



Alcohol misuse: How much does it cost?

September 2003

1. Introduction

1.1 Why measure the costs of alcohol misuse

For most adults drinking alcohol is part of a pleasurable social experience, which causes no harm to themselves or others. For some people though, alcohol misuse is responsible for causing serious damage to themselves, their family and friends and to the community as a whole.

In this context, alcohol has significant costs not only for the individual but also for the whole economy. The potential savings to individuals, households, businesses and the public sector from effective measures to minimise harm from alcohol misuse could therefore be large.

Estimating these costs is a methodological challenge, given the difficulty of quantifying the degree of causality between alcohol misuse and its negative consequences. Nevertheless, cost estimates of this kind are potentially a valuable source of information for policy makers and they would serve several purposes.

First, cost estimates of alcohol misuse would provide a justification or otherwise for resources spent on reducing the harm associated with alcohol misuse and help to appropriately target specific problems and policies such as the impact of prevention, treatment and enforcement strategies.

Second, estimates of the costs that alcohol misuse imposes on society would provide an important insight into future policy appraisal and evaluation. Improved costs estimates are important in assisting policy makers to develop more complete cost-benefit analyses of policies and programmes aimed at reducing the harm associated with alcohol misuse.

Third, estimates of costs of alcohol misuse would provide baseline measures to determine the efficacy of alcohol policies and programmes intended to reduce the damaging consequences of alcohol misuse. Ultimately, cost estimates could be used, e.g., in the design of optimal tax policy and, where possible, national target setting of, for example, alcohol related crime and disorder and central and local government co-ordination.

On a more practical note, estimates of the costs of alcohol misuse may also help identify information gaps, research needs and desirable refinements to national statistical reporting systems. They can also facilitate cross-national comparisons of the consequences of alcohol misuse and the different approaches used when confronting these consequences.

1.2 Underlying questions

The process of estimating alcohol-related costs aims to answering some of the following questions:

- ❖ What kind and scale of health-care services are necessary to deal with alcohol related problems and how much do these services cost?
- ❖ How many people die prematurely as a direct and indirect result of alcohol misuse? What are the economic consequences of these premature deaths?
- ❖ What effect does alcohol misuse have on individual output at the workplace?
- ❖ What is the scale of alcohol-related crime in society?
- ❖ How much does society have to spend to protect itself from alcohol related crime, enforce the law, and punish the offenders?
- ❖ How much does society have to spend in response to alcohol related crime in terms of lost output destroyed property and the pain and suffering of victims of crime?

1.3 Reasons for publishing this paper

The publication of this research paper serves a number of purposes:

- ❖ To provide the Government's National Alcohol Harm Reduction Strategy with new detailed estimates of the costs associated with alcohol misuse to be used in place of the old estimates drawn from various sources.
- ❖ To help inform the Government's National Alcohol Harm Reduction Strategy about how cost effective certain initiatives might be by comparing savings to up-to-date cost estimates.
- ❖ To make public and open the process by which the Strategy Unit at the Cabinet Office estimated the costs associated with alcohol misuse for England and Wales.
- ❖ To ensure that the figures used are open to scrutiny so that they can be improved and gaps in the data may be filled.

The estimates given in this study are far from comprehensive – rather, due to the lack of data in certain areas, they are probably underestimates of the true costs associated with alcohol misuse. As a result estimates could be open to revisions on the basis of new information and research.

1.4 Structure of the paper

The remaining of this paper is structured as follows. Section two presents the recent alcohol consumption trends in the England and the UK in general. This section also presents some estimates of the magnitude of alcohol misuse in England. Section 3 outlines the main issues involved in defining and identifying the main costs of alcohol misuse. It also presents the background on the methodology used in this study to

estimate these costs and a short literature review of previous research in this field with the main recent national and international estimates. A detailed typology of the overall costs considered in this study is also provided. Section 4 presents the health care costs of alcohol misuse and estimates the total NHS bill. Section 5 estimates the costs of alcohol misuse in the workplace and the wider economy while Section 6 presents the cost estimates of alcohol related crime. Section 7 concludes.

2. Trends in alcohol consumption in England

This section identifies sources of data on alcohol consumption in England and presents the most recent data and trends on the prevalence of alcohol use and misuse in England. An attempt is made to isolate dependent and heavy users from the rest of the population and the range of estimates is based on different prevalence assumptions.

Definitional problems in the alcohol field are very pronounced and the nature of causal links between social and other problems and alcohol misuse is complex. For example, there are many physical mental and social problems that are not associated with alcohol dependence and alcohol dependence is only a small part of alcohol related problems. Concentrating on dependent drinkers would only be useful if policy need be formulated specifically for that group. However, it may be argued that these drinkers while indeed having the largest number of individual problems, they are likely to account for the minority of alcohol related problems in an economy.

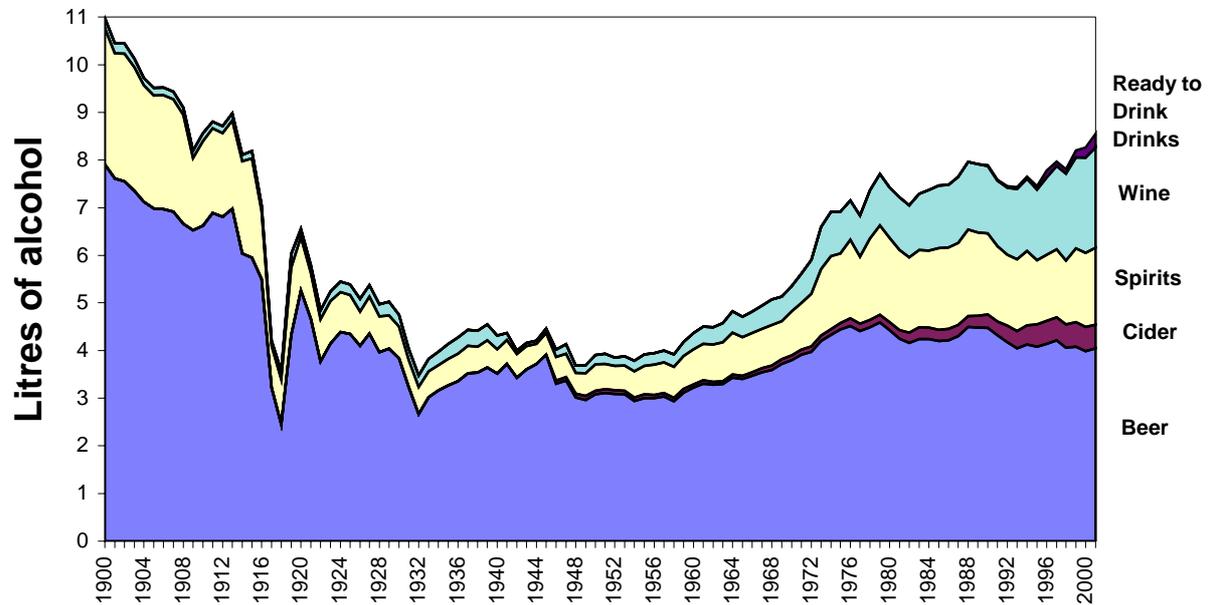
An issue for some consideration therefore exists around the choice of the group of drinkers this costing work should focus on. These issues will be discussed in more detail in the following sections.

2.1 General UK trends in alcohol consumption

Overall alcohol consumption in the UK has varied considerably in the last century. Per capita consumption in the UK has risen by more than half in the past thirty years to 8.5 litres of pure alcohol in 2001. The trend has been more moderate in the 1990s with total consumption growing by 5 percent between 1990 and 2001 (Chart 1). This places the UK at the bottom end of the distribution of per capita consumption among the EU countries but still above Australia (7.5 litres), USA (6.7 litres) and Canada (6.3 litres) (Chart 2).

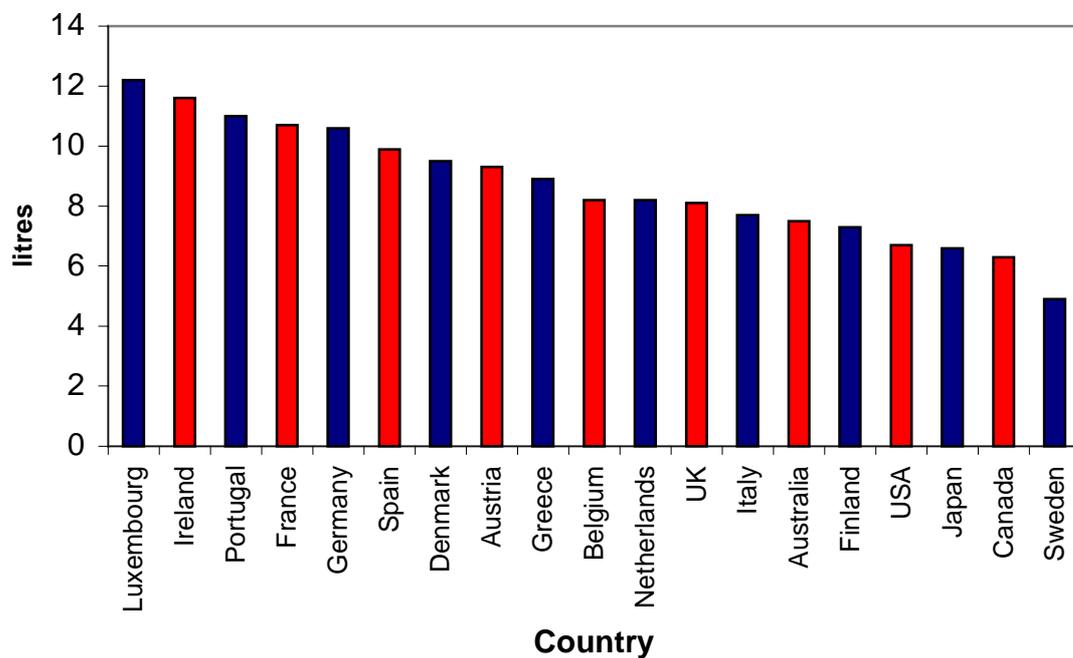
However obtaining reliable information about drinking behaviour is difficult and social surveys consistently under-record consumption of alcohol for two reasons. First, individual respondents consciously or unconsciously under-estimate how much alcohol they consume. Second, respondents reside primarily within private households and hence, students, publicans or homeless people are all excluded. The primary measures of alcohol consumption are weekly consumption level and maximum daily amount drunk last week. Both measures are widely used by surveys such as the General Household Survey (GHS) (ONS, 2001a), the Health Survey of England (HSE) and the Psychiatric Morbidity Survey (ONS, 2001b).

Chart 1 Alcohol Consumption in the UK :1900-2000
Per capita consumption of 100% alcohol



Source: British Beer and Pub Association Statistical Handbook

Chart 2 Annual alcohol consumption in the world - litres of pure alcohol, per inhabitant in 1999

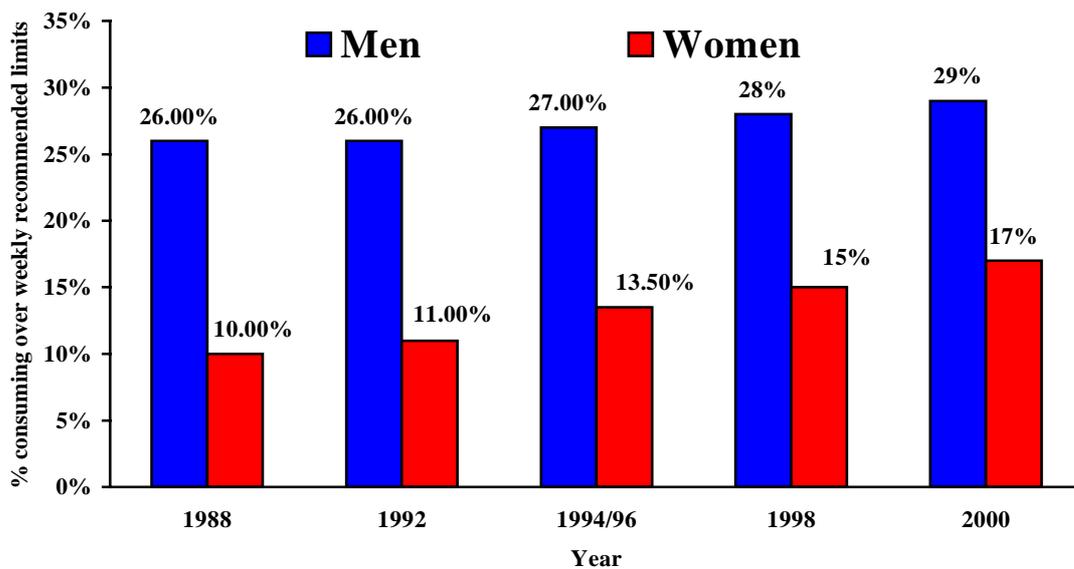


Source: Produktschap voor gedistilleerde Dranken, Schiedam, Netherlands (2000)

The weekly alcohol consumption measure has been used in the GHS since 1986 and was developed in response to earlier medical guidelines adopted by the government as the sensible drinking message (21 / 14 units¹ a week for men and women respectively). The maximum daily amount drunk last week measure was included in 1998 in the GHS following the new government guidelines on maximum daily recommended amount of drinking (4/3 units for men and women respectively). In the former case respondents were asked about their drinking habits over the last year whereas in the latter case, respondents were asked about their drinking habits in the previous week.

Findings from the GHS indicate that men were more likely to have an alcoholic drink in the previous week. The data suggests that 29 percent of men and 17 percent of women exceeded the weekly recommended limits (Chart 3). The corresponding figures for 1988 were 26 percent for men and 10 percent for women.

Chart 3 Consumption of over 14 and 21 units per week of alcohol for women and men respectively – Great Britain 2000/01



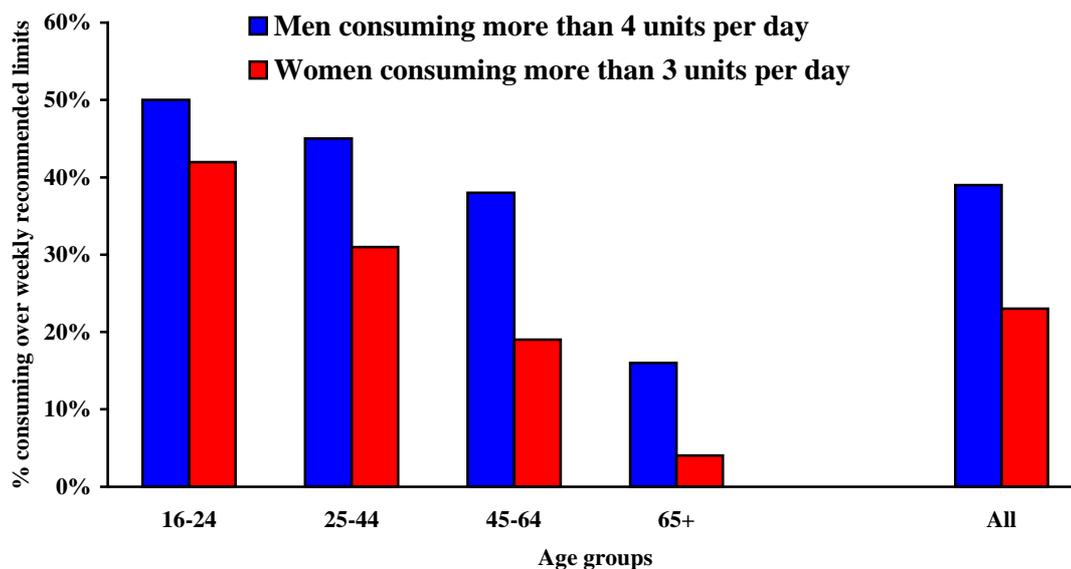
Source: ONS, 2001a

In 2000/01 (ONS, 2001a) 39% of men and 23% of women exceeded the daily recommended limits (4 units of alcohol for men and 3 units for women) on at least one day in the previous week (Chart 4). In addition, 21 percent of men and 10 percent of women were drinking in binges (8+ units (men) and 6+ units (women) in a single occasion) at least once in the previous week (Chart 5).

HSE data suggest that since 1993/94 the prevalence of drinking in excess of the weekly recommended limits has increased in both sexes and in most age groups from age 16 onwards (Primatesta et al, 2002). This increase has been most marked in those aged 16-24, particularly women. The 2001 prevalence in this age group was 40 percent in men and 30 percent in women. In fact, male and female levels of excessive

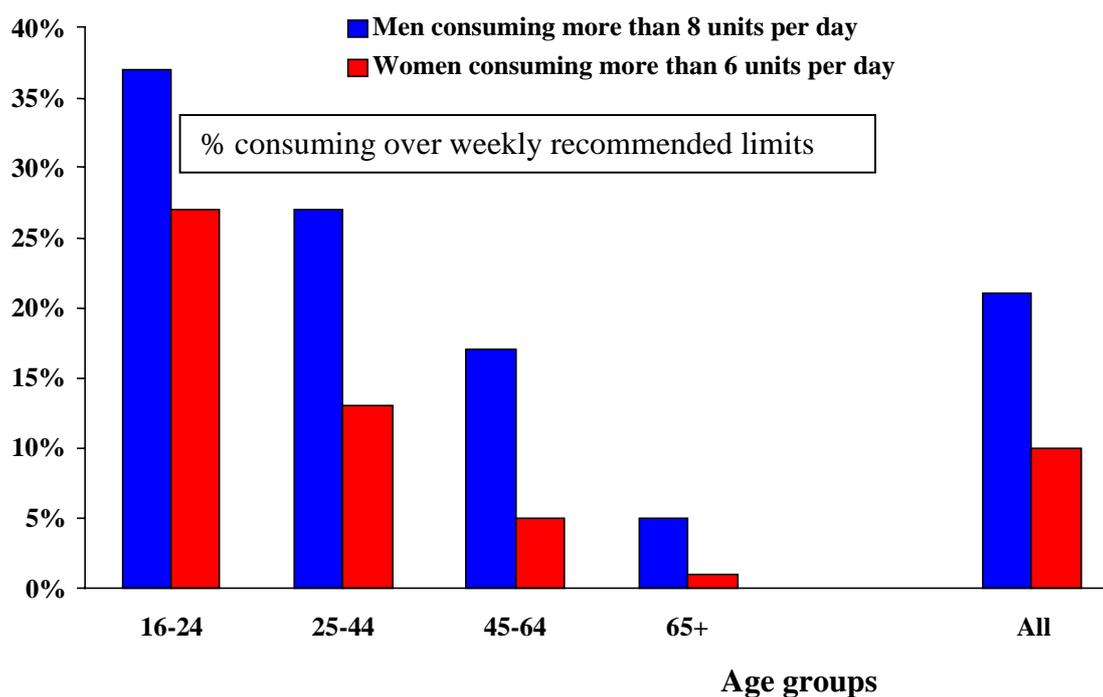
drinking have been converging largely as a result of increased levels of drinking by women. If the trends since 1993/94 are simply extrapolated over the next decade, then the prevalence of drinking above the weekly recommended limits among young women will (around 53 percent) exceed that of young men (around 48 percent) by 2012.

Chart 4 Adults consuming over the recommended daily limits of alcohol, by age and gender – Great Britain 2000/01



Source: ONS, 2001a

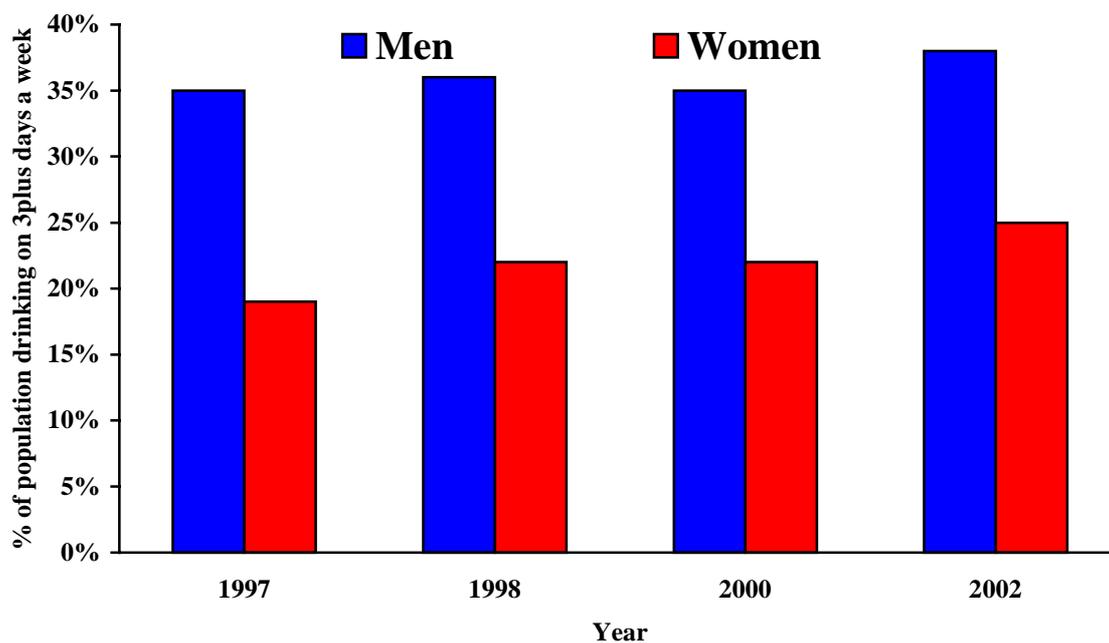
Chart 5 Adults consuming over double the recommended daily limits of alcohol, by age and gender – Great Britain 2000/01



Source: ONS, 2001a

Finally, the percentage of the population drinking on 3 or more days per week has increased since 1997 from 35 to 38 percent for men and from 19 to 25 percent for women (Chart 6). The proportional increase has therefore been greater in women, more of whom are drinking on 3-4 days per week than in earlier years; while more men are drinking on 5-6 days per week and almost daily than in earlier years (ONS, 2002).

Chart 6 Percentage of population drinking on 3 or more days per week – Great Britain 2002



Source: ONS, 2002

2.2 Prevalence of alcohol misuse in England

There is no single definition of alcohol misuse. Researchers to date have assumed misuse to coincide with “bingeing” (8+ units (men) and 6+ units (women) in a single occasion), heavy drinking (50/36 plus units a week for men and women respectively), problematic drinking (a score of one or more on the CAGE² questionnaire) or dependent drinking (based on either the AUDIT³ or SAD-Q⁴ questionnaire). Most studies of this kind have repeatedly been confronted with the problem of defining misuse and determining the most accurate number of those drinkers who may be the ones responsible for the majority of alcohol-related costs incurred in the economy.

This study is no different than other studies in that it tries to determine the number of problematic drinkers in the economy before estimating the costs associated with such type of problematic drinking. However, the nature of the causal links between alcohol misuse and social or health problems is complex. Thus it must be stressed that all

estimates given in this study are sensitive to the prevalence estimate of alcohol misuse and the identification of alcohol related problems.

With regard to alcohol related morbidity and mortality the results in this paper are based on the latest epidemiological literature. There are numerous publications and reports in the epidemiological and biological literature, which report evidence of causal relationships between alcohol misuse and various health outcomes. The study benefits from calculating alcohol related attributable fractions (the proportion of all outcomes from a cause, which can be attributable to alcohol). These are abstinence-based and calculated at all levels of alcohol consumption as given by gender, area and age (i.e. the proportion by which the mortality of men or women of certain age would be reduced if they became abstainers from alcohol).

A different strategy is followed when dealing with other alcohol related problems such as use of NHS services, costs resulting from alcohol related criminal behaviour or reduced output in the labour market due to alcohol misuse. In particular, alcohol related crime costs are not calculated in the same way as health costs, based on patterns of consumption. Due to lack of data on patterns of consumption of those who engage in criminal behaviour while under the influence, data is acquired from arrestee and criminal statistics surveys. More details can be found in section 6 and annex 5.

In addition to calculating some of the labour market costs due to alcohol misuse, the study uses estimates of the prevalence of heavy and or dependent drinking. The reason for this is that research to date in certain areas has been concerned with detecting alcohol related problems among particular groups such as, heavy drinkers and their use of treatment services (Dalton and Orford, 2002), or alcohol dependence and sickness absence (Health and Safety Executive, 2002). Prevalence data are then acquired from the Psychiatric Morbidity Survey (ONS, 2001b) and the GHS (ONS, 2001). Table 1 breaks the prevalence estimates by gender, severity of problem and economic activity using information from these two sources.

Table 1 Number of Alcohol Misusers in England - 2001*			
	Men	Women	All
Individuals drinking above government weekly guidelines	5,910,393	3,203,978	9,114,371
Individuals drinking above government daily guidelines	5,201,708	3,439,693	8,641,401
Heavy drinkers	1,319,285	611,420	1,930,705
Dependent drinkers	2,242,785	591,039	2,833,824
Employed dependent drinkers	988,324	210,681	1,199,006

* Certain overlaps may exist among the different drinking categories because these data come from different sources; as a result they cannot be added up to get a grand total

The Psychiatric Morbidity Survey (ONS, 2001b) indicates that 29 in a thousand women and 119 in a thousand men, aged 16 and over have some form of alcohol dependency as determined by the Severity of Alcohol Dependence Questionnaire (SAD-Q) screening test. This translates into about 7.9 percent of the English population or around 2.8 million (2,833,824) people in England aged 16 and over.

Similarly using information from the 2000/01 GHS (ONS, 2001a) it is found that in the UK 7 percent of men aged 16 and over and 3 percent of women aged 16 and over

are heavy drinkers (50/36 plus units a week for men and women respectively). Assuming the same prevalence among the English population this translates to 1.9 million (1,930,705) heavy drinkers in England.

This study uses the above prevalence estimates, where necessary, to calculate the various costs of alcohol misuse. Considerations with regard to the methodology used and the type of costs estimated are discussed in the next sections.

3. Issues involved in defining and identifying the private and social costs of alcohol misuse

3.1 Methodology of cost estimation

The magnitude of the costs of alcohol misuse for any particular year depends upon the use of prevalence- versus incidence- based estimates.

- *Prevalence-based estimates* – report all costs incurred in a given year that result from instances of alcohol misuse originating any time during or before the base year.
- *Incidence-based estimates* – report all costs incurred any time during or following the base year that result from instances of alcohol misuse originating during the base year.

This study will use prevalence-based estimates which would include the 2001 costs for new (newly incident), mature (have been misusing alcohol for some time) or even former alcohol misusers who may still have problems after they stopped using alcohol (e.g. liver cirrhosis). It follows the international guidelines for estimating the costs of substance misuse (Single et al, 2001) and utilises the “Cost-of-Illness” methodology (COI) to assess the overall negative impact of alcohol misuse on society in England, relative to a counterfactual scenario in which there is no alcohol misuse. In this framework alcohol misuse is treated as an illness that gives rise to costs and consumes resources, which in its absence would have been used in another way.

The study examines the direct costs of resources expended for treatment, prevention, research and law enforcement, plus the indirect cost of losses of production due to increased morbidity and mortality, seen here as the results of alcohol misuse. Several methodological issues are also addressed: the definition and types of costs included, the private and social benefits of alcohol consumption and the budgetary impact of alcohol misuse.

3.2 The definition of costs

The consumption decisions of any commodity involve both costs and benefits. Direct costs or benefits accruing to the individuals engaged in a certain activity (for example, the consumption of alcohol) are described as “private costs” and “private benefits”. However, some of the costs or benefits associated with the consumption of a certain good or service may fall on third parties. These “external costs” (or “external

benefits”) are side effects and are generally referred to as “externalities”. The sum of private and external costs (benefits) are referred to as “social costs” (“social benefits”) (Table 2).

Table 2 Definitions of social costs and benefits		
Private Costs	+ External Costs	= Social Costs
Private Benefits	+ External Benefits	= Social Benefits

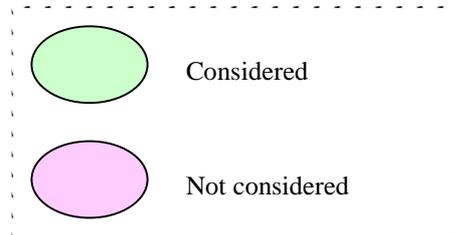
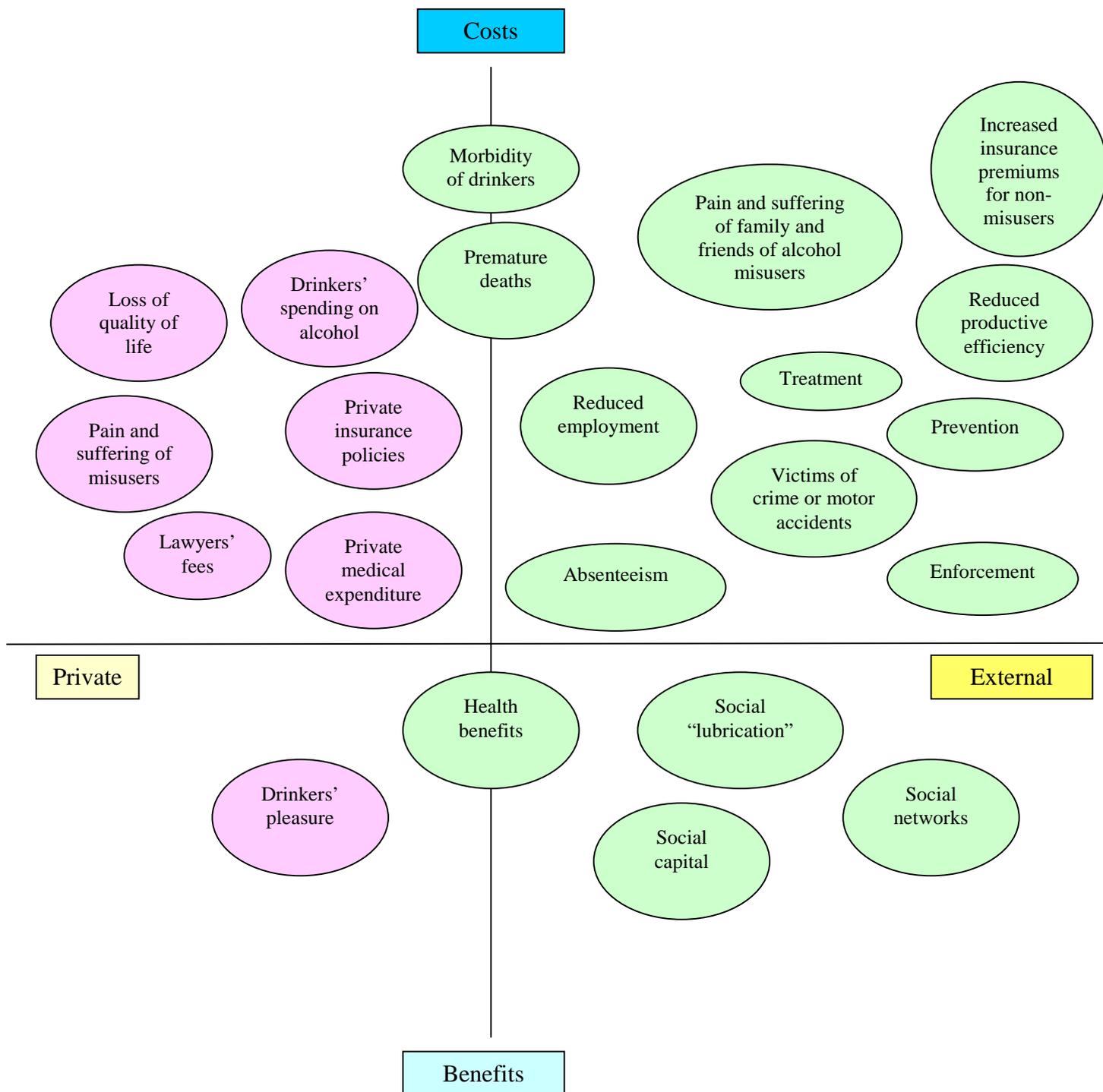
Chart 7 provides a broad categorisation of the main costs and benefits of alcohol use and misuse (the bubbles do not indicate magnitude of cost or benefit but the colour highlights what will be considered in detail for estimation in the following sections; not all of these costs will be necessarily quantified due to lack of data).

The private costs that alcohol users incur are twofold: their expenditure on alcohol and their personal expenses related to the consequences of alcohol misuse (e.g. paying for private medical treatment, higher health insurance premiums or lawyers’ fees to defend themselves after committing an alcohol-related crime). These costs are in turn offset by the benefits that the consumer obtains from alcohol use, namely pleasure. Price (what a consumer is prepared to pay) can be considered to be a minimum estimate of the benefit that a consumer derives from the consumption of a unit of a good or service since people will only buy a good or service if it offers them benefits at least commensurate with the price (see Box 1 for details).

External costs, on the other hand, include costs of injury to third parties from alcohol related motor accidents or crime incidents. External costs, borne by the taxpayers, may also arise from the excess use of health services. Similar problems may occur at the workplace. If wages reflect average productivity, workers who misuse alcohol and are less efficient or absent from work as a result, impose costs on their employers and colleagues. Similarly, external benefits reflect benefits that the society gains from an individual’s actions. In the case of alcohol consumption they may reflect alcohol’s role as a “social lubricant” to enhance socialising or building of networks in a business context.

Only external costs are considered in this study. It is not because private costs are unimportant. Rather they do not generally justify government action because individuals are assumed to take into account both the private benefits and costs of an activity when making decisions to undertake this activity.⁵ From the point of view of public policy it is these external costs imposed by the user upon the rest of society that are relevant, not private benefits stemming from his or her activities. For example, when dealing with issues of environmental pollution, policy makers are concerned about external costs borne by society and not by the private benefits that the polluters may enjoy.

Chart 7 Private and external costs and benefits of alcohol use/misuse



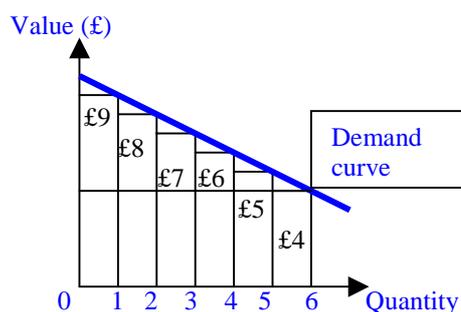
3.3 The private and social benefits of alcohol consumption

The primary benefit of alcohol lies in the pleasure that individuals derive from consuming it (see Box 1). However, besides the direct benefits to consumers alcohol in itself produces wider (external) benefits for the society as a whole. These are primarily centred in alcohol's capacity to act as a catalyst in social interactions and leisure experiences. Alcohol brings people together and facilitates group interactions enhancing the capacity of individuals to relax and socialise, and hence may be seen as promoting social cohesion.

Box 1: Private Benefits and Costs – Consumer Surplus

When a consumer buys a good (or a unit of a good) he or she must value it. Therefore what a consumer will pay for a good (or a unit of a good) measures how much he or she values that good relative to other goods and services. Individual preferences vary by age, gender, family situation, life experiences, education and other factors that vary among individuals. This is why different people might receive different levels of satisfaction or pleasure from the same good or service. As a result each individual would be inclined to value a good differently from the next person.

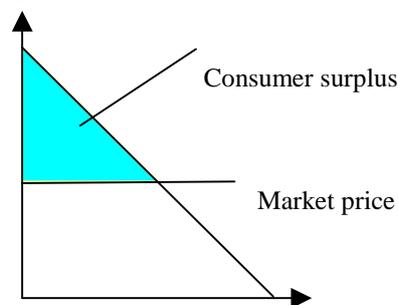
One measure, which can be used to quantify an individual's satisfaction from the consumption of a good or a service, is the concept known as *consumer surplus*. Consumer surplus measures the difference between what a person is willing to pay for a commodity and the amount he or she is actually required to pay.



As shown in the diagram, consumers often value each additional unit consumed less than previous units (the concept of diminishing marginal utility). In this case the consumer would be willing to pay £9 for the first pint of beer, £8 for the second, £7 for the third etc. As his or her thirst is subsiding the value he or she is placing on one extra pint of beer is reducing. The value that the consumer places on each extra pint of beer is summarised by the individual *demand curve*.

If the market price for a pint of beer were £4.00 the consumer would be buying 6 pints since the pleasure derived from further pints of beer is assumed in this example to be worth less than the price of £4. The total value of consumption to the consumer is £39 (£9 + £8 + £7 + £6 + £5 + £4). Part of this value is given up in the form of *total expenditure* equal to £24 (£4 x 6 pints) as shown by the shaded area. The difference of £15 (£39 - £24) represents consumer surplus, the difference between what the consumer was willing to pay and what she or he paid.

If this is now considered as the whole market for beer and hence the overall (aggregate) demand for beer in the economy, the consumer surplus measures the total benefit to all consumers and is the shaded area between the aggregate demand curve & the market price.



Furthermore, in a strict and intensive working environment drinking alcohol may act as a “leisure marker” to separate work from non-work and hence become an integral part of “mateship”. Alcohol is also important for community solidarity and the building of business networks. Drinking in “comfortable” settings enhances pleasure and makes a social or business occasion relaxed and enjoyable.

It is important that all of these external benefits are recognised and so far as possible incorporated in any costing exercise. However it is not easy to convincingly assign monetary values to alcohol’s contribution to the development of social networks and social capital. No such research exercise has been conducted and as a result external benefits are not included in the cost estimates of this study.

It is sometimes argued that the output, income and employment generated by the industry must be represented as being benefits that the community receives from the production of alcohol. However this proposition rests upon two very serious and questionable assumptions. It is firstly assumed that in the absence of alcohol consumption in the economy the money spent on alcohol would not have been used in any form of other expenditure on any other products or services. However this is highly unlikely.

The second assumption is that the resources used in producing alcoholic drinks and services in the economy would have no alternative uses. For example the capital used in the manufacture of alcoholic beverages would remain idle and employees would be fit for no other type of employment. If the resources employed in producing alcohol related products and services were not engaged in these activities they would be released to produce other commodities instead. A net decrease or increase in the number of jobs in the economy cannot be determined a priori. It depends on factors such labour intensity (the concentration of labour versus capital) in production as well as the share of commodities affected and the flexibility of alternative use of resources, such as employee retraining.

The key point is that in flexible, efficiently functioning labour markets there will be a wage at which all those who would like a job will be able to get it. Thus, if industries producing alcoholic drinks contract, shedding employees, one would expect those released to find alternative employment. Hence, in an efficiently functioning labour market, there is no reason why overall levels of employment should change.

There are, however, some potentially important caveats to this argument:

- I. Although overall employment levels may not change, there may be significant structural impacts in the labour market. Employees with specific skills, say in the drinks industry, might find it difficult to acquire alternative employment at the current wage. Retraining employees would mitigate this effect but not necessarily completely.
- II. In the short-term, particularly if there was a major and rapid contraction of the drinks industry there might be a fall in overall levels of employment until the labour market adjusted to the new circumstances. These adjustment costs might be particularly large if the loss of employment was concentrated in particular local areas where there is currently little alternative employment.

These effects might be even more pronounced where lack of employee mobility due to factors such as poor transport or lack of housing (where the employee may not be able to find, easily sell or buy a new property). Indeed it is conceivable that in such circumstances unemployment might persist into the medium or longer term. Such adjustment costs might therefore affect judgements about the pace of policy changes that have adverse effects on the drinks industry and about other policy measures (e.g. labour market reforms, measures to promote labour mobility, regeneration of communities measures etc.) that may be needed to accompany them.

In sum, the output, income and employment generated by the alcohol industry are not measures of social benefits attributable to alcohol. However, figures on the production of alcohol related activities provide a measure of the size of the national, international and local economy and of the transitional cost (retraining of employees or altering production lines) that may be associated with any changes to the industry.

3.4 The budgetary impact of alcohol use and misuse

This study is not simply describing the budgetary impact of alcohol misuse on government accounts. The cost estimates reported in this study affect society as a whole and not just public finances. Budgetary issues involve consideration of government revenues and outlays. Alcohol misuse and substance abuse in general puts a burden not only on real resources but also on government budgets as the result of the need for funding alcohol related health expenditures, as well as prevention initiatives and law enforcement.

The consumption of alcohol also produces government revenue as a result of taxation. In addition to these gains premature mortality resulting from alcohol misuse will lead to some reduction of health and social security expenditures. Hence when calculating the effects of alcohol misuse on the government's budget both expenditures and revenues, or savings, resulting directly or indirectly from that misuse must be taken into consideration. However it cannot be argued that if the net impact of alcohol misuse on the government's budget were positive then alcohol misuse would be in the public interest. Budgetary studies of this type totally ignore the costs of loss of life and the pain and suffering caused by alcohol misuse. This paper therefore takes a broader perspective.

3.5 Typology and calculation of the cost of alcohol misuse

3.5.1 Previous research and estimates

The earliest study focusing on the economic costs of alcohol misuse was conducted in Australia in 1969-1970 (Pritchard, 1971) while similar studies in the United States date back to 1973 (Berry and Boland, 1973). Since then a significant number of studies on the economic costs of alcohol misuse and alcoholism have been conducted in other nations but the most recent and comprehensive alcohol and drug abuse studies have been conducted in Australia (Collins and Lapsley, 1991; 1996), the United States

(Rice et al, 1990; Harwood et al, 1997; ONDCP, 2001) and Canada (Single et al, 1996).

Similar attempts in the UK produced the first estimates in 1981 (Holtermann and Burchell, 1981) from data collected over a variety of years between 1971 and 1976. Since then several other attempts have been made to estimate the economic and social costs of alcohol in the UK and its constituent regions. McDonnell and Maynard (1985) produced a comprehensive estimate for the whole of the UK while more recently a detailed report of costs of alcohol misuse was produced for Scotland (Scottish Executive, 2001) and London (GLA, 2003).

The estimates produced in all the UK studies vary due to the wide range of sources consulted and the lack of reliable data in certain areas. Alcohol misuse has been estimated to cost between 2% and 5% of a country's annual gross national product (GNP). However, recent changes to the method of calculating GNP make it impossible to update these figures accurately. Alcohol Concern (1999) calculated that alcohol misuse costs England at least £10.8 billion in 1999.

Individual UK studies have also produced estimates in key areas such as health and employment. Alcohol misuse costs in the NHS have been reported to total between 2% and 12% of total NHS expenditure on hospitals. This amounts to up to £3 billion a year on hospital services (Royal College of Physicians, 2001). Alcohol misuse is also estimated to cost employers approximately £3 billion a year in sickness and absenteeism at work, premature deaths, accidents and alcohol related crime (Alcohol Concern, 2002a). The corresponding costs for NHS Scotland and the workplace are estimated to be £95.6 and £404.5 million respectively, while the total cost of alcohol misuse for Scotland in 2001 is £1.07 billion.

Table 3 presents a summary of the research studies, the country and year they covered and a general magnitude of the total costs of alcohol misuse. It should be noted that these costs are not directly comparable as they cover a wide array of costs, which in some cases do not correspond from case to case. As a result the purpose of Table 3 is simply indicative. The next section presents a detailed analysis into the different types of costs associated with alcohol misuse to be estimated in this study.

Table 3 Previous research and estimates of costs of alcohol misuse

Study	Country	Year	Costs (£'s billion)
Collins and Lapsley, 1991	Australia	1988	0.8
Collins and Lapsley, 1996	Australia	1992	1.02
Collins and Lapsley, 2002	Australia	1989	2.2
Rice et al, 1990	United States	1985	48.6
Harwood et al, 1997	United States	1992	95.3
ONDCP, 2001	United States	1998	85.8
Single et al, 1996	Canada	1992	3.8
Holtermann and Burchell, 1981	England and Wales	1977	0.4 – 0.7
McDonnell and Maynard, 1985	England and Wales	1983	1.6 – 0.9
Maynard, 1992	England and Wales	1985	1.4 – 2.5
Alcohol Concern, 1999	England	1999	10.8
Scottish Executive, 2001	Scotland	2000	1.07
Great London Authority, 2003	London	2000	4.6

3.5.2 Typology of costs of alcohol misuse

This study presents estimates of the total external costs of alcohol misuse for year 2000/01, the most recent year for which all relevant data were available. All values quoted are given at 2001 prices. Given the lack of accurate data in some categories of these costs, two estimates have been provided. The benefits of moderate alcohol consumption are acknowledged in terms of deaths prevented or life years saved. However the costs presented with regard to the number of hospitalisations or deaths and life years lost, are gross and not net costs, on the grounds that a cost study should not give incomplete and partial consideration to benefits associated with alcohol consumption

A note of caution must be made here about the assumptions involved when interpreting these costs. It would be unrealistic to assume that all of these “wasted” resources attributable to alcohol misuse could be saved by a variety of preventative measures and society will be better off by the full amount. Certain expenses will be incurred, as a result of any preventative measures taken. Hence there is a need in the future to study specific measures designed to reduce misuse and to compare the marginal savings produced with the extra costs of the measures implemented. This study is limited to an assessment of the total external cost of alcohol misuse.

There are four major types of costs that have been considered in this study: (1) health care costs (2) workplace and lost production costs (3) human costs such as pain and suffering and (4) costs of alcohol-related crime, e.g. costs to law enforcement and the criminal justice system and costs to the victims of crime. Some of the costs that fall under these categories have not been calculated due to data limitations. Each of these types of costs are presented in detail in Table 4 and discussed in the following sections with regard to the potential for being estimated and thereby being included in this cost estimation study.

Table 4 Types and examples of costs associated with alcohol misuse

Costs:	External costs (considered in this study)			
	Private costs Costs to users (not included)	Costs to other individuals	Costs to local and central government	Costs to businesses and the economy
(A) Health Care Costs ⇒ Treatment for alcohol misuse and co-morbidity	<ul style="list-style-type: none"> ◆ Private health consultations ◆ User-paid health insurance ◆ Out-of-pocket costs 	<ul style="list-style-type: none"> ◆ Excess insurance premiums 	<ul style="list-style-type: none"> ◆ Hospital inpatient (day) visits ◆ Hospital outpatient visits ◆ Accident and emergency visits ◆ Ambulance services ◆ Practice nurse consultations ◆ NHS GP consultations ◆ Laboratory tests ◆ Dependency prescribed drugs ◆ Other health care costs ◆ Research / training 	<ul style="list-style-type: none"> ◆ Contribution to employee health insurance ◆ Employee Assistance Policies
⇒ Prevention and research (B) Workplace and lost production costs ⇒ Production losses due to morbidity	<ul style="list-style-type: none"> ◆ Forgone income net of taxes 			<ul style="list-style-type: none"> ◆ Drug testing
⇒ Production losses due to mortality (C) Costs of Crime ⇒ In anticipation of crime		<ul style="list-style-type: none"> ◆ Insurance premiums ◆ Protective Alarms 		<ul style="list-style-type: none"> ◆ Production losses due to absenteeism ◆ Production losses due to reduced employee efficiency ◆ Production losses due to reduced employment ◆ Production losses due to premature death
⇒ In response to crime	<ul style="list-style-type: none"> ◆ Lawyers' fees and defence costs ◆ Penalties 		<ul style="list-style-type: none"> ◆ Police costs ◆ Criminal Justice system ◆ Prison and probation services 	
⇒ As a consequence of crime (D) Human costs	<ul style="list-style-type: none"> ◆ Pain and suffering to user ◆ Quality life years lost 	<ul style="list-style-type: none"> ◆ Damaged property ◆ Victim support and emotional impact ◆ Suffering to family and friends (for death or illness of loved ones) 		<ul style="list-style-type: none"> ◆ Victim's lost production

4 Health Care costs attributable to alcohol misuse

4.1 Attribution of morbidity and mortality to alcohol misuse

There are a wide variety of health problems associated with alcohol misuse (see Table 5). Some of these are entirely attributable to alcohol misuse, while other causes are only partly attributable. For example, the proportion of traffic accident deaths or injuries which can reasonably be attributed to alcohol will vary between countries and also within them over time due to differences in alcohol consumption rates or other differences in the socio-economic characteristics of their populations.

Table 5 Costs associated with the use of alcohol		
Consequences to health system	100 % attributable to alcohol use	Partly attributable to alcohol use
Treatment for alcohol misuse:		
⇒ Hospital inpatient visits	◆ Alcoholic psychosis	◆ Lip cancer
⇒ Hospital outpatient visits	◆ Alcohol dependence	◆ Oral cancer
⇒ Accident and emergency visits	◆ Alcohol abuse	◆ Pharyngeal cancer
⇒ Ambulance services	◆ Alcoholic polyneuropathy	◆ Oesophageal cancer
⇒ Practice nurse consultations	◆ Alcoholic cardiomyopathy	◆ Colon cancer
⇒ NHS GP consultations	◆ Alcoholic gastritis	◆ Rectal cancer
⇒ Laboratory tests	◆ Alcoholic liver cirrhosis	◆ Hepatic cancer
⇒ Dependency prescribed drugs	◆ Ethanol toxicity	◆ Pancreatic cancer
⇒ Other health care costs	◆ Other alcoholic poisonings	◆ Laryngeal cancer
(All of the above multiplied by appropriate attributable fractions)		◆ Breast cancer
		◆ Pellagra
		◆ Hypertension
		◆ Ischaemic heart disease
		◆ Cardiac dysrhythmias
		◆ Heart failure
		◆ Stroke
		◆ Oesophageal varices
		◆ Gastro-oesophageal haemorrhage
		◆ Cholelithiasis
		◆ Acute pancreatitis
		◆ Low birthweight
		◆ Road injuries
		◆ Fall injuries
		◆ Fire injuries
		◆ Drowning
		◆ Aspiration
		◆ Machine injuries
		◆ Suicide
		◆ Assault
		◆ Child abuse

Adapted from Single et al (2001)

The availability of data used to estimate the social costs of alcohol misuse is clearly related to how credibly a particular type of consequence is attributable to alcohol misuse. It is therefore important that the appropriate attribution factor, often termed the “attributable fraction” is chosen and reviewing the most current literature on each

particular cause of morbidity or mortality may do this. However, as expected, no one set of attributable fractions can be applied in any society. There have been a number of studies, which have looked in these issues in detail. Seminal papers in this field are those by Single et al (1998, 2001) for Canada and Shultz et al (1991) for the United States.

Although as the above papers indicate such reviews do exist, the appropriate attributable fractions encountered in one country may not apply to another country or even the same country at different points in time. Some of the reasons for this will be the differences in the rate and patterns of alcohol consumption between countries and within countries at different points in time. Therefore, a cost estimation study on alcohol misuse requires careful consideration of the attributable fractions, which are the most appropriate for the society in which they are applied.

Attributable fractions for alcohol have been presented in a recent report by the World Health Organisation (WHO, 2000). A summary and range of these fractions can be found in Annex 1 (Table 1.2). The alcohol attributable fractions in this study are abstinence-based and have been derived using risk functions from Corrao (1999) and Britton and McPherson (2001). Abstinence-based means that they reflect risks of alcohol at all levels of consumption relative to a baseline of complete abstinence from alcohol. The flexibility of the risk functions, allows for alcohol risks to be estimated at any level of alcohol consumption. The estimation details can be found in Annex 1 (Box 1.1). For alcohol attributable fractions related to injuries our estimates were based on those from an earlier meta-analysis of international literature as reviewed by the WHO (2000) (Annex 1, Table 1.2).

An analysis of the various health care costs attributed to alcohol misuse can be found in the following sections.

4.2 Health care costs

This section outlines the healthcare costs attributable to alcohol misuse for the year 2000/01 and presents the methodological issues and assumptions involved when making these estimations. The main costs considered and the sources used to calculate them (where available) are presented in Table 6 below. Detailed cost estimations are presented in the next sections and in Annex 2. In all cases the best use of available data was made to produce two cost estimates.

Table 6 Health Care costs of alcohol misuse		
Types of costs	Calculated	Source of data
<i>Treatment costs for alcohol misuse and co-morbidity</i>		
• Hospital inpatient visits	✓	Hospital Episode Statistics (Department of Health (2001))
• Day hospital attendances	✓	Hospital Episode Statistics (Department of Health (2001))
• Hospital outpatient visits	✓	GHS (ONS, 2001a) & Birmingham Untreated Heavy Drinkers Study (2002)
• A&E consultations	✓	MORI (2003) & Hospital Activity Statistics (Department of Health, 2001)
• Ambulance services	✓	MORI (2003) & Ambulance Services Statistics (Department of Health, 2001)
• Practice nurse consultations	✓	GHS (ONS, 2001a) & Birmingham Untreated Heavy Drinkers Study (2002)
• NHS GP consultations	✓	GHS (ONS, 2001a) & Birmingham Untreated Heavy Drinkers Study (2002)
• Laboratory tests	✓	Costs assumed to be included in GP consultations
• Dependency prescribed drugs	✓	Prescription Cost Analysis: England (Department of Health, 2001)
• Other health care costs	✓	GHS (ONS, 2001a) & Birmingham Untreated Heavy Drinkers Study (2002)
Community psychiatric nurses	✓	
Counselling	✓	
Health visitors	✓	
• Alcohol-specific treatment services		Alcohol Concern (2002b)
Assessment/Care Management	✓	
Open Access	✓	
Residential Detox	✓	
Structured Day Care	✓	
Community Detox	✓	
Planned Counselling	✓	
Residential Rehabilitation	✓	
• Employers' contributions to health insurance	x	Data included in the employers' costs of lost production
• Extra costs of insurance premiums to others	x	No data available
<i>Costs for prevention and research</i>		
• Research / training	✓ / x	Some funds for research included partly in Alcohol Concern (2002b) – no data on training of alcohol specialists
• Drug testing	x	No overall firm data
• Employee Assistance Policies	x	No overall firm data

4.2.1 Hospital inpatient visits and day hospital attendances

Cost calculations in this section are based on the sum of all days that patients' in England with 100% alcohol-related problems occupied hospital bed days during 2000/01. The number of bed days where the primary diagnosis is attributable to alcohol misuse is presented in Table 7. Data are presented by ICD-10 codes and final costs include both bed days and day cases (where the individuals visit the hospital for the day but do not get admitted and stay the night). Choice of liver diseases is done in accordance with ONS (2003). Psychiatric cases are incorporated in the overall data. The overall in-patient costs directly attributable to alcohol misuse are £126.2 million.

Table 7 Illnesses directly attributable to alcohol misuse		Bed Days
E24.4 Cushing's syndrome alcohol-induced pseudo-Cushing's syndrome		26
F10 Mental and behavioural disorders due to use of alcohol		274,759
G62.1 Other polyneuropathies alcoholic polyneuropathy		1,752
G72.1 Other myopathies Alcoholic myopathy		516
I42.6 Cardiomyopathy alcoholic cardiomyopathy		2,205
K29.2 Gastritis and duodenitis Alcoholic gastritis		2,463
K70 Alcoholic liver disease		128,726
K73-74 Chronic Hepatitis and cirrhosis of liver		39,011
K76 Other diseases of the liver		18,763
K86.0 Other diseases of pancreas alcohol-induced chronic pancreatitis		13,926
T51 Toxic effect of alcohol		1,619
Z50.2 Care involving use of rehabilitation procedures alcohol		7,491
Z72.1 Problems related to lifestyle alcohol use		439
X45 Accidental poisoning by and exposure to alcohol		950
X65 Intentional self-poisoning by and exposure to alcohol		1,215
Y15 Poisoning by and exposure to alcohol undetermined intent		160
Y90 Evidence of alcohol invol determined by blood alcohol level		303
Y91 Evidence of alcohol involv determined by level intoxication		945
Total bed days		495,269
Total Costs (including bed days and day cases)		£ 126,239,086

Inpatient visits data were also obtained for those conditions, which might be indirectly attributed to alcohol misuse. The proportion of inpatient episodes attributed to alcohol misuse indirectly was estimated by using the attributable fractions derived as described in Annex 1. Low and high cost estimates are derived representing a variation in the range of diseases presumed to be partially attributable to alcohol misuse (see Annex 2). Tables 8 and 9 present the partially and overall alcohol attributable inpatients costs respectively. The latter range from £470 to £526 million.

Table 8 Partially alcohol attributable inpatient costs		
	Low estimate	High estimate
Number of partially alcohol attributable bed days	1,410,551	1,638,272
Partially alcohol attributable bed day costs (£)	341,353,342	396,461,824
Partially alcohol attributable day case costs (£)	2,819,730	3,362,941
Total partially alcohol attributable inpatient costs (£)	344,173,072	399,824,765

Table 9 Overall NHS inpatient costs of alcohol related misuse England 2000/01 - (2001 prices)		
	Low estimate	High estimate
100% alcohol attributable	126,239,086	126,239,086
Partly attributable to alcohol	344,173,072	399,824,765
Total (£)	470,412,158	526,063,851

4.2.2 Hospital outpatient visits

Data on outpatient visits was available for the whole of England but the total number of outpatient attendances attributable to alcohol was not available. However, results from the Birmingham Untreated Heavy Drinkers (BUHD) ((Dalton and Orford, 2002) suggest that the cohort of heavy drinkers used these services almost twice as much as their general population counterparts (see Annex 2). Using data from the General Household Survey (ONS, 2001a) it is found that the average number of outpatient consultations for heavy drinkers ranges between 2.7 and 5.3 million. This puts the cost of outpatient attendances for heavy drinkers in England in 2001 at between £222.8 and £445.6 million in 2001 prices (Table 10).

Table 10 Overall NHS outpatient costs of alcohol related misuse England 2000/01 - (2001 prices)		
	Low estimate	High estimate
Number of outpatient consultations		
Men	1,860,192	3,720,384
Women	813,189	1,626,377
Total cost of outpatient consultations (£)	222,799,527	445,599,053

4.2.3 Accident and Emergency consultations and ambulance services

Data on the number of accident and emergency attendances and ambulance journeys attributable to alcohol misuse were not available. Data provided by the Department of Health Hospital Activity Statistics indicate that for the period 2000-2001 the total number of accident and emergency attendances was 14.3 million. The total number of ambulance journeys in England was 18 million (18,060,000) (Ambulance Services in England, 2000/01). Of that, nearly 3 million (2,914,000) were emergency journeys covering transport requests generally made via a 999 call and therefore most commonly associated with journeys to A&E departments. However, research by MORI commissioned by the Strategy Unit indicates that 35% of these A&E attendances were alcohol related. This brings the total A&E cost at £510 million (see Annex 2).

Table 11 A & E attendances¹		Attendances
First attendances		12,953,432
Follow up attendances		1,339,875
Total attendances		14,293,307
Alcohol related attendance		5,002,658
Alcohol related emergency ambulance journeys		1,019,900
Total cost of alcohol-related A&E attendances (£)		510,162,038

¹ Source: Department of Health, Hospital Activity Statistics (2000-01)

4.2.4 Practice nurse consultations

Again as in the case of outpatient attendances no data exist linking directly practice nurse consultations and patient alcohol consumption. Hence certain assumptions have to be made using the data from Dalton and Orford (2002) (see Annex 2). The results indicate the total cost for practice nurse services comes to around £19 million.

Table 12 Overall Practice Nurse costs of alcohol related misuse England 2000/01 - (2001 prices)		
	Low estimate	High estimate
Number of practice nurse consultations		
Men	1,319,285	1,319,285
Women	611,420	611,420
Total cost of outpatient consultations (£)	19,133,287	19,307,050

4.2.5 NHS GP consultations

Data on GP consultations due to alcohol misuse face the same array of problems as those in the case of outpatient visits and practice nurse consultations. In all these cases the reason for which the individual has visited his or her GP is unknown and as a result no direct association can be made between NHS GP consultations and drinking problems. Data from the GHS (ONS, 2001a) suggest on average 4 GP visits for men and 6 for women in 2000/01. While those drinking more than 51 or 35 units a week (men and women respectively) visit their GP 4 times a year (see Table 2. 1, Annex 2). Combining these with data from Dalton and Orford (2002) we find that total NHS GP consultations among heavy drinkers in England in 2000/01 range between 1.5 and 2.7 million. This produces a total cost for this of between £28 and £49 million (Table 13).

Table 13 Overall NHS GP alcohol-related consultation costs England 2000/01 - (2001 prices)		
	Low estimate	High estimate
Alcohol-related NHS GP consultations	1,544,564	2,702,987
Total (£)	27,802,152	48,653,766

4.2.6 Other Primary Care Service Usage

Data from Dalton and Orford (2002) put the total cost of all the other primary care services, whose usage is associated with alcohol misuse at £35 million (see Annex 2 for details) (Table 14). One might argue that treating all of the above costs of other primary care services by heavy drinkers as alcohol related could be seen as an overestimate of health service costs relating to alcohol misuse. In our defence the estimates only relate to current health service use and do not account for the impact of current alcohol misuse on future health-care demands. Furthermore this figure covers only heavy drinkers and excludes others with alcohol related ailments who have different drinking patterns.

Table 14 Costs of usage of other primary care based services by heavy drinkers England 2001				
	Number of consultations			Total costs
	Males	Females	ALL	
Counselling Community	131,929	1,039,414	1,171,343	33,348,135
Psychiatric Nurse	118,736	18,343	18,461	424,603
Health visitor	0	48,914	48,914	1,222,850
Other services	52,771	183,426	236,197	292,994
TOTAL	303,436	1,290,097	1,593,533	35,288,582

4.2.7 Treatment Services

Table 15 below provides a breakdown of spending on second, third and fourth tier of specialist alcohol services by the nature of the treatment provided. It also indicates that the total amount spent on alcohol is £51 million. More than two thirds of these services were provided in the voluntary sector. In fact, the voluntary sector provides the majority of services in all areas of treatment. It is interesting to note that the NHS directly provides (as opposed to merely funds) a very wide range of services and is the dominant funder of alcohol services. The voluntary sector however provides the majority of services in all areas of treatment (Alcohol Concern 2002b) (see Annex 2).

Table 15 Spending on specialist alcohol treatment services by activity and source ('000s)

	NHS	Loc Auth	Probation	Charitable	Other	Total
Assessment & Care Management	1,377	843	43	31	423	2,716
Community Detox	1,823	132	7	0	22	1,985
Open Access	3,239	2,692	238	266	584	7,019
Planned Counselling	3,410	1,394	350	246	377	5,778
Residential Detox	4,649	1,417	69	57	886	7,078
Residential Rehabilitation	876	8,035	54	224	3,307	12,497
Structured Day Care	1,297	1,769	234	242	546	4,088
Unspecified	6,988	986	372	120	553	9,020
TOTAL	23,660	17,269	1,368	1,186	6,699	50,182

Source: Alcohol Concern, 2002b

Extrapolated total £96,155,000

4.2.8 Dependency Prescribed Drugs

Data here were acquired from the Prescription Cost Analysis: England (Department of Health, 2001). Prescription Cost Analysis (PCA) provides details of the number of items and the net ingredient cost of all prescriptions dispensed in the community in England. The British National Formulary (BNF) therapeutic class lists the prescription items dispensed alphabetically within chemical entity (for drugs).

Prescription Cost Analysis (PCA) data are based on information obtained from prescriptions sent to the Prescription Pricing Authority (PPA) for payment. PCA data cover all prescriptions dispensed in the community, i.e. by community pharmacists, appliance contractors, dispensing doctors and items personally administered by doctors.

During 2001, an estimated £34.4 million was spent by the NHS in England on drugs used to treat substance dependence. 5% of that amount, or £1.6 million, was spent on drugs used specifically to treat alcohol problems. Our calculations are based on the cost of two specific drugs: acamprosate and disulfiram.

4.2.9 Laboratory Tests

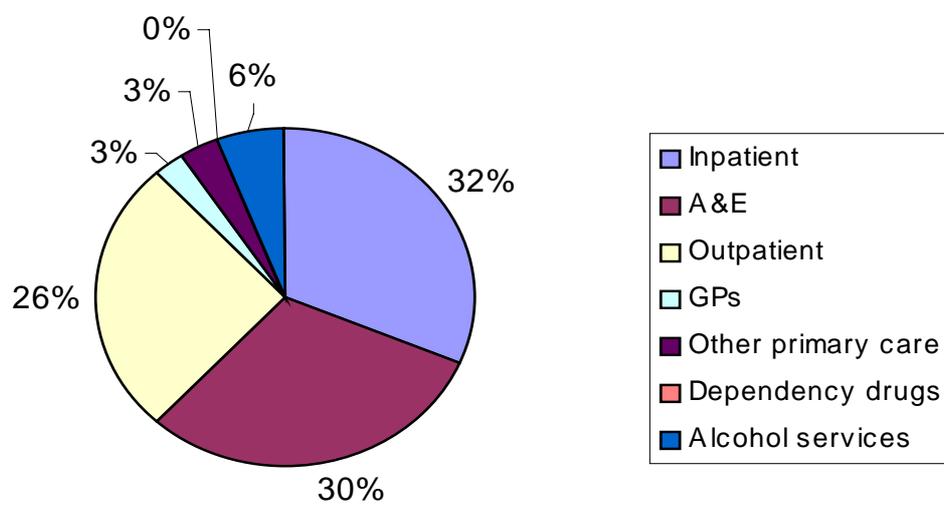
Anecdotal evidence suggests that some only some GPs would undertake blood tests to measure blood alcohol levels, mean corpuscular volume and liver function. The majority of GPs might refer patients to outpatient hospital services or indeed some of these tests will be included in inpatient treatment. In addition individual drinkers visiting their GP might undergo tests that are unrelated to their level of alcohol consumption. Consequently we assume that the costs of tests for these individuals. Therefore, given the uncertainty surrounding the source, which pays for these tests and also the lack of direct data indicating the reasons for individual consultations, we have decided to leave these costs out of our calculations.

4.2.10 Total Healthcare Costs

The total healthcare cost of alcohol misuse was estimated by assigning unit resource costs (Netten and Curtis, 2002) to resource use estimates as acquired from various sources. Attribution of service use to alcohol misuse was determined based on previous established research findings. In line with previous research in this area a low and high estimate was provided in each category of resource costs. Table 16 below presents a break down of these estimates.

Table 16 Total Health Costs (£ million)		
	Low	High
Hospital inpatient visits (including day cases)		
Directly attributable to alcohol misuse	126.2	126.2
Partly attributable to alcohol misuse	344.2	399.8
Hospital Outpatient attendances	222.8	445.6
A & E attendances	305.2	305.2
Ambulatory services	205.0	205.0
GP consultations	27.8	48.7
Practice nurse consultations	19.1	19.3
Other Primary Care	35.3	35.3
Dependency drugs	1.6	1.6
Treatment services	96.2	96.2
TOTAL COSTS	1,383	1,683

Table 16 indicates that healthcare costs related to alcohol misuse range between £1.4 and £1.7 billion with a middle estimate of about £1.6 billion. Based on the low estimate, the contribution of costs to the overall bill by type of service indicates that accident and emergency attendances and ambulance transportation account for 37 percent of the total healthcare costs due to alcohol misuse (Chart 8). Hospitalisation accounts for an estimated 34 percent while outpatient services account for a further 16 percent.

Chart 8 breakdown of total healthcare costs due to alcohol misuse

5. Costs associated with the workplace and the wider economy

Excessive alcohol consumption could reduce employee performance, reasoning and co-ordination and encourages frequent absence among the workforce. Most would agree that those who are dependent or misuse alcohol would have a higher propensity to take more days off sick than other people. Alcohol misuse is hence responsible for the loss of production of goods and services through impaired performance at work, short and long-term sickness absence, unemployment and, in extreme circumstances, death. Hence the effect of alcohol misuse in the workplace and the wider economy is usually estimated under the wider umbrella of lost productive output due to:

- Morbidity and
- Premature mortality

5.1 Morbidity – lost employment or productivity

It is widely recognised that alcohol misuse by employees can adversely affect their performance at the work place. It is also generally acknowledged that people with alcohol related problems are known to have high rates of sickness absence from work. The value of lost output during sickness has long been regarded as one of the main costs to the economy from alcohol misuse. Disability pensions or social security benefits, such as sickness benefit, unemployment benefit and other supplementary benefits are not included in these calculations.

If a person previously in the workforce receives any welfare benefits as a result of alcohol related sickness it would be double counting to include in the estimate of external resource costs both the values of these benefits as well as the output loss. The same is true of tax revenue. Thus the only cost, which could be included in this study representing forgone resource costs, are administrative costs. However due to the lack of robust data in this field these costs have not been included in this study.

The discussion in this area focuses in three types of costs related to reduced output from:

- Employee absenteeism
- Unemployment
- Reduced efficiency

The purpose of the next three sections is to explore these issues in detail.

5.1.1 Employee absenteeism and alcohol misuse

Concern over the level of sickness absence in the UK has been growing over recent years. The reasons for this are twofold. On one hand, employers are worried about employee health and their well being as any negative effects will be reflected in employee morale and hence reduced productivity. On the other hand, sickness

absence imposes large preventable costs on employing establishments and diverts resources away from efficient use.

There were almost 2.2 million days lost to sickness in Autumn 2001 which accounted for 2 percent of the total scheduled days. In other words, on any one day around 2 percent of the working population are absent due to sickness. The proportion of workers absent for at least one day in the reference week was 3.4 percent. Absence is however concentrated among women, full time workers, those under 30 years of age and those working in the public sector (Barham and Leonard 2002).

Data from the Confederation of British Industry (CBI) show that in 2001 7.1 days were lost on average per employee through due to sickness absence – slightly lower than 2000 (7.8). Based on a 228-day working year this represents an absence rate of 3.1 % of total working time (3.4% in 2000). This finding is very much in line with that of 3.2% produced by Barmby et al (1999) and Ercolani (2002). Projected across the whole of the UK workforce, this suggests that over 176 million working days have been lost as a result of workplace absence in 2001 (16 million less than 2000) (CBI, 2002). More general information on the state of employee absenteeism in the economy can be found in Annex 3.

Although the CBI data are very detailed two issues are of particular importance. Firstly no similar data exist at a national level and secondly there is no indication as to how alcohol consumption relates to sickness absence. In fact there are no data currently collected on the number of days of sickness absence related to the use of alcohol for Britain or the UK as a whole. It is indeed highly unlikely that individual workers will in fact report hangovers or the use of alcohol as a reason for being absent from work. Gathering direct and unequivocal information on the relation between alcohol misuse and absenteeism is a difficult if not impossible task. Best data available in this field come from various sources (Table 17).

Although the magnitude of the results differs from study to study all studies point in the same direction. Alcohol misuse increases the average number of days of sickness absence. However, it cannot be said too strongly that a large survey of the employment experience of alcoholics and other drinkers is needed in order to obtain reliable information about the true magnitude of sickness absence as a result of alcohol misuse. As a result of the lack of such data we have to proceed with our estimation of the total costs of absenteeism in the economy by making certain assumptions, discussed in detail in Annex 3.

Estimating production (lost output) costs due to absenteeism may be achieved by calculating the number of working days lost due to alcohol misuse and valuing them using the average costs of an employee, after taking into account employers' costs such as national insurance contributions, pension contributions etc. In the absence of reliable national data on employee absenteeism and detail causes of illness the study has used the more recent finding from the Health and Safety Executive study by Head et al (2002) and applied its findings, with caution, on national data.

Accounting for part-time and full-time employment rates and assuming that rates of absenteeism were the same among full and part-time employees it was found that in 2001 nearly 11 million (10,988,096) days were lost in England among alcohol

dependent employees due to alcohol misuse. This implies that the total cost of absenteeism (including employer costs) due to alcohol misuse in England is £1.2 billion (£1,213,631,951).

A higher estimate is also calculated aiming to take into consideration that sickness absence due to alcohol misuse may also occur among non-dependent drinkers because of hangovers or other temporary alcohol-related short ailments. Accounting for part-time and full-time employment rates and assuming that rates of absenteeism were the same among full and part-time employees it was found that in 2001 17 million (17,282,802) days were lost in England due to alcohol misuse. The higher estimate of the total cost of absenteeism (including employer costs) due to alcohol misuse in England is £1.8 billion (£1,785,907,643) (Table 18).

Table 17 A short survey of the findings on alcohol misuse and absenteeism

Author	Year	Content of study -findings
Edwards et al	1967	Alcoholics have an average of 86 days off work a year due to their drinking problem
Saad & Maden	1975	The average days of sickness amongst a group of 73 male alcoholic patients was 77.4 days per person
Goddard	1991	Data from a national drinking survey on self-reported alcohol-related sickness absence indicated that 1 percent of sample had been off work because of the effects of alcohol
Goodwin	1992	Data from an 1 percent survey of doctors' certificates indicated that for men and women 0.7 and 0.2 percent respectively, of the total number of days lost were alcohol-related
Marmot et al	1993	Data from the Whitehall II study of 10,000 civil servants with regard to their weekly levels of alcohol consumption revealed the existence of a U shaped relationship between alcohol consumption and sickness absence for men but there was no such clear relationship for women. Men who drunk 30 or more units of alcohol per week had an extra of about 7 days of sickness absence each per 100 men per year and these men made up 10 percent of the workforce.
Head et al	2002	<p>Information from the Whitehall II showed that the risk of absence attributable to injury was related to the amount of alcohol consumed in the last week even at moderate levels of drinking. In fact there was an increased absence due to injury at moderate levels of alcohol consumption (11-21 units per week in men / 8-14 units per week in women) as well as at heavy levels of alcohol consumption. The estimated risks were very similar for men and women with heavy and moderate drinkers having about a 20 percent increased risk of absence due to injury when compared with light drinkers. Adjustment for smoking and baseline health status did not alter these associations.</p> <p>Those classified as "binge" drinkers (those consuming more than 5 units at one sitting) had an approximate 25 percent risk of absence due to injury. Participants classified as alcohol dependent on the basis of the answers to the CAGE screening questionnaire (two or more positive answers) had a significantly increased risk of short spells of absence due to injury: 46 percent for absence due to injury less or equal to 7 days. The relevant risk for all spells of absence (not necessarily due to injury) was between 25 and 29 percent, indicating a strong relationship between alcohol dependence and absence from work.</p>

Table 18 Alcohol-related sickness costs to the economy

	Low estimate	High estimate
Number of working days lost	10,988,096 (11 million)	17,282,802 (17 million)
Total cost to the economy (£)	1,213,631,951 (1.2 billion)	1,785,907,643 (1.8 billion)

5.1.2 Unemployment and alcohol misuse

The relationship between alcohol misuse and unemployment is not obvious and evidence suggests that there is not a clear one way causation between them. Problem drinking may reduce employment because dependent workers may find it difficult to cope with demanding tasks. Higher unemployment but also lower activity rates among heavy or dependent drinkers may also appear through a “discouraged worker” effect as heavy drinking may very well lead to a lower chance of finding employment and hence a greater chance of discouragement in the labour market. The reverse could also be true as unemployment causes emotional and financial stress and this stress in turn causes increased alcohol consumption.

However, while it is reasonable to consider short-term unemployment as causing contemporaneous increases in drinking, it is more difficult to think of short-term unemployment as causing the disorders of alcohol misuse and dependence as these require manifestation of symptoms over a period of time. It is thus more likely that unemployment causes increased and possibly excessive drinking as compared to causing alcohol misuse and dependence.

Alternatively other factors may cause both employment and alcohol problems; such factors could include psychiatric problems, congenital or chronic health problems, injuries, physical pain, lack of ability to cope, problems with friends and family, frustration of various forms or an unstable upbringing. From the researcher’s perspective these factors may be difficult to observe and quantify.

A short survey of the literature is presented in Table 19 below. It highlights how excess drinking is negatively associated with employment. Of particular interest is the study by MacDonald and Shields (2003) who account not only for higher unemployment but also lower activity rates among heavy or dependent drinkers through a “discouraged worker” effect. Since heavy drinking may very well lead to a lower chance of finding employment and hence a greater chance of discouragement in the labour market estimates in this study will be based on the findings of MacDonald and Shields (2003).

In a manner similar to that of the calculation of the alcohol related absenteeism costs it is found that heavy male drinkers (50 plus units a week) spend an average of 11.4 days per annum out of employment. As before two estimates are presented here, a low

and a high. It was assumed that being a heavy drinker leads to a considerable reduction in the probability of working by about 7 percent. This translates into a total of 15,039,659 days of non-employment per year among heavy male drinkers and a total cost of £1.7 billion (£1,726,053,577). The estimate accounts for full-and part-time employment rates in the economy and employer costs but as explained above excludes female dependent drinkers. To acquire a higher estimate we also apply MacDonald and Shields' (2003) estimates to female heavy drinkers. Accounting for the lower female participation rates and high rates of part-time employment it was found that female heavy drinkers spend an average of 8.1 days on average per annum out of employment. This translates to a total of 4,970,243 days of non-employment per year for female heavy drinkers which brings the total cost to £ 2.2 billion (2,153,721,146) (for both male and female heavy drinkers) (Table 20). These findings are in line with earlier findings especially those of Holterman and Burchell (1981).

Table 19 A short survey of alcohol misuse and unemployment

Author	Year	Content of study -findings
Saad & Madden	1976	Investigated 73 male alcoholics and found that the average yearly time loss through unemployment was 35.6 working days
Holterman and Burchell	1979	The study was based on alcohol addicts only using the same assumption as that of Saad & Madden. It found that the number of days of unemployment among male economically active alcoholics was 12.6 days per annum.
Crawford et al	1987	Compared the drinking habits of male respondents from a population survey who were unemployed with those who were in full-time employment. The findings showed a general trend towards unemployed males reporting more hazardous drinking styles than it did for those who were in employment. During the week prior to the interview unemployed men consumed significantly greater amounts during their heaviest drinking day, and generally reported longer drinking periods and faster consumption rates. During the previous 2 years they were not only most likely to exceed the criterion (14 units) for a heavy drinking day but also to report a range of adverse consequences from their drinking. Whereas employed men tended to report more frequent drinking days and occasions, unemployed men were more likely to binge and to do so regularly.
Mullahy & Sindelar	1996	Found that for both men and women, problem-drinking results in reduced employment and increased unemployment. Their results indicate that consumption of alcohol per se is not detrimental but rather it is problem drinking that has adverse effects on employment. Problem drinking reduces employment and increases unemployment. Controlling for unobserved heterogeneity reveals a much bigger adverse impact of problem drinking on employment success, which holds for both men and women. The findings of a negative impact of problem drinking on employment confirm the results of a previous study by the same authors.
Dooley & Prause	1997	Measured the impact of unemployment and underemployment on alcohol misuse. They found that job loss can increase the risk of alcohol misuse but involuntary part-time and low-income employment can also increase this risk. Gaining a job after a long bout of unemployment reduces the risk of alcohol misuse.
Ettner	1997	Found little evidence that a recessionary environment or layoffs will increase alcohol abuse. Reductions in employment may actually discourage the abuse of alcohol.
Terza	2001	Found that for both men and women alcohol misuse results in reduced employment and increased unemployment
MacDonald & Shields	2003	Found that being a problem drinker leads to a considerable reduction in the probability of working by between 7% and 31% (7% for their alcohol units measure (greater than 45.3 units per week) and 31% for their CAGE score).

Table 20 Alcohol-related reduced employment costs to the economy

	Low estimate	High estimate
Number of days out of employment	15,039,659 (15 million)	20,009,902 (20 million)
Total cost to the economy (£)	1,726,053,577 (1.7 billion)	2,153,721,146 (2.1 billion)

5.1.3 Reduced efficiency in the workplace due to alcohol misuse

Reduced efficiency at the work place may result in a lower quality and/or quantity of work. This may be the result either of a hangover or of more serious health problems associated with alcohol misuse. In some cases reduced efficiency at work may be the direct effect of employees being under the influence of alcohol while at work. In all these occasions it is very difficult to actually measure reduced efficiency unless employee output is strictly defined (e.g. piecework). More importantly, it is impossible to measure the proportion of reduced efficiency due to alcohol misuse.

Since the work of Becker (1964) and Grossman (1972) there has been a common belief among economists that a strong relationship exists between health and earnings. Substance use or misuse may have considerable consequences on shaping certain labour market outcomes such as occupational attainment, career progression or wage determination. Evidence suggests that moderate alcohol consumption can benefit health by possibly reducing stress and tension levels and lower the incidence of disease such as Coronary Heart Disease (CHD) (Heien, 1996; Hutcheson et al, 1995). It is in turn argued that improved health may lead to reduced absenteeism, improved performance and better morale, which generate greater promotional opportunities and wages.

In addition, alcohol consumption can also have a “networking” effect as part of that consumption is associated with social time spent with colleagues and business associates (Hutcheson et al, 1995). Individuals may use these social occasions to close deals, informally obtain useful information about the workings of the institutions or firms in which they are employed and learn of new jobs and career opportunities. Furthermore, social drinking time with work colleagues may signal to more senior members their motivation for the job and commitment to the firm or organisation.

Excessive alcohol consumption or misuse on the other hand can result in bad health, which in turn would jeopardise the individual’s promotion opportunities and wages by giving employers a negative signal about an individual’s commitment to their job or the wider organisation or suitability for occupational advancement. Studies of the relationship between substance use or misuse and labour market outcomes suffer from the uncertainty about the causal path between them. It may not only be that alcohol misuse affects labour opportunities but that also trouble at work may induce heavier drinking.

Related to this is the issue of unobserved heterogeneity, which can arise if some of the unobserved attributes that affect occupational attainment and wages (e.g. personality type) also influence the individual's choice to consume alcohol. Also for example, suppose the unobserved characteristic is an individual's rate of time preference. Individuals with a high rate of time preference tend to base consumption decisions on the pleasure they derive currently, without taking into account potential future adverse health consequences (Becker and Murphy, 1988). On the other hand, individuals with a high rate of time preference also tend to select jobs with a flatter age-earnings profile (i.e. they select jobs with a current high wage but tend not to invest in human capital).

A short literature review is presented in Table 21. Although these studies establish some form of relationship between alcohol consumption and wage they fail to indicate the magnitude by which moderate or heavy drinking affects wages. Due to the lack of evidence that robustly confirms the effects of alcohol misuse on employee earnings, no alcohol related costs were estimated in this study.

Table 21 A short survey of alcohol misuse and reduced employment efficiency		
Author	Year	Content of study -findings
Mullahy & Sindelar	1991	Found that alcoholism had an insignificant direct effect on earnings. Instead they found important indirect effects of alcoholism on variables that affected earnings, such as educational attainment and marital stability.
Mullahy & Sindelar	1993	Explored the life cycle effects of alcoholism on work and income for males aged 22 to 64. They found that alcoholism had a negative and significant impact on labour force participation and income only for male drinkers aged between 30 and 59 years old
French & Zarkin	1995	They report an inverse U-shaped relationship between alcohol consumption and wages with a peak approximately at 1.5 to 2.5 drinks per day on average. Those who drink between 1.7 and 2.4 drinks a day on average have the highest wages after controlling for other factors that affect compensation. Moderate drinkers are predicted to have the highest wages compared with abstainers and heavy drinkers with maximum returns occurring at 1.7 drinks per day and 2.4 drinks per day corresponding to a wage premium of around 5% over non drinkers.
MacDonald & Shields	2001	For both males and females the figures suggest an inverted U-shape for the relationship between drinking intensity and mean hourly wages. The turning points for the inverted U-shape curve are in the range of 21-36 units for men and 14-28 units for women.

5.2 Premature mortality

In extreme circumstances alcohol misuse can result in death. Premature mortality data due to alcohol misuse can be estimated using the Mortality Statistics for England and Wales. Table 22 indicates the number of deaths directly related to alcohol misuse. These findings are consistent with those of ONS (2003).

Table 22 Alcohol related deaths: England and Wales - 2000				
ICD-9 codes		Men	Women	Total
291	Alcoholic psychoses	17	4	21
303	Alcohol dependence syndrome	214	96	310
305.0	Alcohol	143	59	202
357.5	Alcoholic polyneuropathy	1	0	1
425.5	Alcoholic cardiomyopathy	126	22	148
535.3	Alcoholic gastritis	6	1	7
571.0	Alcoholic fatty liver	61	33	94
571.1	Acute alcoholic hepatitis	67	40	107
571.2	Alcoholic cirrhosis of liver	547	299	846
571.3	Alcoholic liver damage,	1,242	667	1909
571.4	Chronic hepatitis	27	60	87
571.5 - 571.9	Other liver diseases without mention of alcohol	977	750	1,727
980	Toxic effect of alcohol	109	58	167
E860	Accidental poisoning by alcohol,	105	58	163
Total		3642	2147	5789

Source: Mortality Statistics, ONS 2000

Premature mortality may also arise where alcohol misuse is an attribution factor. A list of causes of mortality associated with alcohol misuse was reported in Table 5 and Table 1.1 in Annex 1, which also included attributable fractions for alcohol as reported by the World Health Organisation. As in the case of health costs due to alcohol related morbidity, two estimated alcohol related deaths were produced, as explained in Annex 1. Table 23 presents the two estimates of premature deaths related directly or indirectly to alcohol misuse. Details of indirect alcohol-related deaths can be found in Annex 4.

Table 23 Total alcohol related deaths - 2000 England and Wales		
	Low	High
Direct alcohol effects	5,789	5,789
Indirect alcohol related deaths	9,527	16,169
Total (excluding Ischaemic stroke)	15,316	21,958

The number of alcohol-related deaths can also be translated as an estimate of the number of years of life lost due to alcohol misuse. In line with previous studies, this study has estimated the potential years of life lost to age 65. These are defined for any death below the age of 65 as the difference between the age at death and 65 (mid age points are taken in age categories, i.e. 17 for deaths at ages 15-19 etc.) (Table 24). Another estimate is also provided where the age threshold is that of the average expectancy age as provided by the Government Actuaries Department (2000) (Table 25).

Table 24 Potential Years of Life Lost up to the Age of 65 years- England and Wales 2000			
	Men	Women	Total
Alcohol specific deaths	42,573	20,858	63,431
Alcohol related deaths (low)	61,666	22,983	84,649
Alcohol related deaths (high)	71,554	27,802	99,356
Total low	104,239	43,841	148,080
Total high	114,127	48,660	162,787

All estimates exclude ischaemic stroke. Low and high estimates are as explained in Annex 1.

Table 25 Potential Years of Life Lost up to Expectancy Age - England and Wales 2000			
	Men	Women	Total
Alcohol specific deaths	88,315	54,746	143,061
Alcohol related deaths (min)	118,536	68,115	186,652
Alcohol related deaths (max)	156,010	101,066	257,076
Total min	206,852	122,861	329,713
Total max	244,325	155,812	400,137

All estimates exclude ischaemic stroke. Low and high estimates are as explained in Annex 1.

It is important to note at this stage that for some medical conditions alcohol consumption at certain levels can have a protective effect, that is, alcohol consumption can reduce the risk of illness or death.

One “health warning” here would be that the deaths prevented, as estimated in the majority of these studies, occur largely among those individuals in the oldest age groups, who had a much higher risk of Coronary Heart Disease (CHD). These effects are usually more pronounced for those aged 75 years old and over also for men more than for women (Corrao et al, (1999) and Briton et al (2001)). Although these findings are of medical importance, they are of less interest in terms of reducing mortality among the younger section of the population. The deaths of younger people

contribute more to the total years of life lost, while the extra years gained from a protection from CHD contribute comparatively less.

In addition some confusion exists around the interpretation of the protective effects of alcohol. When examining the potential benefits of policies designed to prevent alcohol misuse the relevant number of deaths to consider is the total number of alcohol-related deaths, that could have been averted had alcohol misuse not taken place, and not the net figure acquired after subtracting the actual number of alcohol-related deaths from the number of deaths prevented. Interpretation of these figures must be undertaken with extreme care.⁶

As in the case of unemployment costs premature deaths imply loss of output in the economy. In other words if all these premature deaths could be prevented or at least deferred until the proper time as indicated by UK life expectancy tables, then society would gain the value of the output they would produce in the current and future working years. One approach is to perform forward-looking calculations, using what is known as the “human capital approach”. More details on this method and on the issues involved in calculating the lost output in the economy due to premature death can be found in Annex 4.

Table 26 Costs of alcohol-related premature mortality		
	Low estimate	High Estimate
Premature Mortality Costs		
- Number of deaths	15,316	21,958
- Lost output (£)	2,254,321,758	2,481,810,172

The present value of lost output in the economy due to premature deaths among employees who misuse alcohol is between £ 2.3 billion (2,254,321,758) and £ 2.5 billion (2,481,810,172) (Table 26). The estimates include the 530 alcohol related deaths from motor accidents. Death estimates are taken from the Department of Transport (DTLR, 2001). It was found that 6% of all road accidents and 16% of road deaths in 2000 occurred when someone was driving over the legal limit for alcohol.

5.3 The human costs of alcohol misuse

There are significant costs that are associated with alcohol-related mortality and morbidity. The cost of health care and premature mortality in terms of lost productive output has already been estimated in the previous section. This section addresses the issue of “human costs” associated with alcohol-related illness and mortality such as the cost of pain and suffering, reduced quality of life and the value of life itself. The most important characteristic of these costs are that they are “intangible”⁷, in the sense that when they are reduced there is no tangible or easily measurable release of production or consumption resources in the economy. As a result it is extremely

difficult to place a value upon such intangible costs both with regard to alcohol-related morbidity and mortality.

Alcohol misuse can have severe consequences for an individual's well being and quality of life as well as a negative influence on a person's relationships with his or her family and close friends (Table 27). Death, pain, suffering and bereavement cause major costs. These will be considered in the next two sections.

Table 27 A short survey of the human costs of alcohol misuse

Author	Year	Content of study -findings
Vellerman	1993	Marriages where one or both partners have an alcohol problem are twice as likely to end in a divorce as marriages where no alcohol problems exist
Barber & Crisp	1994	Children of problem drinkers have high levels of behavioural difficulty, school related problems, such as under-performance and truancy, and emotional problems
Lynksey et al	1994	By the age of 15 young people in families with a problem drinking parent have higher rates of psychiatric disorder than other young people
Royal College of Physicians	1995	Alcohol problems are also a significant factor in male teenage suicides
OPCS	1996	A third of those using shelters were severely alcohol dependent
Jacobs	1998	Up to 70 percent of men who assault their partners are under the influence of alcohol when the assault takes place
Kershaw et al	1999	Data from the British Crime Survey indicate that in 44% of cases of domestic violence, the victim thought their assailant had been drinking
Farrow & Young	2000	Young women are more likely to have casual sex while under the influence of alcohol
Griffiths	2002	Half of those sleeping rough are alcohol reliant

5.3.1 The human costs of alcohol-related morbidity

Following the classification of costs and benefits in Chart 8, the lack of quality of life and well being that a misuser will experience is considered to be a private cost. Hence these costs are not quantified in this study. However, where these costs relate to the pain and suffering of the misuser's family and close friends then an attempt must be made for them to be quantified.

Morbidity alcohol-related or otherwise, involves a reduction not only in the individual's quality of life and well being but also in that of his family and friends. Quality of life (QOL) has become an important consideration in the field of health, both physical and mental. QOL may be understood as a concept akin to a sense of

well being and satisfaction with life. WHO defines Quality of Life (QOL) as a multidimensional concept incorporating an individual's perception of their position in life after accounting for their cultural settings and with regard to their goals, expectations, standards and concerns⁸. No current UK studies exist which place a value on human external costs of alcohol-related morbidity.⁹ Consequently these costs were not quantified in this study.

5.3.2 The human costs of alcohol-related mortality

The valuation of life is quite generally attempted in many countries but there is no internationally agreed method of putting a monetary value on human life. When a life is lost prematurely the society bears two type of costs – the loss of productive output and the psychological effects borne by the deceased and others (the deceased's family and friends). This latter is the “intangible” cost of premature death. Valuing the loss of productive output is done by following the human capital methodology as outlined in the previous section and Annex 4. The psychological effects of premature death can in turn be estimated by the Willingness-To-Pay (WTP) approach, which values human life according to what individuals would be willing to pay for a change that reduces the probability of illness or death (Schelling 1968, Acton 1975). It takes into consideration the risk of illness or death for those who misuse alcohol and studies what they would be willing to pay to avoid death or illness.

The estimates produced usually overwhelm the cost of lost material production as estimated by the human capital approach and considerable difficulties still exist in the accuracy and consistency of these estimates. In addition, putting a value on life lost implicitly assumes that the value of every dead person's life, irrespective of his or her prior to death health status, is the same for all. Life time earnings as calculated by the human capital method is then often used as a lower bound to a person's willingness to pay for a person's decreased risk of death (Linnerooth 1979 and Landefeld and Seskin, 1982).

Estimates of this kind have been produced by the Department of Transport in the UK prior to 1987 to evaluate the costs of accidents and encapsulated the value of pain, grief and suffering by using WTP approach. The WTP approach involves assessing the monetary value which people put on reducing the risks associated with mortality. These estimates indicate that the human costs of pain, grief and suffering to the casualty, relatives and friends was between £7,970 and £108,800 (slight and serious injuries respectively). The intrinsic loss of enjoyment of life for fatal casualties was estimated to be £783,000 (Department for Transport, 2002). In line with the previous assumptions and estimates of this study no attempt was made to quantify the magnitude of the intangible costs of the loss of enjoyment of life by the individual misuser. No similar estimates exist for either for quantifying the pain and suffering that comes from bereavement for the friends and family of misusers¹⁰.

5.4 Overall costs of alcohol misuse in the workplace and the wider economy

The overall costs of alcohol misuse in the workplace and the wider economy range between £5 and £6 billion pounds and total of around 150,000 and 163,000 potential years of life lost (calculated up to an age threshold of 65 years). These costs involve

the value of output lost through absenteeism, reduced employment and premature death. Disability pensions or social security benefits, such as sickness benefit, unemployment benefit and other supplementary benefits are not included in these calculations. Administrative costs for these were also not available and hence left out.

Neither the intangible cost of morbidity due to alcohol misuse nor the intangible value of life for all alcohol-related premature deaths are quantified for reasons presented in the previous sections.

Table 28 Costs of alcohol misuse in the workplace and the wider		
	Low estimate	High Estimate
Morbidity Costs		
- Absenteeism	1,213,631,951	1,785,907,643
- Reduced Employment	1,726,053,577	2,153,721,146
- Reduced efficiency	<i>Not available</i>	<i>Not available</i>
Premature Mortality		
- Lost output	2,254,321,758	2,481,810,172
Total costs of lost output	5,194,007,286	6,421,438,961
Potential Years of Life Lost (till 65)	148,080	162,787
Working days		
- Absenteeism	10,988,096	17,282,802
- Reduced Employment	15,039,659	20,009,902

6 The costs of alcohol related crime

6.1 Alcohol and crime: some general notes

The costs of crime have become an increasingly important tool for government and other decision-makers who are concerned with the impact of crime on the economy and the society in general. Brand and Price (2000) found that the total cost of crime in England and Wales in 1999/2000 was around £60 billion. Establishing the link between alcohol consumption and crime activities has not been easy. A number of studies have demonstrated significant and positive associations between alcohol consumption and rates of violence (Table 29).

Room and Rossow (2001) highlight that the argument focuses around the meaning of “causation”. The criminology literature provides a restrictive view of causation, which contrasts sharply with the more subjective view of public opinion about alcohol and violence as it appears in victim surveys. Somewhere in the middle sits the epidemiological literature, which argues that causes of a condition are often multiple and at a population level the causal connection is probabilistic rather than all or nothing. However, relative risks and attributable fractions for alcohol’s role in violence in a given society have not yet been fully developed on the basis of a robust epidemiological literature. In fact arriving at “sound” estimates of the association between alcohol consumption and violent behaviour is hampered by various methodological problems.

When examining “alcohol-related crimes” the implication is that alcohol may cause or have a leading or even minor role in bringing about the crimes. This can be in terms of making the offender more likely to commit the crime and / or the victim more vulnerable to being subjected to it. In the custody suite environment, for example, police officers often assess and record whether alcohol was a factor in the arrest, based on their knowledge of the incident and the degree of visible intoxication of the suspect.

The subjective nature of this measure opens it to criticisms of its validity and reliability (SIRC, 2002). Researchers agree that there is no direct objective way of measuring alcohol-related crime. However, this should not stop us from using direct subjective definitions (like victim, offender, police or clinician perceptions) and less direct methods, such as offence/ incident, victimisation, spatial, temporal and contextual data to analyse the problems and potential solutions (Tierney and Hobbs, *forthcoming*).

Another problem is that even more objective measures of alcohol use in the body, such as urine testing are not infallible. Unlike drugs like heroin or cocaine, alcohol is dispersed in the body very quickly, so a positive urine test for alcohol may only indicate very recent and/ or heavy use (Bennet et al, 2001). This remains useful, of course, but may understate the role of alcohol in offending. Aside from arrest data, information from incidents recorded by the police can sometimes be used as an indicator of alcohol-related crime, disorder and anti-social behaviour. There are a large number of calls made to the police about incidents in which alcohol may or may not be a factor but it is not often possible to validate this.

Table 29 Alcohol consumption and crime

Author	Year	Content of study -findings
British Crime Survey	2002	47 percent of all violent crime is alcohol related
Room & Rossow	2001	In the US 40 percent of violent offenders had been drinking at the time of the offence for which they were jailed. In addition surveys in the US of victims indicate that 35 percent of respondents perceive the perpetrator to have been drinking
McMurrin	2002	Offenders are often heavy drinkers and offending is more prevalent in heavy drinkers. Many arrestees are drunk and a proportion of offenders admit there is a relationship between their drinking and offending
Ensor & Godfrey	1993	Violent crime appears to have the strongest links with alcohol use, but there are also drink-specific crimes (underage drinking, drunk and disorderly/ incapable, drink driving) and links with property damage, arson, acquisitive crime, aggression and sexual offending. These links do not mean that alcohol causes crime.
Rainstrick et al	1999	There are several potential indirect links between alcohol and crime. Adolescent alcohol use can interfere with development leading to a more anti-social adult. Alcohol can in general trigger or facilitate aggression and produce a home environment conducive to anti-social behaviours. Alcohol intoxication can reduce inhibitions and judgement. Drunk people may be amnesiac regarding the negative consequences of their criminal actions, thus failing to learn from them. In addition alcohol use can serve as a financial motive for crime.

6.2 The Evidence Base: sources of data and evidence

There are several sources of information on the links between alcohol and crime, disorder and anti-social behaviour. However, there is no truly robust source as much of the data rely on subjective definitions and assumptions about alcohol's role in affecting behaviour. Some of the problems with most of the sources of information on alcohol and crime can be found in Annex 5. Existing sources include victim surveys statistics, arrest and offender data by the police and the criminal justice system (Table 30). Some of these sources have been used in this study to estimate the costs of alcohol-related study, presented in the following sections.

Table 30 Sources of information on the links between alcohol and crime	
Source	Content of study -findings
British Crime Survey	A nationally representative household survey of adults aged 16 and over in England and Wales. The main purpose of the BCS is to measure crimes not necessarily reported to or recorded by the police. Violent crimes covered in the BCS are: common assault, wounding, robbery and snatch theft (including unsuccessful attempts). A 4-group typology is used: stranger, acquaintance and domestic violence and mugging. The 'alcohol' component is measured through (a) the victim's perception of whether the offender was drunk at the time and/or (b) whether the incident occurred in or around licensed premises. There are also questions on perceptions of alcohol-related crime and disorder in the respondent's neighbourhood. Similar data are provided by the Home Office on recorded crime figures, esp. those for violent crime, criminal damage and drink-specific offences.
New English and Welsh Arrestee Drug Abuse Monitoring (NEW-ADAM)	Interviews of adults arrested during 30-day periods in 15 sites in England and 1 in Wales during 1999-2001. The first 8 sites were revisited in 2001/02. Those who consented were interviewed by independent researchers and urine tested for alcohol and other drugs. They were asked a host of questions about drug and alcohol use, offending behaviour and the links between them. They also responded on their need for and experiences of alcohol treatment. The programme has been suspended and will be re-launched as the Arrestee Survey in 2003
Routine administrative data	Routine administrative data are collected on those arrested by the police annually. These are broken down by offence type, age, sex and police force area. The Home Office has recently carried out a census of custody suites, including data on total arrests for drunk and disorderly/ incapable by suite for 2001/02. One-off research projects have also been conducted recently by the Home Office on alcohol and crime in five custody suites. These were based on analysis of routine data and observation in the police stations themselves late at night. Another survey looked at 4,250 arrests in 10 custody suites in 1993-94.
Home Office	Finally the Home Office produces court and prison statistics by offence type, age, sex and area; it also has a series on breath-test results and drunkenness and underage drinking offences.
ONS Psychiatric Morbidity Survey of Prisoners (ONS, 1999)	Interviews of representative samples of male and female prisoners about drinking, drug use, mental health and other factors

6.3 The incidence of alcohol related crime

As indicated in the previous sections it is very difficult to determine what proportion of all crime is, if at all, alcohol related. Given the lack of robust population attributable fractions one way of determining what proportion of all crime is alcohol-related is to rely on data from research on those arrested by the police. Arrestee surveys are becoming more and more common recently but they are plagued by small samples and lack of being representative of the whole population (Table 31).

Table 31 Arrestee surveys in use	
Source	Content of study -findings
Man L-H et al (2002)	Report data from 1,600 arrestees in three city stations during Feb 2000; 15% for an alcohol-specific offence (drunk and disorderly, drunk and incapable, drink driving) and a further 16% for 'alcohol-related' offences (i.e. according to an officer). In the latter, 23% were for violence, 22% theft, 15% criminal damage, 11% threatening behaviour and 9% breach of the peace.
Deehan et al (2002)	Studied data of 169 people who were arrested in two city stations during 22:30 and 03:00 on a selection of weekdays and weekends between Nov 1999 and Feb 2000. Over a third of arrests were for alcohol-specific offences. About three-quarters said they had been drinking and 59% were classified (subjectively) as being intoxicated. 60% of the intoxicated arrestees were being held for alcohol-specific offences; 20% for public order offences and 12% for assault.
Bennet et al, 2001; Bennet and Sibbitt, 2000; Bennett, 1998	Used interviews of adults arrested during one month in 15 sites in England and 1 in Wales (NEW-ADAM, New English and Welsh Arrestee Drug Abuse Monitoring). Eight of the sites were revisited two years later. Those consenting were interviewed by independent researchers and tested for alcohol and other drugs. They were asked a host of questions about drug and alcohol use and offending behaviour and the links between them. They also responded on need for and experiences of alcohol treatment. The main results showed that 58 percent of the sample had used alcohol in the last three days while 8 percent said they were currently dependent on alcohol and 6 percent would like treatment for their alcohol use. However only a quarter (24 percent) of those who had drunk in the last year thought that alcohol was connected to their offending – mostly because of the effect alcohol had on their judgement.

This study uses the NEW-ADAM to derive estimates of alcohol-related crime. Attribution fractions used can be found in Annex 5. It is important to note here that the total alcohol-related crime costs presented in this study must be considered as maximum estimates. Using alcohol test data as attributable fractions may overestimate the cost findings as those found to have drunk prior to committing an offence may not necessarily commit that offence because of alcohol misuse.

Room and Rossow (2001) suggest that common practice in the US and Canada has seen the halving of the average proportion of offenders who had been drinking prior to committing a crime. The justification of the halving was a small 20 year old study in which half of the proportion of inmates in prisons and jails who reported having been drinking before committing a violent crime attributed the crime to their own drinking. In addition, if one accepts the view expressed by the arrestees themselves that only a quarter of their offences were connected to alcohol use then the magnitude of these costs will reduce. Given the uncertainty in this field this study presents only maximum estimates and not an estimate range. It is therefore implicitly assumed that alcohol-related crime costs may vary within this upper limit. With this in mind the next section proceeds by estimating first the costs in response to alcohol-related crime occurring.

6.4 The value of alcohol related crime in England and Wales

The analysis in this study follows closely that of Brand and Price (2000) and estimates three categories of alcohol-related crime costs:

- ◆ Costs incurred in anticipation of crime
- ◆ Costs incurred as a consequence of crime and
- ◆ Costs incurred in response to crime and tackling criminal activities (costs to the criminal justice system).

Important costs such as those related to fear of crime or quality of life impacts have not been quantified. A more detailed presentation of the relevant costs estimated in this study can be found in Table 32.

Table 32 Crime costs of alcohol misuse		
Types of costs	Calculated	Source of data
<i>Alcohol-related and alcohol specific crimes¹</i>		
<i>Costs in anticipation of crime</i>		
• Security expenditure: alarms, lights etc	✓	Brand and Price (2000)
• Precautionary behaviour: taxis at night etc.	✓	Brand and Price (2000)
• Administrative costs of insurance	✓	Brand and Price (2000)
<i>Costs as a consequence of crime</i>		
• Property stolen and damaged	✓	Brand and Price (2000)
• Lost output	✓	Brand and Price (2000)
• Emotional and physical impact on victims	✓	Brand and Price (2000)
• Victim services	✓	Brand and Price (2000)
• Health services	✓	Brand and Price (2000)
• Value of life for premature deaths from homicide	x	Not calculated
<i>Costs in response to crime</i>		
• Custody suite arrest costs for alcohol-related and alcohol-specific offences	✓	Man L-H et al (2002), NEW-ADAM, Ayres et al (2002)
• Criminal Justice System costs for alcohol-related offences (incl police)	✓	Brand and Price (2000)
• Magistrate Courts for alcohol-specific offences (incl sentencing)	✓	Criminal Justice Statistics for England and Wales (ONS, 2001); Harries (1998)
<i>Drink driving</i>		
• Custody suite arrest costs	✓	Man L-H et al (2002), NEW-ADAM, Ayres et al (2002)
• Magistrate Courts (incl sentencing)	✓	Criminal Justice Statistics for England and Wales (ONS, 2001); Harries (1998)
• Crown Courts (incl sentencing)	✓	Criminal Justice Statistics for England and Wales (ONS, 2001); Harries (1998)
• Lost output	✓	DTLR (2001); HEN 1 (2002)
• Medical and ambulance services	✓	DTLR (2001); HEN 1 (2002)
• Human costs	✓	DTLR (2001); HEN 1 (2002)
• Value of life for premature deaths from homicide	x	Not calculated

¹Alcohol specific offences are drunkenness and disorder, all other may be alcohol-related

The categories of crime used in this study are drawn from a list of notifiable offence categories (the types of offences that police forces record and are required to report to the Home Office) (Home Office, 2002) (Annex 5). There are many crimes, which are not included in this list. However for reasons of consistency and comparability with previous cost crime estimates this study includes crimes which have included in the study conducted by Brand and Price (2000) and as a result have a known average cost attached to them. Fraud and Forgery is excluded from that list as costs for this type of offence could not be disaggregated in the same manner as in the case of all the other crimes included. Most importantly though, there is no significant evidence in the literature to suggest that in some instances offences of fraud and forgery could be alcohol related.

This study uses the notifiable offence categories to determine the types of crime on which this study will focus. However, notifiable offences recorded by the police have not been used as a measure of the incidence of crime. The reason for this is that the police can only record those crimes that come to their attention and hence the number of recorded offences is an underestimate of the actual number of offences committed. Hence in line with Brand and Price (2000) this study uses the British Crime Survey estimates of crime incidence based on victim responses for all crimes that are recorded by the survey, such as common assault, robbery from individual, burglary in a dwelling, theft from a person, theft of and from a vehicle, attempted vehicle theft and other theft and handling. Wounding replaces the two categories of violence (serious and less serious) as recorded by recorded crime statistics. Homicide statistics are taken from Home Office (2002).

For all other crimes that are not recorded by the British Crime Survey this study follows a methodology similar to that adopted by Brand and Price (2000) which uses recorded crime estimates and crime “multipliers” to bring recorded crime to BCS levels. In particular, Brand and Price (2000) used a multiplier for each crime to allow consistent comparison between the British Crime Survey and recorded offences. The multipliers for burglary in business, sexual offences, criminal damage and robbery from business were 2.1, 3.5, 6.3 and 5.8 respectively. Details on the total numbers of all offences used in this study can be found in Annex 5.

In addition to the aforementioned offences the study also considers offences of drunkenness and alcohol-related disorder. These are treated as separate category below and their costs are derived in different manner, as it will be explained in detail below. Finally drink-driving offences have also been included and dealt with at the end of this section as a separate offence.

6.5 Costs in anticipation of alcohol related crime

The costs that fall in this category are related to measures, which reduce the risk of victimisation. In other words potential victims would be willing to take measures to reduce the probability or risk of them becoming a victim. These measures comprise the purchase of defensive expenditure on security products such as alarms, security lights etc and precautionary behaviour such as taxis instead of public transport, staying home after dark etc. Both types of measures involve costs which the individuals could avoid and devote these resources productively in other types of expenditure in the economy in the absence of crime.

Additionally, individuals are willing to avoid the financial uncertainty arising from the risk of becoming victims of crime. Thus they are willing to purchase insurance policies, which allows them to pool and spread risk. Insurance therefore mitigates of the consequences of victimisation by reducing its adverse financial consequences. Of course insurance is largely a transfer of resources from potential victims with insurance to victims with insurance. This type of transaction takes place voluntarily by both parties and hence insurance claims are treated as a transfer payment and not a loss of resources to the economy. Hence the premia paid by policyholders are not considered here. However, the resources used in insurance administration are included because these resources represent an opportunity cost to the economy. In

other words in the absence of crime these resources could have been productively engaged elsewhere in the economy.

Average costs in this category vary by type of crime and details can be found in Brand and Price (2000). Table 33 contains the details of all costs in anticipation of alcohol-related crime. It is suggested that the total cost in anticipation of alcohol-related crime is around £ 1.5 billion. And with that in mind the next section explores the last category of alcohol-related crime costs, costs as a consequence of crime.

Table 33 Costs in anticipation of crime - 2001 prices (£) – England and Wales 2000/01			
Type of offence	Alcohol related cases	Average prevention costs* (£)	Total prevention costs(£)
Homicide	319	0	0
Common assault	841,770	0	0
Wounding	309,730	2	649,047
Sexual offences	18,848	2	39,497
Burglary in Business	159,998	950	159,258,103
Criminal damage	3,151,896	360	1,188,878,277
Robbery from individual	43,440	40	1,820,593
Robbery from business	9,185	1,300	12,510,967
Burglary in a dwelling	168,470	430	75,902,152
Theft from a person	80,080	20	1,678,097
Theft of a pedal cycle	50,050	20	1,048,811
Theft of vehicle	42,900	690	31,014,833
Theft from a vehicle	202,800	70	14,874,044
Attempted vehicle theft	91,910	30	2,888,997
Other theft and handling	192,920	20	4,042,689
Total costs (£)			1,494,606,106

* Note that average costs are in 1999 prices and total costs have been updated to 2001 prices. Average costs have been adopted from Brand and Price (2000)

6.6 Costs as a consequence of alcohol-related crime

Costs in this section cover three main categories; cost of property damaged or stolen, victim support and emotional impact costs and lost of productive output of the victim. As in the previous cases victims include individuals, households and businesses. In addition it is important to note that a victim in this study implies the direct victim of crime and not family or friends. The impacts of crime on victims' families and friends are left out due to lack of data and appropriate techniques of estimating such costs. Furthermore fear of crime costs are also excluded and new means for estimating such costs are needed if crime costs need be more accurate in the future.

First, stolen property constitutes a cost of crime as it is represents an unwanted transfer of resources out of the legal economy and hence a loss to the economy and the society as a whole. Similarly damaged property involves an opportunity cost of using resources for repairs when they could have been productively elsewhere in the economy. In addition victims use time to file insurance claims, repair damaged

property and dealing with the authorities. This time could have otherwise been spent as work or leisure and hence is included as an opportunity cost.

Second, victims suffer the psychological and physical impact of crime. This involves recovering from injuries and shock. Victims may suffer serious emotional trauma depending on the severity of crime and these impacts, especially for violent and sexual crimes, generally by far outweighs any financial costs as it can be seen from Table 34 below. Health costs of the victims may fall on the NHS as they are in need of medical and other support services such as counselling. Therefore some overlapping is expected in this area but at a minimum level as only a small number of assaults were considered in Section 2.

Finally, victims of crime find it inevitable to take time of work to recover either from physical or psychological injuries. In some cases even if their work attendance continues their performance might be severely affected. Employers might find that their employees who had been victims of crime are often absent from work and as result the employer faces costs due to absenteeism and disruption to productive output. In other words the economy faces large costs when employees are victims of crime similar to those explored in previous sections dealing generally with alcohol-related health problems and absenteeism.

Table 34 Costs as a consequence of alcohol-related crime - 2001 prices – England and Wales 2000/01					
Type of offence	Alcohol-related		Average costs* (£)		
	Cases	Property/victim	Lost output	Emotional	Total costs
Homicide	319	5,000	370,000	0	125,322,932
Common assault	841,770	10	20	240	238,133,374
Wounding	309,730	1,206	2,000	12,000	4,934,706,373
Sexual offences	18,848	1,206	2,000	12,000	300,297,666
Burglary in Business	159,998	1,200	40	0	207,873,734
Criminal damage	3,151,896	440	30	0	1,552,146,640
Robbery from individual	43,440	506	420	2,400	151,382,307
Robbery from business	9,185	1,550	120	590	21,749,834
Burglary in a dwelling	168,470	834	40	550	251,359,685
Theft from a person	80,080	130	4	100	19,633,737
Theft of a pedal cycle	50,050	127	4	100	12,113,764
Theft of vehicle	42,900	3,060	60	890	180,245,621
Theft from a vehicle	202,800	300	10	180	104,118,305
Attempted vehicle theft	91,910	120	7	120	23,786,075
Other theft and handling	192,920	127	4	100	46,693,055
Total costs (£)					8,169,563,102

* Note that average costs are in 1999 prices and Total costs have been updated to 2001 prices. Average costs have been adopted from Brand and Price (2000)

Lost output costs due to homicide related premature deaths are not included in this section as they have been incorporated in the earlier section of lost productivity due to

premature deaths. In addition, for consistency with the estimates of lost output from premature deaths in the earlier section, emotional and physical impact costs (human costs) are not included for homicide victims (value of life estimates were include in Section 3.4). Similar types of alcohol-related crime costs as those included here and in the previous two sections have been calculated for drink-driving offences. These costs will be explored in detail later.

6.7 Costs in response to alcohol related crime

This category of costs covers a wide range of costs incurred as a response to crime committed (Table 35). They are costs to the police, who record and investigate crimes which come to their attention, the Crown Prosecution Service, Magistrates and Crown courts, defence costs and costs to the prison and probation services. An average estimate (in 1999 prices) for all these costs is provided by category of crime in Brand and Price (2000). Additional costs are estimated from the custody suite for drunkenness and disorder offences as well as other alcohol-related offences.

Table 35 CJS costs - In response to crime - 2001 prices – England and Wales 2000/01			
Type of offence	Alcohol-related offences	Average CJS cost*	Total cost
Homicide	319	22,000	7,352,279
Common assault	841,770	270	238,133,374
Wounding	309,730	2,700	876,213,811
Sexual offences	18,848	3,900	77,019,657
Burglary in Business	159,998	490	82,143,653
Criminal damage	3,151,896	60	198,146,380
Robbery from individual	43,440	1,400	63,720,755
Robbery from business	9,185	1,400	13,473,349
Burglary in a dwelling	168,470	490	86,493,150
Theft from a person	80,080	90	7,551,437
Theft of a pedal cycle	50,050	30	1,573,216
Theft of vehicle	42,900	70	3,146,432
Theft from a vehicle	202,800	30	6,374,590
Attempted vehicle theft	91,910	10	962,999
Other theft and handling	192,920	20	4,042,689
Total Costs			1,666,347,769

* Note that average costs are in 1999 prices and total costs have been updated to 2001 prices. Average costs have been adopted from Brand and Price (2000)

Intoxicated arrestees held for non-alcohol-specific offences (e.g. assault) took longer to process than non-intoxicated arrestees held for the same offence types. The majority of the work of Forensic Medical Examiners involves drunken arrestees and they will often recommend 15-minute checks to ensure their well being. Intoxicated arrestees were more likely to be aggressive, non-compliant and present hygiene problems for the police. These have implications for the relative cost of processing

alcohol-related arrests. Taking into consideration alcohol specific offences (drunkenness and disorder and the extra costs that drunk arrestees impose on custody suites the total costs in response to crime are presented in Table 36 (details on estimation can be found in Annex 5).

Table 36 Costs in response to crime excl drink driving offences - 2000/01			
England and Wales 2001 prices			
	Cases	Average costs (£)	Total costs (£)
Arrests 2000/01			
Alcohol related	299,308	180.6	54,055,025
Alcohol specific ¹	81,000	117.2	9,493,200
CJS costs - alcohol related			1,666,347,769
CJS costs of drunkenness, disorder and related			
Magistrate	33,749	550	20,424,038
Total costs (£)			1,750,320,031

¹ Alcohol-specific offences are those of drunkenness and disorder

6.8 Costs of drink-driving offences

Estimates from the Department of Transport (DTLR, 2001) indicate that 6% of all road accidents and 16% of road deaths in 2000 occurred when someone was driving over the legal limit for alcohol. The numbers of people killed and seriously injured in drink-driving accidents in Great Britain has stabilised at about 3,000 casualties a year in recent years.¹¹

It was estimated that there were 530 drink-drive deaths in 2000 for the whole of Great Britain and provisional estimates for 2001 suggested that around 480 people were killed¹²

Table 37 below shows the percentages exceeding varying levels of blood alcohol for different classes of road user using a sample data of around half of all road accident fatalities from the 2000 Coroner's and Procurators Fiscal data. It also includes the different proportions of fatalities exceeding 80mg/100ml by time of day.

Table 37. Blood alcohol levels of fatalities aged 16 and over: GB: 2000

	Percentage over Blood alcohol levels (mg/100ml)							% over 80 mg/100ml	
	<u>9</u>	<u>50</u>	<u>80</u>	<u>100</u>	<u>150</u>	<u>200</u>	<u>size</u>	<u>22:-00- 03:59</u>	<u>04:00- 21:59</u>
Motorcycle riders	24	12	10	10	7	4	380	43	7
Other vehicle drivers	35	24	22	22	16	10	774	49	15
Passengers	39	24	20	17	10	4	240	41	11
Pedestrians	47	38	35	33	27	22	316	74	20
Cyclists	22	14	14	14	14	8	37	..	6

Adapted from Road and Accidents: Great Britain, DTLR, 2001

More than one in five drivers killed in 2000 were over the legal limit of 80mg/100ml while for motor cycle riders the rate was half that. Alcohol levels above 150 mg/100ml (almost twice the legal limit) were more common amongst drivers killed than among passenger fatalities. Around half of the drivers killed between 10:00 pm and 4:00 am were over the legal limit.

As in other cases of crime the costs associated with drink driving evolve around the Criminal Justice System, lost output due to premature death or a serious casualty, health and emotional impact on accident victims. The average estimates of such type of costs are taken from the Department of Transport (2002) and are categorised by type of casualty, slight and serious. Details of all of the above costs can be seen in Table 38. The total bill for slight and serious casualties from drink driving is estimated to be around £ 0.5 billion (excluding drink-driving fatal casualties) (For details see Annex 5).

Average arrest costs are taken from Man L-H et al (2002) and drink driving arrests are assumed to be equal to all the cases that went through proceedings at Magistrate courts. The average cost of proceedings at Magistrate courts is equal to £ 550 (1997 prices) as in previous cases, taken from Harries (1999). Average Crown court proceeding costs are taken from the same source but also include sentencing. The average cost of a case going through Crown Courts was assumed to be £2,700 (Harries, 1998).

Loss of output due to drink driving premature deaths was included in section 3.2. The intangible value of life itself is not added to the human capital valuation for consistency with previous costs estimates from alcohol-related premature death.

Table 38 Drink driving costs of serious and slight casualties – England and Wales 2001			
	Cases	Average cost (£)	Total cost (£)
Drink driving arrests	96,591	181	17,444,335
<i>CJS costs of drink driving offences</i>			
Magistrates courts	95,983	550	58,086,474
Crown courts (including sentencing)	608	2,700	1,806,281
<i>Costs of drink driving casualties</i>			
<i>Lost output</i>			
Serious casualties	2,140	15,810	33,833,400
Slight	15,530	1,670	25,935,100
<i>Medical and ambulance</i>			
Serious casualties	2,140	9,580	20,501,200
Slight	15,530	710	11,026,300
<i>Human costs</i>			
Serious casualties	2,140	108,800	232,832,000
Slight	15,530	7,970	123,774,100
Total Drink-Driving Costs of serious and slight casualties (£)			525,239,190

6.9 Total costs of alcohol-related crime

The total maximum cost estimate of alcohol related crime to England and Wales in 2001/02 is estimated around £ 12 billion. Table 40 shows how this £ 11.7 billion is split by cost type (a more detailed table can be found in Annex 5). Criminal Justice System costs are around £ 1.7 billion. Almost £ 2.5 billion are the costs as a consequence of alcohol-related crime (property damaged or stolen, health and victim services). Around £ 1.5 billion of the total cost is the cost in anticipation of alcohol-related crime. Nearly £ 1 billion of the total cost is lost productive output to the economy. Emotional impact costs of the victims of alcohol-related crime outweigh all other cost estimates at around £ 4.7 billion. Last the cost of serious and slight casualties from drink-driving offences reaches £0.5 billion.

Table 39 Total costs of crime – England and Wales - 2001	
	Total costs
Criminal Justice System costs	
Alcohol specific offences ¹	29,917,238
Alcohol related offences	1,720,402,794
Property/health and victim services costs	2,521,171,533
Costs in anticipation of crime	1,494,606,106
Crime costs of lost productive output	969,796,364
Total costs of crime excluding human costs	6,728,541,756
Emotional impact costs	4,678,595,205
Total Crime Costs (excluding drink-driving offences)	11,414,489,240
Total Crime Costs (including drink-driving offences)	11,939,728,430

7 Conclusions

This study presents estimates of death and illness and the costs associated with them, attributable to alcohol misuse in England (some of these effects and corresponding costs are also quoted for Wales where information and data were not available for England alone). The estimates produced are those of the external costs of alcohol misuse. These are threefold. Costs born by the taxpayers arising from the excess use of health services, costs of injury to third parties from alcohol related motor accidents or crime incidents, and costs due to lost productive output. This decision is not because private costs are unimportant. Rather they do not generally justify government action because individuals are assumed to take into account both the private benefits and costs of an activity when making decisions to undertake this activity.

A further classification has been made between tangible and intangible costs of alcohol misuse. The former are these costs, which when reduced, yield resources which are then available to the community for consumption or investment purposes. The latter, which include pain and suffering, when reduced or eliminated, do not yield resources available for other uses. All costs have been quoted in 2001 prices and are generally based on 2000/01 data. Assuming that the prevalence of alcohol misuse will remain at similar levels, the costs may then be considered as costs per annum.

The results for the bulk of this study are estimated over a range of problem drinkers, which includes either heavy drinkers (50/35 plus units of alcohol consumed per week for men and women respectively) or dependent drinkers as defined by the Severity of Alcohol Dependence Questionnaire (SAD-Q) questionnaire from the Psychiatric Morbidity Survey (ONS, 2001). It was found that 7.9 percent of the English

population, or around 2.8 million (2,833,824) people in England aged 16 and over have some form of alcohol dependence. Similarly using information from the 2000/01 GHS (ONS, 2001) it was found that around 1.9 million (1,930,705) heavy drinkers exist in England.

The findings regarding the negative effects of alcohol misuse on health were derived using levels of alcohol consumption over the whole of the drinking population. Attributable fractions were thus estimated as being abstinence-based which means that the risks or benefits reflected of alcohol at all levels of consumption relative to a baseline of complete abstinence of alcohol. It is found that in 2000 between 15,316 and 21,958 people died of alcohol related causes (direct and indirect) in England and Wales. The potential years of life lost due to alcohol misuse (calculated up to the age of 65) were in total between 148,080 and 162,787 (up to the age of 65 and between 329,713 and 400,137 up to life expectancy age).

However, studies in the medical and epidemiological literature indicate that when consumed in moderation alcohol has a protective effect against Coronary Heart Disease (CHD) and possibly ischaemic stroke. The benefits of moderate alcohol consumption are acknowledged, however the costs presented with regard to the number of hospitalisations or deaths and life years lost, are gross and not net costs, on the grounds that a cost study should not give incomplete, and partial consideration to benefits associated with a alcohol consumption

Table 41 presents the overall picture of the cost findings in this study. The overall cost of alcohol misuse ranges between £18 and £20 billion. Within that estimate the intangible external emotional costs imposed on the victims of crime are around £4.7 billion. In addition, it was estimated that the cost to the NHS in 2000/01 to be at a middle range of £1.5bn. One in every 26 hospital bed days and 1 in 80 day cases is attributable in some measure to alcohol misuse, while 35 percent of accident emergency consultations were also found to be alcohol related. The estimated £46m spent directly on specialist alcohol services by the NHS forms a small part of this total.

Premature deaths were evaluated in terms of future earnings loss to represent potential productivity loss. These estimates value potential output (production) losses at approximately £2.4 billion. It was also found that around 14 million working days are lost annually because of alcohol-related absences, with a cost estimated at £1.5bn. This takes into account a conservative estimate of shorter absences connected with alcohol misuse. For some individuals heavy drinking will account not only for higher unemployment but also lower activity rates among heavy or dependent drinkers through a “discouraged worker” effect. These costs of unemployment and discouragement in the labour market were found to be around £2bn (mid-range estimate).

It was found hard to assign an exact value to alcohol-related crime and disorder. Alcohol attributable fractions, similar to those encountered in the epidemiological literature, have not yet been developed in the crime field. Evidence presented in this study on the role that alcohol might play in the incidence of crime comes from arrestee surveys where alcohol level in individuals’ urine was measured at the point of arrest. Thus maximum estimates are offered, based initially on the costs to the criminal

justice system. These estimates however, also include preventive costs of crime (such as administrative costs of insurance or any other expenditure on items such as property alarms which would not have taken place if crime was absent (opportunity cost) as well as costs of lost productive output and emotional impact costs on the victims of crime. Maximum total crime costs, incorporating all these items just mentioned reach £ 12 billion. Costs of drink-driving serious and slight casualties account for another £ 0.5 billion.

It was not possible to quantify the intangible costs of pain and suffering to friends and family for alcohol-related morbidity or mortality. Such calculations are based on willingness to pay techniques used to evaluate the pain and suffering outcomes of the friends and family of the alcohol misusers. No such studies have been conducted for alcohol related mortality and morbidity cases.

In sum, the cost estimates in this study do not necessarily indicate the amount of money and life years which could be saved as a result of the introduction of efficient government policy measures to reduce the harm associated with alcohol misuse. In fact the introduction of any such policy may increase prevention or research costs in the short run. The costs estimated here include both avoidable and unavoidable costs. Avoidable costs are those which could not have been incurred if there had been no problems associated with alcohol misuse. Some avoidable costs of alcohol misuse are associated with acute harm, such as injuries from road accidents. Avoidance of these harms would result in both immediate and longer-term savings. Treatment, law enforcement and some productivity costs form the bulk of alcohol-related costs estimated here fall in this category.

Chronic harm may also be reduced or eliminated but only over relatively longer periods. Even after the successful implementation of government policy there will be a long period of time before health and other targets are achieved. In addition, even if there had been a sudden end to alcohol misuse due to successful government policy in any year there would still have been costs due to the cumulative or lagged impact of previous alcohol misuse. These latter costs are the unavoidable costs of alcohol misuse. These are costs which are currently borne relating to past alcohol misuse together with those resulting from the fact that it is unavoidable that some part of the population will continue to misuse alcohol in the future. Costs of this kind may also be reduced or eliminated but over an even longer period of time.

Table 40 Overall Costs of Alcohol Misuse (£ millions)

	First Estimate	Second Estimate
Health Care Costs		
Hospital inpatient (&day) visits		
Directly attributable to alcohol misuse	126.2	126.2
Partly attributable to alcohol misuse	344.2	399.8
Hospital outpatient visits	222.8	445.6
Accident and emergency visits	305.2	305.2
Ambulance services	205.0	205.0
Practice nurse consultations	19.1	19.3
NHS GP consultations	27.8	48.7
Laboratory tests	N/A	N/A
Dependency prescribed drugs	1.6	1.6
Other health care costs	35.3	35.3
Specialist treatment services	96.2	96.2
Workplace and Wider Economy Costs		
Lost output due to absenteeism	1,213.6	1,785.9
Lost output due to reduced employment	1,726.1	2,153.7
Lost output due to reduced employment efficiency	N/A	N/A
Lost output due to premature death	2,254.3	2,481.8
Costs of alcohol-related and alcohol specific crime		
Criminal Justice System costs		
Alcohol specific offences	29.9	29.9
Alcohol-related offences	1,720.4	1,720.4
Property/health and victim services	2,521.2	2,521.2
Costs in anticipation of crime (alarms etc)	1,494.6	1,494.6
Lost productive output of victims	969.8	969.8
Emotional impact costs for victims of crime	4,678.6	4,678.6
Drink driving		
Criminal Justice System costs	77.3	77.3
Cost of drink-driving casualties		
Lost output		
Serious casualties	33.8	33.8
Slight casualties	25.9	25.9
Medical and ambulance		
Serious casualties	20.5	20.5
Slight casualties	11.0	11.0
Human costs		
Serious casualties	232.8	232.8
Slight casualties	123.8	123.8
TOTAL COSTS	18,517.1	20,044.0

REFERENCES

Acton, J D (1975) Measuring the Social Impact of Health and Circulatory Disease Programs: Preliminary Framework and Estimates, Rand Report R-1967, Santa Monica, CA: The Rand Corporation

Alcohol Concern (1999) Proposals for a National Alcohol Strategy for England

Alcohol Concern (2002a) State of the Nation 2002

Alcohol Concern (2002b) Report on the Mapping of Alcohol Services in England

AON (2002) Analysis of Sickness Absence in the Civil Service (www.aon.co.uk)

Barber, J G and Crisp B R (1994) The Effects of Alcohol Abuse on Children and the Partner's Capacity to Initiate Change, Drug and Alcohol Review, 13, 4, 409-416

Barham, C, and Leonard, J (2002) Trends and Sources of Data on Sickness Absence, Labour Market Trends, April, 177-185, London: Office for National Statistics

Barmby, T, Ercolani, G, and Treble, J (1997) A Monthly Sickness Absence Series for Britain, 1971-1984, Report from the Institute for Labour Research, University of Essex (www.essex.ac.uk/ilr/)

Barmby, T, Ercolani, G, and Treble, J (1999) Sickness Absence in Great Britain: New Quarterly and Annual Series from the GHS and LFS, 1971-1997, Labour Market Trends, August, 405-415, London: Office for National Statistics

BCS (2002) British Crime Survey, Home Office.

Becker, G S (1964) Human Capital, Chicago: University of Chicago Press

Becker, G S and Murphy, K M (1988) A Theory of Rational Addiction, Journal of Political Economy, 96, 4, 675-700

Bennet, T (1998) Drugs and Crime: The Results of Research on Drug Testing and Interviewing Arrestees, Home Office, Research Development and Statistics Directorate, Research Findings, No 183 (www.homeoffice.gov.uk/rds/pdfs/hors183.pdf)

Bennett, T and Sibbitt, R (2000) Drug use among arrestees, Home Office, Research Development and Statistics Directorate, Research Findings, No 119, (www.homeoffice.gov.uk/rds/pdfs/r119.pdf)

Bennett, T, Holloway, K and Williams, T. (2001) Drug use and offending: summary results from the first year of the NEW-ADAM research programme, (www.homeoffice.gov.uk/rds/pdfs/r148.pdf)

Berry, R, and Boland, J (1973). The Economic Costs of Alcohol Abuse – 1972, Brookline, MA: Policy Analysis, Inc

Brand, S and Price R (2000) The Economic and Social Costs of Crime, Home Office Research Study, 217

Britton, A and McPherson, K (2001) Mortality in England and Wales Attributable to Current Alcohol Consumption, Journal of Epidemiology and Community Health, 55, 6, 383-388

Brookman, F and Maguire, M (2003) Reducing Homicide: Summary of a Review of the Possibilities, Home Office, Research Development and statistics Directorate, Ocasional Paper, No. 84 (www.homeoffice.gov.uk/rds/pdfs2/occ84homicide.pdf)

Cipriani, F, Balzi, D, Sorso, B and Buiatti, E (1998) Alcohol related mortality in Italy, Public Health, 112, 183-188

Collins, D J, and Lapsley, H M (1991) Estimating the Economic Costs of Drug Abuse in Australia. National Campaign Against Drug Abuse, Monograph Series No. 15, Canberra: Australian Government Printing Service

Collins, D J, and Lapsley, H M (1996) The Social Costs of Drug Abuse in Australia in 1988 and 1992, Monograph No. 30, Commonwealth Department of Human Services and Health, Canberra: Australian Government Printing Service

Confederation of British Industry (2002) Counting the Costs; 2002 Absence and Labour Turnover Survey

Corrao, G, Bagnardi, V, Zambon, A and Arico, S (1999) Exploring the Dose-Response Relationship Between Alcohol Consumption and the Risk of Several Alcohol – Related Conditions: A Meta – Analysis, Addiction, 94, 1551-1573

Crawford, A, Plant, M A, Kreitman, N and Latcham, RW (1987) British Journal of Addiction, 82, 1007-1016

Dalton, S and Orford, J (2002) Birmingham Untreated Heavy Drinkers Project, Report on Wave Three (Commissioned by the Department of Health)

Deehan, A, Marshall, E and Saville E (2002) Drunks and Disorder: processing intoxicated arrestees in two city-centre custody suites. Home Office Police Research Series Paper 150 (www.homeoffice.gov.uk/rds/prgpdfs/prs150.pdf)

Department of Health (2001) Prescription Cost Analysis

Department of Health (2001) Hospital Episode Statistics, England: Financial Year 2000 – 01

Department for Transport (2002) 2001 Valuation of the Benefits of Prevention of Road Accidents and Casualties, Highways Economics Note No 1, November

Dooley, D and Prause, J (1997) Underemployment and Alcohol Misuse in the National Longitudinal Survey of Youth, *Journal of Studies on Alcohol*, November, 669-680

DTLR (2001) Road Accidents Great Britain and Transport Statistics Great Britain 2001, Department for Transport

Edwards, G et al (1967) Clients of Alcoholism Information Centres, *British Medical Journal*, 4, 346-349

English, D, Holamn, D, and Milne, E (1995) The Quantification of Drug Caused Morbidity and Mortality in Australia: 1992, Canberra Commonwealth Department of Human Services and Health

Ensor, T. and Godfrey, C. (1993) Modelling the Interactions Between Alcohol, Crime and the Criminal Justice System, *Addiction*, 88, 477-487

Ercolani, M (2002) Sickness Absence in the UK, A Multivariate Analysis, Report from the Institute for Labour Research, University of Essex (www.essex.ac.uk/ilr/)

Ettner, SL (1997) Measuring the Human Cost of a Weak Economy: Does Unemployment Lead to Alcohol Abuse?, *Social Science and Medicine*, 44, 2, 251-260

Finney, A (forthcoming) Alcohol and Violence: a review of the research literature: a report on the prevalence and patterns of alcohol related violence and the relationship between alcohol and violence in the night time economy, intimate partner violence and sexual violence. London: Home Office

French, M T and Zarkin, G A (1995) Is Moderate Alcohol Use Related to Wages? Evidence from Four Worksites, *Journal of Health Economics*, 14, 319-344

Goddard (1992) General Household Survey 1990, Series GHS no 21, OPCS, London: HMSO

Godfrey, C and Hardman, G (1994) Changing the Social Costs of Alcohol, Final Report to the AERC

Goodwin, R (1992) Stress and Sickness Absence, Greater Manchester Industrial Mission, Manchester

Greater London Authority (2003) London Agenda for Action on Alcohol

Griffiths, S. (2002) Addressing the health needs of rough sleepers. Office of The Deputy Prime Minister, Homelessness Directorate

Grossman, M (1972) On the Concept of Human Capital and the Demand for Health, *Journal of Political Economy*, 80, 223-255

Harries, R (1999) The Cost of Criminal Justice, Home Office, Research Development and Statistics Directorate, Research Findings, No 103 (www.homeoffice.gov.uk/rds/pdfs/r103.pdf)

Harwood, H, Fountain, D and Livermore, G (The Lewin Group) (1997) The Economic Costs of Alcohol and Drug Abuse in the United States – 1992, National Institute on Drug Abuse (NIDA) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA)

Health and Safety Executive (2002) Work Environment, Alcohol Consumption and Ill-Health: The Whitehall II Study

Heien, D M (1996) Do Drinkers Earn Less? , Southern Economic Journal, 63, 60 –68

HM Treasury (2002) Appraisal and Evaluation in Central Government, The Treasury Green Book, London: The Stationary Office

Holtermann, S and Burchell, A (1981) The Costs of Alcohol Misuse, Government Economic Service, Economic Working Paper, No. 37

Home Office (2002) Crime in England and Wales 2001/2002, London: Home Office

Hutcheson, G D, Hemderson, M M and Davies, J B (1995) Alcohol in the Workplace: Costs and Responses, Department for Education and Employment Research Series No 59, London: Department for Education and Employment

Kersaw, C, Budd, T Kinshott, G, Mattinson, J, Mayhew, P and Myhill, A (2000) The 2000 British Crime Survey, England and Wales, Home Office Statistical Bulletin, 18/00

Landefeld, J S and Seskin, E P (1982) The Economic Value of Life: Linking Theory to Practice, American Journal of Public Health, 72, 555-566

Linnerooth, J (1979) The Value of Human Life – A Review of the Models, Economic Inquiry, 17, 52-74

Lynksey, M T, Fergusson, DM and Horwood, J L (1994) The Effect of Parental Alcohol Problems on Rates of Adolescent Psychiatric Disorders, Addiction, 89, 1277-1286

Man, L-H, Best, D, Marshall, J, Godfrey, C and Budd, T (2002) Dealing with alcohol-related detainees in the custody suite. Home Office Research Findings 178

Marmot, M, North, F, Feeney, A and Head, J (1993) Alcohol Consumption and Sickness Absence: from the Whitehall II Study, Addiction, 88, 369-382

Maynard, A (1992) Social Costs of Alcohol, Yorkshire Addictions Research Training and Information Consortium (YARTIC)

MacDonald, Z and Shileds, M (2003) Does problem Drinking Affect Employment? Evidence from England, Health Economics , forthcoming

MacDonald, Z and Shileds, M (2001) The Impact of Alcohol Consumption on Occupational Attainment in England, *Economica*, 68, 427-453

McDonnell, R and Maynard, A (1985) The Costs of Alcohol Misuse, *Journal of Addiction*, 80, 27 – 35

McMurrin, M. (2002) 'Alcohol and Crime' in *Alcohol Concern, 100% Proof: Research for Action on Alcohol*

Mullahy, J and Sindelar, J (1991) Gender Differences in Labour Market Effects of Alcoholism, *American Economic Review*, 81 (Papers and Proceedings), 161-165

Mullahy, J and Sindelar, J (1993) Alcoholism, Work and Income, *Journal of Labor Economics*, 11, 494-520

Mullahy, J and Sindelar, J (1996) Employment, Unemployment and Problem Drinking, *Journal of Health Economics*, 15, 409-434

Netten, a and Curtis, L (2002) Units Costs of Health and Social Care 2002, Personal Social Services Unit (www.ukc.ac.uk/PSSRU/)

ODPM, Office of the Deputy Prime Minister (2002) Homelessness Statistics, September (www.homelessness.odpm.gov.uk/policybriefing/pdf/statistics.pdf)

Office of National Drug Control Policy (ONDCP) (2001), *The Economic Costs of Drug Abuse in the United States- 1992-1998*, Washington, DC: Executive Office of the President (Publication No. NCJ – 190636)

Office for National Statistics (1999) *Psychiatric Morbidity Survey of Prisoners in England and Wales*

Office for National Statistics (2001) *New Earnings Survey (NES) 2001 UK Volume*, London: The Stationary Office

Office for National Statistics (2001a) *Living in Britain; Results from the 2000/01 General Household Survey*, London: The Stationary Office

Office for National Statistics (2001b) *Psychiatric Morbidity Among Adults Living in Private Households, 2000*, London: The Stationary Office

Office for National Statistics (2001) *Labour Force Survey (LFS) 2001 UK Volume*, London: The Stationary Office

Office for National Statistics (2001d) *Criminal Statistics England and Wales 2001*, London: The Stationary Office

Office for National Statistics (2002) *Drinking: Adults' Behaviour and Knowledge in 2002*, London: The Stationary Office

Office for National Statistics (2003) *Recent trends in alcohol-related mortality, and the impact of ICD-10 on the monitoring of these deaths in England and Wales*. London: The Stationary Office

OPCS, Office of Population Censuses and Surveys (1996) *Psychiatric Morbidity Among Homeless People*, London, HMSO

Parker, D L, Schultz, J M, Gertz, L, Berkelman, R and Remington, P L (1987) The social and Economic costs of alcohol misuse in Minessota, 1983, *American Journal of Public Health*, 77, 982-986

Pertersilia,, Greenwood, P, and Lavin, M (1978) *Criminal Careers of Habitual Felons*, U.S. Government Printing Office, Washington, D.C.

Power, C and Estaug V (1990) Employment and drinking in early adulthood: a longitudinal perspective, *British Journal of Addiction*, 85, 487-494

Primatesta, P, Falaschetti, E and Marmot, M (2002) *Average Alcohol Consumption and Patterns of Drinking*, Report to the Strategy Unit, Cabinet Office (unpublished)

Pritchard, H M (1971). *Economic Costs of Abuse of and Dependency on Alcohol in Australia*. In: Kiloh, L G, and Bell, D S, (eds) *Proceedings of the 29th International Congress on Alcoholism and Drug Dependence*, February 1970, Sydney, Australia: Butterworths

Raistrick et al (1999) *Tackling Alcohol Together: The evidence base for a UK alcohol policy*, London: Free Association Books

Rice, D P, Kelman, S, Miller, L S, and Dunmeyer, S (1990) *The Economic Costs of Alcohol and Drug Abuse and Mental Illness: 1985*, Report submitted to the Alcohol, Drug Abuse, and Mental Health Administration, U.S. Department of Health and Human Services. DHHS Publication No. (ADM) 90-1694. San Francisco, CA: Institute for Health & Ageing, University of California

Room, R and Rossow, I (2001) *The Share of Violence Attributable to Drinking*, *Journal of Substance Use*, 6, 218-228

Royal College of Physicians and the British Paediatric Association (1995) *Alcohol and the Young*, Royal College of Physicians, London

Royal College of Physicians (2001) *Alcohol – Can the NHS Afford It?*

Saad, E S M and Madden, J S (1976) *Certificated Incapacity and Unemployment in Alcoholics*, *British Journal of Psychiatry*, 128, 340-345

Scragg, R (1995) *A quantification of alcohol-related mortality in New Zealand*, *Australian New Zealand Journal of Medicine*, 25, 5-11

Schelling, T C (1968) *The Life You Save May Be Your Own*, In *Problems in Public Expenditure Analysis*, (Ed) S B Chase, 127-176, Washington DC: The Brookings Institution

Schultz, J M, Rice, D P and Parker, D L (1990) Alcohol-related mortality and years of potential life lost – United States, 1987, *Morbidity and Mortality Weekly Report* 39, 173-178

Shultz, J M, Nrice D P, Parker D L, Goodman R A, Stroh, G, Jr and Chalmers, N (1991) Quantifying the Disease Impact of Alcohol with ARDI Software, *Public Health Reports*, 106, 443-450

Single, E, Robson, L, Xie, X, and Rehm, J (1996), *The Costs of Substance Abuse in Canada*. Ottawa, Ontario, Canada: Canadian Centre on Substance Abuse

Single, E, Robson, L, Xie, X, and Rehm, J, (1998) The Economic Costs of Alcohol, Tobacco and Illicit Drugs in Canada, 1992, *Addiction*, 93, 7, 983-998

Single, E, Collins, D, Easton, B, Harwood, H, Lapsley, H, Kopp, P, and Wilson, E (2001) *International Guidelines for Estimating the Costs of Substance Abuse*, Ottawa: Canadian Centre on Substance Abuse.

SIRC (2002) *Counting the cost: the measurement and recording of alcohol-related violence and disorder*, The Portman Group

Stinson, F S and DeBakey, S F (1992) Alcohol-related mortality in the United States, 1979-1988, *British Journal of Addiction*, 87, 777-783

Sutocky, J W, Schultz, J M and Kizer, K W (1993) Alcohol –related mortality in California, 1980 to 1989, *American Journal of Public Health*, 83, 817-823

Terza, J (2002) Alcohol Abuse and Employment: A Second Look, *Journal of Applied Econometrics*, 17, 4, 393-404

The Royal College of General Practitioners (1986) *Alcohol: a balanced view*

The Royal College of Physicians (1987) *A great and Growing Evil; the medical consequences of alcohol abuse*, Tavistock London

The Scottish Executive (2001) *Alcohol Misuse in Scotland: Trends and Costs*

Tierney, J and Hobbs, D (forthcoming) *Alcohol-related crime and disorder data: guidance for local partnerships*. Home Office Research Study, London: Home Office

Velleman, R (1993) *Alcohol and the Family*, Institute of Alcohol Studies, London

World Health Organisation (2000) *International Guide for Monitoring Alcohol Consumption and Related Harm*

Endnotes

¹ In the UK one unit is equal to the following: 8g or 10 ml ethanol, equivalent to a half pint of ordinary strength beer, 100 ml wine, or one measure of spirits. Internationally there is no agreed measure or “unit” for alcohol consumption.

² According to the CAGE test, an individual is considered a problem drinker if he or she answers scores positive to one or more of these questions:

- Have you ever felt you ought to cut down on your drinking?
- Have people ever annoyed you by criticising your drinking?
- Have you ever felt bad or guilty about your drinking?
- Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (‘eye opener’)?

³ The Alcohol Use Disorders Identification Test is based on the following questionnaire:

- How often do you have a drink containing alcohol?
- How many drinks containing alcohol do you have on a typical day when you are drinking?
- How often do you have six or more drinks on one occasion?
- How often during the last year have you found that you were not able to stop drinking once you had started?
- How often during the last year have you failed to do what was normally expected from you because of drinking?
- How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?
- How often during the last year have you had a feeling of guilt or remorse after drinking?
- How often during the last year have you been unable to remember what happened the night before because you had been drinking?
- Have you or someone else been injured as a result of your drinking?
- Has a relative or friend or a doctor or other health worker been concerned about your drinking?

Each item is scored on a scale of 0 to 4 giving a maximum of 40, and increasing scores represent increasingly hazardous drinking. The first 3-4 AUDIT questions alone are also sensitive and specific.

⁴ The Severity of Alcohol Dependence Questionnaire (SAD – Q) is based on the following questions. People who scored 4 or more on the SAD-Q were considered to be dependent on alcohol

Please recall a typical period of heavy drinking in the past 6 months. When was this? Please tick to show how often each of the following statements applied to you during this time:

-
1. I woke up feeling sweaty
 2. My hands shook first thing in the morning
 3. My whole body shook violently first thing in the morning if I didn't have a drink
 4. I woke up absolutely drenched in sweat
 5. I dreaded waking up in the morning
 6. I was frightened of meeting people first thing in the morning
 7. I felt near the edge of despair when I awoke
 8. I felt very frightened when I awoke
 9. I liked to have a morning drink
 10. I always gulped my first few morning drinks down as quickly as possible
 11. I drank in the morning to get rid of the shakes
 12. I had a very strong craving for drink when I awoke
 13. I drank more than a quarter bottle of spirits a day (or 4 pints beer / 2 cans strong lager / 1 bottle wine)
 14. I drank more than a half bottle of spirits a day (or 8 pints beer / 4 cans strong lager / 2 bottle wine)
 15. I drank more than one bottle of spirits a day (or 15 pints beer / 8 cans strong lager / 4 bottle wine)
 16. I drank more than two bottles of spirits a day (or 30 pints beer / 15 cans strong lager / 8 bottle wine)

⁵ But this analysis refers quite specifically to the consumers' perceptions of the costs they incur. Consumers may be uninformed or misinformed about the costs that he or she bears. In that case if their consumption is determined by perceived costs that are less than their actual costs, the difference between the two is an external cost even though it is borne by the drinkers themselves. This is because drinkers have not adjusted their behaviour in response to these "extra" unperceived costs and so these costs are unaccounted for. It must therefore be emphasised that costs borne by the alcohol misusers can represent external costs if these costs have not been knowingly incurred. An allowance for the costs of consumption was included in Collins and Lapsley (1991). A second issue here relates to the connection between alcohol and addiction. Addiction may imply that an individual knowingly and willingly incurs certain costs and in this case external costs as defined above may be considered to be private. This is a very rare case and so the problem of how to measure external costs even in the case of addiction remains.

⁶ Estimating the benefits from alcohol consumption is beyond the remit of this study. Some initial findings are in line with Corrao et al (1999) and Britton et al (2001), and indicate that alcohol consumption can have protective effects against Coronary Heart Disease (i.e. in 2000 alcohol use prevented 17,984, or 3.3%, deaths of Coronary Heart Disease in England and Wales that would be expected in a non drinking population. This corresponds to 28,605 potential years of life saved up to the age of 65).

⁷ Intangible costs, which include pain and suffering, when reduced or eliminated, do not yield resources available for other uses. These costs are important but difficult to quantify. In contrast, tangible costs are these costs, which when reduced, yield resources which are then available to the community for consumption or investment purposes (Single et al, 2001)

⁸ The World Health Organisation (WHO) Quality of Life project was created with the aid of 15 collaborating centres around the world. It has been the broadest cross-cultural effort to develop a universally accepted QOL instrument, the WHOQOL-100 that can be used in a variety of cultural settings whilst allowing the results from different populations and countries to be compared. The WHOQOL-100 places primary importance on the perceptions of the individual and has many uses, including use in medical practice, research, audit, and in policy making.

The WHOQOL assessment of economic and other resources is very different from that of the Human Development Index (HDI) developed by the United Nations Development Programme (UNDO, 1995). The HDI stresses the importance of human development in enabling people to lead long and healthy lives and to acquire all the physical and educational resources needed to attain a decent standard of living. The WHOQOL assessment in contrast is set against subjective individual standards of well being and satisfaction with regard to financial resources as well as physical, social and mental environment. No attempt is therefore been made by the WHOQOL assessment to determine an absolute money figure, making QOL comparisons easier between different groups.

⁹ Although the WHO definition of health focuses on physical social and mental dimensions, the WHOQOL study's final list of six QOL domains included a range of physical and psychological dimensions, levels of independence, social relationships, environment, and spiritual, religious and personal beliefs. However, no facets of QOL are related to alcohol consumption. In fact in much of the WHOQOL focus-groups work very little emphasis was given to sociable eating and drinking and hence very little justification exists for having any such facet devoted to this area. Despite the importance of drinking in the UK society no steps have been taken to include such facets in the British WHOQOL instrument making, therefore, quality of life valuations for alcohol dependent individuals difficult to determine.

¹⁰ Unfortunately there are no such studies assessing the value that people put on reducing the mortality risks associated with alcohol misuse. Individuals place different value on life in different situations and this is likely to be affected by how averse individuals are to risk. Ideally one would want to compare the health outcome of policies that save life or increase the quality of life for alcohol misusers to health outcome of other diseases and also to diseases causing morbidity on a large scale. A tentative estimate of the magnitude of the estimates of the intangible costs of premature death would be between £13 and £17 billion. A serious "health warning" must be attached to them in that the value of life derived in the context of transport accidents might differ from that in another context.

¹¹ The idea of an attributable fraction permeates these estimations in the same manner as in the rest of the analysis. The attributable fraction has been taken from studies by English et al (1995) and alcohol related traffic deaths were calculated in line with those. This produced around 730 alcohol related traffic deaths. However, as these attributable fractions were not from an English population, a lowest estimate of deaths given by the DETLR (530) was taken into account in these calculations. One important caveat here is that using traffic data in such a manner makes it very difficult to determine an accurate degree of causality between alcohol consumption and traffic

accidents. In fact several other comfounders, such as road lighting, driver expertise or risk taking may influence the outcome of a drink-driving accident. Since there is no way of disentangling these effects from drink-driving it may be the case that the alcohol-related traffic deaths are slight overestimates.

¹² For the purpose of clarity a drink-drive accident is defined by the Department of Transport as follows:

“...being an incident on a public road in which someone was killed or injured and where one or more of the motor vehicle drivers or riders involved either refused to give a breath test specimen when requested to do so by the police (other than when incapable of doing so for medical reasons), or one of the following:

- i) failed a roadside breath test by registering over 35 micrograms of alcohol per100 millilitres of breath*
- ii) died and was subsequently found to have more than 80 milligrams of alcohol per 100 millilitres of blood.*

Similarly drink-drive casualties are defined as *“...all road users killed or injured in a drink-drive accident”*.