimates of costs and consequences?**
   9.1. If data on costs and consequences were stochastic, were appropriate statistical analyses performed?
   9.2. If a sensitivity analysis was employed, was justification provided for the range of values (for key study parameters)?
   9.3. Were study results sensitive to changes in the values?

10. **Did the presentation and discussion of study results include all issues of concern to users?**
    10.1. Were the conclusions of the analysis based on some overall index or ratio of costs to consequences (e.g. cost-effectiveness ratio)? If so, was the index interpreted intelligently or in a mechanistic fashion?
    10.2. Were the results compared with those of others who have investigated the same question? If so, were allowances made for potential differences in study methodology?
    10.3. Did the study discuss the generalisability of the results to other settings and patient/client groups?
    10.4. Did the study allude to, or take account of the other important factors in the choice or decision under consideration (e.g. distribution of costs and consequences, or relevant ethical issues)?
    10.5. Did the study discuss issues of implementation, such as feasibility of adopting the ‘preferred’ programme given existing financial or other constraints, and whether any freed resources could be redeployed to other worthwhile programmes?
Economic evaluation offers the opportunity for planners of drug prevention policy and services to be more efficient with, and to prioritise, the finite resources available for implementation. However, to date, the application of economic principles and analysis in the drug prevention field has not been fully exploited in the UK. Internationally, there have been more extensive economic evaluations of treatment and enforcement programmes and these have provided useful evidence on which to base decisions. However, as more drug prevention programmes are implemented in competition with drug treatment interventions and other approaches, it will become increasingly important to determine which programmes make the best use of resources. Whilst prevention remains generally under-evaluated, other areas with more proven cost-benefits will continue to dominate resource use. This is likely to continue until there is a more standardised economic framework for drug prevention.

Various techniques of economic evaluation have been applied within the drug prevention field, often without any justification. Although it is essential to determine efficiency of resource use, both between programmes that address the same problem and resources that could be used in alternative ways, these methods must be properly employed. Existing published studies have been inconsistent and in some cases methodologically flawed (Plotnick et al, 1998; Kim et al, 1995; Kenkel, 1998). A small but growing number of studies now include an assessment of ‘return on investment’ expressing the magnitude of benefits in monetary terms. These will be increasingly useful to decision makers at all levels if they can be interpreted meaningfully. At present the majority of studies use a cost-offset method to assess lost benefits and further work on willingness-to-pay techniques are required. In particular, establishing the wider social costs and benefits (including the psycho-social benefits) of drug prevention programmes is essential and can only strengthen the case for drug prevention by capturing currently under-estimated benefits. The present selection of cost-offsets can be highly subjective. A growing number of these studies mainly come from North America and this makes interpretation and translation of the results difficult for other countries.

Whilst some might conclude that the emerging evidence regarding the cost-effectiveness of drug prevention programmes looks promising (see Swisher et al., 2004), considerable caution is required in the interpretation of current results, predominately due to variations in the scope of costs and benefits addressed and the time-scales adopted. Other economic issues relevant to prevention, such as the need to discount future costs and benefits, have yet to be properly addressed. For example, standard discounting procedures (used elsewhere in social investment decisions) are not widely used in the drug prevention field. This could contribute to the over-estimation of BCRs in the majority of studies, as future benefits would be less when any discount factor is applied. Taken at face value, more costly schemes may not necessarily reap greater benefits and cheaper interventions may be just as effective.

**Future activities**

This report has highlighted the importance of incorporating economic evaluation into policy- and decision-making in the field of drug prevention. However, health economics is a complex field for the non-specialist, and there are still a number of unresolved issues, particularly around determining which costs and benefits to include in UK-based evaluations, which may continue to hinder its development. This is especially pertinent when considering the transferability of existing data generated in the US, where differences in provision, structure, policy, and national priority exist. Regardless, this should not act as a barrier to the eventual adoption of health economic approaches. Whilst some data is beginning to emerge with regards to drug (and alcohol) treatment, further investment into specific research into the economics of drug prevention is required. Ideally, evaluations of medium to large-scale prevention projects in the UK should, in addition to examining health and social outcomes, collect economic data as a matter of course.
There appears to be a need for clear guidance on which techniques should be used and in what circumstances to evaluate the costs and benefits of drug prevention programmes. Policy and decision makers in the field should be encouraged to develop an understanding of good practice in economic evaluation, in addition to relevant interpretational and critical appraisal skills. Researchers conducting drug programme evaluations may also benefit and be able to present conclusions with greater public health and policy relevance if economic analyses were also considered.
Section 4

References


Appendix 1.

Methods for identifying cost-benefit analyses of drug prevention programmes.

This report was not intended to be a systematic review of all literature that reported economic evaluation, but was designed to identify articles that specifically included a cost-benefit (benefit-cost) ratio (CBR) or net present value (NPV) statistic used in cost-benefit analysis. This largely excluded a systematic analysis of cost-effectiveness studies (except where a CBA was also performed).

A search on several key databases was made including Medline (via PubMed), as well as hand searching in specialist libraries during March - July 2005. A limit was placed on articles published before 1995. Keywords used included: Drug prevention; harm; abuse/misuse; addiction; economics; economics of; cost; effectiveness; cost-effectiveness; benefit; cost-benefit; utility and cost-utility. The addition of ‘utility’ and ‘ratio’ keywords did not pick up further studies. A final search was performed using PubMed in October 2005.

The search revealed 105 relevant papers of which 16 were directly relevant, the remaining papers were collated from a specialist library collection (some overlap did occur). Although, some papers claimed to be cost-benefit studies they gave no material evidence to support this. Many papers were repeatedly cross-referenced and some papers were simply variants on an original paper.

Appendix 2.

Recommended resources and further reading

Health Economics textbooks

Drug prevention resources

Useful contacts
- International Health Economics Association - http://healtheconomics.org/
- The NHS Health Economics Support Programme (HESP) at the University of East Anglia. http://www.med.uea.ac.uk/research/research_econ/hesp
CONTACT
National Collaborating Centre for Drug Prevention
Centre for Public Health
Liverpool John Moores University
Castle House
North Street
Liverpool
L3 2AY
E-mail: NCCDPinfo@ljmu.ac.uk
www.drugpreventionevidence.info

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