The Social Costs of Alcohol in Sweden 2002

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Contents

TABLES

1. INTRODUCTION

1.1 Purpose and scope of study

The aim of this project is to estimate the societal costs of alcohol use in Sweden for the year 2002. The project came out of discussions involving representatives from the Swedish Ministry for Health and Social Affairs and the European office of WHO. A two-phase project was envisaged, in which the first phase would be a cost-of-alcohol study for Sweden. The second phase would be an application of the principles and model used in the Swedish study to other countries of the European region. The Swedish Ministry for Health and Social Affairs contracted with the Centre for Social Research on Alcohol and Drugs (SoRAD) of Stockholm University to undertake the first phase of the project, and this report is a major step in that work.

The study which results in this report has been carried out within the broad tradition of cost-of-illness studies, with particular attention to the *International Guidelines for Estimating the Costs of Substance Abuse* (Single et al., 2003). Efforts have been made to improve on previous studies in this tradition where Swedish data was available or could be developed that made it possible to do so. We have also carried out and included a number of sensitivity analyses, i.e. alternative calculations employing alternative data sources or methodology, giving a clearer picture of the range of cost estimates which could reasonably be derived from the available data. In the case of some analyses, we have not included their results in the final accounting of results, since to do so would be controversial, and indeed beyond current practice in the field. Cost-of-illness studies are concerned with adverse effects of a disease, condition or set of events, and the methodology cannot appropriately be applied to possible benefits from drinking in general. However, in line with previous studies, one area of benefits is included in the analysis, although it has lately become more controversial (Fillmore et al., 2006; Room, 2006). This is the reduction in overall alcohol-related morbidity and mortality due to protective effects of drinking with respect to several diseases, notably including ischemic heart disease (IHD). This estimated reduction is subtracted from cost-of-alcohol-related illness. This subtraction is viewed in this analysis as a mitigation or reduction in the health harm due to drinking, rather than a benefit of drinking.

As we discuss below, there is considerable contention about cost-of-illness studies of the social costs of alcohol. Issues which are raised concern not only specific elements in the costing, but also underlying assumptions and principles. In our view, conducting a cost-of-illness study carries a number of benefits, particularly when one looks beyond the single "bottom-line" figure which tends to be all that the political process and the media want or remember from such studies. We will try to look beyond the "bottom line" by offering sensitivity analyses which point up the fact that it is orders of magnitude which we can be confident about in the results of these studies, not any exact figure of thousands of kronor. One useful outcome of a study such as this is to identify the large gaps in the knowledge and data which would be required for a full accounting of costs, and to stimulate new data collection and analyses aimed at filling those gaps. This will be discussed in Appendix 4. Another useful outcome is to give a sense of the order of magnitude of the social and health problems from a risk factor in a particular society or locality, particularly if studies with comparable methods have been carried out elsewhere or on other risk factors. A third outcome is to pave the way for cost-effectiveness and other policy-relevant analyses in the field, which can contribute crucial knowledge for sound policymaking.

1.2 The Swedish Costs of Alcohol

This study will estimate the societal cost-of-alcohol consumption in Sweden for the year 2002. It will be a prevalence-based study using the cost-of-illness (COI) methodology, following the *International guidelines for estimating the costs of substance abuse* (Single et al., 2003) where possible.

Apart from the overall aim, a number of specific study questions are considered:
- how are the costs divided between different sectors of society and levels of government?
- what are the effects on the overall result of different assumptions regarding both data and methodology?
- what guidance can be given from doing the study in Sweden for carrying out such studies elsewhere in the European region of WHO?
- what gaps in the data were identified which it would be good to fill before future Swedish cost-of-illness or cost-effectiveness studies are undertaken?

The cost items included are briefly described in the next paragraph, while the methods and material used in the cost calculations are detailed in chapter 4, with one section for each cost item. The resulting costs are described in the first part of chapter 5, with one section each per cost item. The overall result can also be found in chapter 5, in section 5.7, along with the costs per sector of society. The theoretical considerations underlying the calculations are found in chapter 2, while chapter 3 is detailing the background data and estimates needed for the cost calculations. The data used and the methodology for the calculations might influence the result to a large extent. We have thus calculated the relevant costs both including and excluding the cost reductions from alcohol consumption, termed the net and gross costs. A large number of alternative calculations, so-called sensitivity analyses, are also performed, to describe the effects on the overall result from different assumptions regarding both data and methodology. The methods, data and results of the sensitivity analyses are found in chapter 6. In appendices 3 and 4, the last study questions are considered. Appendix 3 describes the overall result if there had been less data, which might reflect the situation in other WHO countries. Appendix 4, on the other hand, discusses some cost items where the lack of data in Sweden hindered correct estimates on the Swedish costs of alcohol.

1.3 Cost items included in the study

The possible cost items that could be included in this study are found in Appendix 1. The list of items was compiled with inspiration from the International Guidelines and from previous Cost-of-alcohol studies, in particular Single et al. (1998) from Canada and the study for England and Wales by the UK Strategy Unit (2003). In Appendix 1, the cost items that are included in the calculations are marked in bold. The cost items in normal text are excluded, because of their anticipated minor impact on the overall result or because of lack of data. The costs included can be summarised as costs because of morbidity from alcohol-related diseases or injuries, costs arising from social problems caused by alcohol, decreases in productivity because of alcohol consumption, and the welfare losses because of alcohol consumption for both the consumer and other members of society. The costs are thus spread over many different areas of the Swedish society, such as the health care sector and the judiciary and social services system. Furthermore, the decreased production affects all members of society, while some individual members of society are particularly affected, such as family members of problem drinkers and victims of crime. Apart from the costs, we estimate the morbidity and mortality caused and prevented by alcohol consumption. Morbidity is reported as the number of diseased or injured people that can be attributed to alcohol, while the mortality is reported as the number of deaths as well as the number of life-years lost. The welfare losses because of mortality and morbidity as well as decreased quality-of-life among consumers and other members of society, are reported as QALYs (quality-adjusted life-years).

1.3.1 Health care costs

The health care sector is substantially affected by the adverse effects of alcohol consumption, through ill-health directly caused by alcohol and through ill-health where alcohol is a contributing cause. In Sweden, health care is the responsibility of 21 regional organisations, the county councils. The cost of alcohol-related diseases is assumed to be reflected mainly in three areas of the Swedish health care system: inpatient, outpatient and primary care. A fourth aspect of alcohol-related costs in health care will also be included, the so-called co-morbidity, i.e. that alcohol affects the general condition of patients with a non-alcohol-related main diagnosis, and thereby might increase the cost of treatment. This will mainly be calculated for inpatient care but efforts will be made to make similar calculations for outpatient and primary care. Additional costs to the health care sector could have been estimated, but are excluded because of data deficiencies or as they are expected to be of smaller magnitude. These are some of the non-state funded health care, ambulance service, county council prevention/promotion, other medical personnel (e.g. dentists and midwives) and pharmaceuticals. Concerning pharmaceuticals, only drugs that are only used for treatment of alcohol problems are included, because of the difficulty of separating the alcohol-related use of other drugs from the non-alcohol-related use. One type of non-state funded health care is included, namely the costs for employer assistance programs (EAPs), paid for by the employers.

1.3.2 Social services

In Sweden, the municipal social service is responsible for giving help to those with alcohol- and drug-related problems. Thus, in contrast to most other countries, most treatment of alcohol abusers in Sweden is carried out within the social welfare system and not in the health system (Room et al., 2003). The major costs of alcohol to the social services are found in the various services and treatment provided to adult abusers and to children and youth. These areas are included in a broader domain of the social services denoted “Services to individuals and families” [Individ- och familjeomsorg].

1.3.3 Crime

Attempts at calculating the social costs of crime resulting from alcohol consumption have become increasingly common over recent decades. Studies have been conducted in a number of countries, including among others Canada (Pernanen et al. 2000), the USA (BJC, 1998), Australia (Collins & Lapsely, 2000) and Scotland (Catalyst Health Economics Consultant, 2001). The most recent and most complex studies have been undertaken in England (Brand & Price, 2000; UK Cabinet Office Report, 2003) and Norway (Gjelsvik, 2004). Research focusing on the social costs of crime has not yet caught up with studies of the health costs associated with alcohol[1]. The comprehensive studies conducted in England (Brand & Price, 2000; UK Cabinet Office Report, 2003) of the social costs of crime have however created a new framework, which also makes it easier for other countries to fill in the missing pieces that still characterise this field of research.

The English research also includes studies that illuminate the costs incurred by the justice system in combating crime, as well as recurrent systematic surveys of the conditions and experiences of crime victims within the framework of the British Crime Survey (BCS). In the context of the English projects, attempts are made not only to measure the extent and character of crime, but also the harms and costs that arise as a result of alcohol-related crime. Alcohol is significantly involved in many crimes, both as crimes per se such as drinking driving, and as a strong contributory cause to other types of offences, in particular violent crimes. The crimes included in this study are drinking driving, crimes of violence, theft, burglaries, arson, vandalism, rape and public drunkenness. Basically, only registered crimes are chosen since these are the crimes the social response system deals with and include the

[1] For a recent overview of studies on the social costs of crime and justice, see Cohen (2005). In Cohen, some criticism is also raised regarding the methods and possibilities for calculating the social cost of crimes.

most tangible costs. Hidden criminality is somewhat included in health care costs since both reported and unreported violent crimes to some extent are captured here.

Two main sections are included in calculating alcohol-related crimes. These are costs that arise as consequences of crime and as responses to crime. Costs that can be attributed to consequences of alcohol-related crimes are property costs (stolen goods and burglaries) and costs that arise from vandalism and arson offences. Regarding drinking driving, productivity costs due to early deaths and health care costs for the injured are included. The two latter, productivity costs and healthcare costs are accounted for but not included in the total cost for crime, since these are included in the healthcare and productivity part of the report. This also applies for productivity costs for homicide victims and health care costs for victims of assault. Costs that can be attributed to responses to crime include costs for police investigations, the judiciary system, and prisons and productivity losses due to incarceration of offenders. Other costs that arise in response to crimes (or in anticipation of crime) are administrative costs for insurance, burglar alarms and costs for breathalysers. An estimate of the quality-of-life losses for victims of violent crime and victims of drinking driving is also included, under the QALY section.

1.3.4 Research, policy and prevention

A large number of organisations in Sweden are performing alcohol-related efforts in the areas of research, policy, prevention etc. Data on the costs for such agencies is collected for the largest and most influential of the organisations, mainly operating on a national level. These costs are most certainly underestimated.

1.3.5 Productivity costs

Productivity costs arise because of a decreased work capacity in the work force. The reasons for the decreased work capacity might be premature mortality or morbidity, which leads to sickness absence or early retirement, or because of less productivity while on the job. The productivity costs thus consist of resources not produced. In this study, the base case calculations include productivity costs from absence from work, because of short- and long-term sickness absence, and because of premature retirement and mortality. It is plausible that costs also arise because of lower productivity for heavier alcohol consumers while on the job. This lower productivity might be temporary, e.g. due to hangovers that reduce the work intensity, but also permanent, if alcohol consumption has reduced educational attainment or career possibilities. Lacking data, we have not included any of these effects on productivity while on the job in the base case estimates.

Productivity losses due to sickness absence and early retirement constitute a considerable cost in Sweden (SOU 2002:5). These costs are limited to people in gainful work, normally aged 16-64. In the Swedish welfare system, and also in the recording of cases in the registers, there are important differences between sickness absence and early retirement. Sickness absence is limited to people that once managed to enter a paid job, whereas early retirement has no such inclusion limit. For those newly granted early retirement, there are medical diagnoses from the current disease classification system, as also used in recording causes of death and health care. This makes early retirement relevant to include in a cost-of-alcohol study, using the same methodology as for early deaths and health care. The productivity costs because of premature mortality are calculated until the customary Swedish retirement age of 65 years, as well as until the expected age of death. Caution should be taken when interpreting these costs, as many recommendations in health economics warn against the calculation (Gold et al., 1996; Sculpher, 2001; Swedish Pharmaceuticals Board, 2003). To enhance comparability with previous studies, the premature mortality costs are included but reported separately. The productivity costs are valued with the human capital approach. The sickness absence and early retirement valuations only include paid market work, while the premature mortality valuation also includes non-market production, mainly domestic work, valued according to the replacement method. For life-years lost after the retirement age, only the non-market productivity costs are calculated.

1.3.6 Intangible costs

In this study we measure the "intangible costs", i.e. the cost of death, pain, distress and suffering that is difficult to express in monetary terms, by the QALY measure (quality-adjusted life-years). The measure is frequently used in health economic studies, to describe the health-related quality-of-life effects of interventions. We however use the measure in a somewhat broader sense, as we include also some non-health-related quality-of-life aspects. The QALY measure is used to value lost life-years because of mortality and also the decreased quality-of-life because of alcohol consumption, both for the alcohol consumers themselves and for their relatives and family members. Quality-of-life losses for victims of violent crime are also included, but not the fear and anxiety that might be generated in the general population because of alcohol consumption and related crime.

While the health and casualty harms attributable to alcohol have been measured and quantified in earlier studies, social harms, such as problems in family life and personal friendships and relationships, have not been well measured. Concerning costs caused by other's drinking in particular, this is, to our knowledge, the first COI study that makes an attempt to quantify and value such costs in monetary terms - although a number of studies do emphasize the significance of including these kinds of problems. Thus the study of the social costs of alcohol carried out in preparation for the Alcohol Strategy for England (UK Prime Minister's Strategy Unit, 2004:31) identified harm to "family/social networks" as one of the four major areas of alcohol-related harm, but was forced to add "costs not quantified" for this area. This has been generally true in studies estimating the social costs of alcohol. The choice of using the quality-of-life concept originates from our ambition to move beyond a pure description of alcohol-related problems caused to a third party towards quantifying and, in a separate analysis, also valuing such problems in monetary terms. The fact that these problems have not been valued in this manner before is perhaps one reason why this has been a forgotten area in the political debate. A study on the quality-of-life losses of relatives and family members of alcohol consumers was thus performed within this study, by a telephone survey using quality-of-life questions from the WHO instrument WHOQOL-BREF. The QALYs lost because of quality-of-life losses arising from alcohol-related deaths, for the alcohol consumers themselves and their relatives and family members, and for some victims of crime, are added to obtain an overall estimate of the magnitude of the intangible costs. In one sensitivity analysis, the QALYs are also converted into monetary costs.

1.3.7 Summary

Our frame for estimating and summarising costs thus covers the areas of health care, social services, crime, research, policy and prevention, and productivity losses. We also measure intangible costs in terms of QALYs, but these are not included in monetary terms when summarising the total cost-of-alcohol in Sweden.

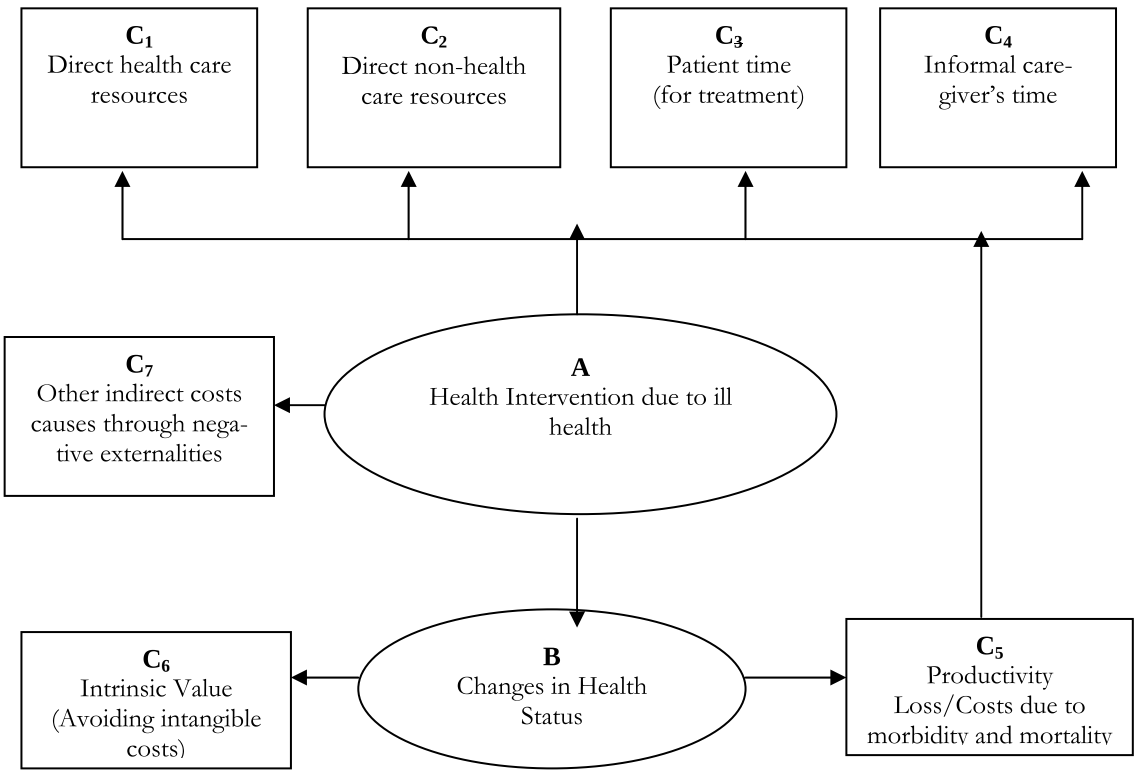
2. BACKGROUND TO COST-OF-ALCOHOL STUDIES

2.1 Cost-of-illness studies

The estimation of the societal cost of alcohol consumption is a form of cost-of-illness study (COI) where the impact of consumption on the welfare of the society is investigated. The focus is the social cost (see below) of the resources spent or not created in society as well as the loss of quality-of-life. This is estimated relative to a counterfactual scenario without alcohol consumption (Single et al., 2003).

It is important to clarify that COI studies are not economic evaluations. The major difference between a COI study and an economic evaluation is that in the former case no specific interventions are dealt with, hence no outcomes are included. In Figure 2.1, the recommended cost items in economic evaluations are indicated. In a cost-of-illness study, the parts labelled “C” are the focus of the study while the part labelled “A” are not dealt with. Another issue important to clarify early on is that COI studies cannot guide where resources should be invested in order to gain the most societal benefit with regard to health, which follows from above. The purpose of COI studies in general and this study in particular is discussed in section 1.1 and 2.13.

Figure 2.1. Cost items in economic evaluations



Source: Reprinted from Islam & Gerdtham (2005).

2.2 The counterfactual scenario

When estimating societal cost of a risk factor it is necessary to compare the actual situation to something, i.e. a counterfactual scenario (or alternative scenarios as proposed by Kay et al. 2000). This comparison has normally not been explicit in most prior COI studies (see for example Wilhelmson et al. 2006, forthcoming) although most, if not all, have compared the current situation to a situation without any exposure to the risk factor or to a situation without adverse affects of the health risk. The results will be greatly affected by which scenario is chosen. There are an infinite number of counterfactual scenarios for each health risk factor although four have traditionally been discussed following Murray & Lopez (1999). These are (1) theoretical minimum risk, (2) plausible minimum risk, (3) feasible minimum risk and (4) cost-effective minimum risk. The first is defined as the exposure that would result in the lowest population risk while the second is the lowest imaginable exposure. Feasible exposure denotes the lowest exposure that has been observed in comparable populations and the cost-effective exposure is that exposure that would result if all existing cost-effective interventions were applied (Murray et al. 2003). The choice of counterfactual scenario depends on the perspective of the study.

The theoretical minimum is for many risk factors also equal to a situation without exposure. This is true for air pollution and smoking where the lowest risk is achieved with zero exposure. However, there are two exceptions to this: (1) issues that only become a risk factor after a certain threshold and (2) risk factors that also have beneficial health effects. The first exception is traditional handle by setting a fixed non-zero level that is deemed healthy and divergence from this level is considered a risk factor, e.g. blood pressure and body mass. The second exception indicates that a total reduction of a risk factor would be unwanted from a societal perspective and that the minimum risk level would be a non-zero exposure level. It is in these cases important to focus on the burden of a risk factor, as this would facilitate the definition of the theoretical minimum, and not on the specific outcomes. Alcohol is such a risk factor with beneficial effects of consumption, as discussed below.

In this study the societal cost is defined as the adverse effects related to alcohol consumption that lead to a welfare loss in society. This is defined in distinction from what is not counted: the private cost, where the cost to the individual has a countercting benefit, and transfer costs, where the cost is a benefit for someone else. The choice to use the concept of alcohol consumption rather than alcohol abuse avoids a theoretical problem in that no definition of abuse is required. The counterfactual scenario is set to a society without alcohol consumption and since alcohol is a risk factor with a theoretical minimum of a non-zero level of exposure, the counterfactual scenario used is rather a scenario of minimum gross cost. This is in line with most previous studies in this area and will thus allow for comparison between studies.

2.3 The four steps: identify, quantify, value and discount the costs

When measuring costs, the first step is to identify all resources that are used. The second step is to quantify these resources, so as to be able to value them at their opportunity cost in the third step. Finally, costs not occurring in the same period of time need to be discounted. Step one, two and four are rather straightforward, even though the magnitude of the discount value is important to discuss, since its effect on the results often is considerable. The third step, evaluating the opportunity costs, needs further discussion. If market prices are available for the resources being evaluated, these are normally a good representation of the opportunity costs. This is not the case regarding, for example, health care in many countries where resources are not subject to market valuations. The solution to this depends on the material and the question posed. Normally the estimation of the costs will be more correct when using “micro costing”, that is applying unit costs to each and every different type of resource identified, often some sort of shadow-price within the health care organisation. This is often both difficult and expensive and should be weighted against the need for precision. “Macro costing” uses aggregated measures of resource use to estimate costs; this could be said to be the opposite of “micro costing”.

2.4 Direct, indirect and intangible costs

A common division of costs in cost-of-illness studies is into direct costs, indirect costs and intangible costs (see Figure 2.1). The direct costs include the resources consumed as a consequence of the problem investigated. The indirect costs are instead resources that are not created because of the problem, due to decreased work capacity, for instance because of ill-health. The intangible costs are costs which are not marketable resources, and thus difficult to value in monetary terms.

2.4.1 The direct costs

The direct costs in cost-of-illness studies are conceptually easy: enumerate the resources consumed because of the problem investigated and attach a monetary value to them. The most common problems investigated in cost-of-illness studies are medical conditions, where the direct costs consist of resources used mainly in the health care sector. In the case of cost-of-alcohol studies, however, the calculation is more complex. Apart from the considerations discussed below for the counterfactual scenario and the treatment of beneficial effects, the costs connected with alcohol consumption are spread into many different areas of society. Alcohol consumption leads to resources being consumed not only within the health care sector, where a large number of diseases and connected costs have to be included, but also to resources used within the social services and the judiciary systems as a consequence of social problems. An addition to this is policy costs, i.e. costs resulting from interventions to lessen the burden of alcohol consumption. These costs might be seen as investments to prevent future alcohol costs. Another issue is that policy costs might not be directly connected to the level of consumption or the burden but rather to the perceived burden, but should nonetheless be estimated since they would not exist in the counterfactual scenario of no alcohol consumption chosen in this study. In summary, the calculations of the direct costs for alcohol cost-of-illness studies are thus more complex than studies on specific medical conditions.

2.4.2 The indirect costs

The indirect costs are nowadays often called production losses or productivity costs, and include the value of resources not being produced because of the problem investigated. In previous cost-of-illness studies regarding different medical conditions (Jacobsson & Lindgren, 1996) or health behaviours (Bolin & Lindgren, 2004), the productivity costs form a large part of the total costs. In the cost-effectiveness literature, however, the inclusion and in particular the valuation of productivity costs is widely discussed and critiqued (e.g. Sculpher, 2001). Historically, the productivity costs were almost always calculated by the human capital method, and included production lost because of morbidity, ill-health and mortality. The human capital method assumes that the worth of an individual's production can be valued as the remuneration the employer is willing to pay, i.e. the salary before income tax and including employer taxes on wages. The standard way of calculating the productivity costs was then to use the average wage, sometimes age- and gender-specific, and sometimes adjusted for labour market participation and future increases in productivity until the age of retirement. The value of lost productivity because of death and permanent disablement were thus identical.

In the cost-of-alcohol field both the human capital method and the demographic method are recommended (Single et al., 2003). The choice between the two methods depends on what type of information is needed, since they answer two different questions. The human capital method investigates the present and future productivity loss that is a result of premature mortality during the study period, while the demographic method investigates the present productivity loss that is a result of past and present premature mortality. The demographic method is used in the Australian cost-of-alcohol estimate (Collins & Lapsley, 2002). In the literature, the human capital method has been criticized from several angles and similar criticism would apply to the demographic method. One line of criticism was that the method overestimates the productivity losses, as eventually a diseased worker would be replaced by another worker. The only costs that would accrue would be the so-called friction costs (Koopmanschap et al., 1995), i.e. costs for replacement and training. Built into this criticism are the assumptions that every worker is replaceable and that there is a reserve army of workers available as replacements. Another line of criticism assumed that the human capital method was valuing life per se and thus stated that the value of life is considerably higher than just the value of production. This criticism is based on a misunderstanding, as the value of life and lost life-years always have been considered intangible costs. However, as these intangible costs were never included in the estimates, the misapprehension is understandable. The current recommendations in cost-effectiveness analysis are that the mortality productivity costs should not be calculated, but only the productivity costs because of morbidity (Gold et al., 1996; Swedish Pharmaceuticals Board, 2003), and that, because of difficulties in estimating the friction costs (a method which has also been criticised), they should be valued according to the human capital method.

However, the recommendation in the *International guidelines for estimating the costs of substance abuse* (Single et al., 2003) is for estimating productivity cost of mortality and morbidity using the human capital method. Due to the disputed nature of this issue, we are including the productivity costs of mortality to enhance comparability with previous studies, although they will be reported separately. In a set of sensitivity analyses, we are also using a variant of the friction costs approach, previously used in a Canadian cost-of-alcohol study (Rehm et al., 2006).

2.4.3 The Intangible costs

Intangible costs, the last cost category, are seldom included in cost-of-illness studies. There are however two methods available; the willingness-to-pay approach and the approach using QALYs (quality-adjusted life-years). The willingness-to-pay approach was developed and is widely used in environmental economics and in transport economics, including traffic safety aspects. The method attempts to value intangible costs and benefits in monetary terms, either by examining decisions in related areas (the revealed preference method) or by population surveys (the contingent valuation method). The method has been used in recent cost-of-illness studies (e.g. Sloan et al., 2004; Miller et al., 2006a). The other method, QALYs (quality-adjusted life-years), is the recommended valuation of health benefits in cost-effectiveness analyses (Gold et al., 1996; Swedish Pharmaceuticals Board, 2003), and is also mentioned as an option in the international guidelines (Single et al., 2003).

The QALYs are commonly used within health economics to quantify health by combining life-years and health-related quality-of-life (Dolan, 2001). A year with full quality-of-life is assigned the value 1. Losses in quality-of-life are measured as fractions of a year, which are subtracted from the full quality-of-life of 1. As an example; a loss in quality-of-life of 0.1 leads to a QALY-value of 0.9. Lost QALYs should thus be interpreted as losses of years with full quality-of-life. There is a possibility to combine the willingness-to-pay approach with the QALYs, namely by assigning a monetary value to a year lived with full quality-of-life, i.e. to a QALY. The combined approach is currently discussed (e.g. Eichler et al., 2004; Hjalte et al., 2005) and has been used previously (Cutler & Richardson, 1998; Burström et al., 2002). Rare examples of the combined approach in a COI can be found in the revised Cost of Crimes from the UK (Dubourg et al., 2005) and in the US estimates of the societal costs of underage drinking (Miller et al., 2006b). In this study, we use the QALY methodology to estimate intangible costs, using the combined approach with a monetary valuation in a sensitivity analysis.

2.5 Deadweight losses

Another type of costs is the deadweight losses because of taxes. Public funding, e.g. criminal sector and health care, requires the collection of taxes. According to economic theory, there is a net loss of total surplus resulting from the economic inefficiency caused by taxes (Pindyck & Rubinfeld, 2001). This loss of surplus is a cost to society and should, from an economic point of view, be included. The argument for this holds even if it is assumed that the tax level would remain the same without the cost burden of the issue under study. In that case the deadweight loss is assumed to cover the opportunity cost of the best alternative use of the funds. There are, however, different standards used in different economic areas, and deadweight losses are normally not included either in cost-of-alcohol or in other cost-of-illness studies. We will therefore estimate these costs in a sensitivity analysis using several rates of deadweight losses.

2.6 Top-down or bottom-up calculations

COI studies are performed either as top-down studies or as bottom-up studies, depending on the data material. A top-down study estimates costs for a given population sample using statistical databases and/or registers, while bottom-up studies measure costs from a patient sample and extrapolate this to the population. Both methods have certain problems, the former because not all costs for a certain disease/condition normally can be found in registers, the latter because the patient sample needs to be unbiased and representative for the whole population (Kobelt, 2002). The current study applies both methods for different cost areas.

2.7 Prevalence-based or incidence-based costs

The costs could be analysed either on a prevalence or an incidence basis. Included in the former are costs estimated for a certain population for a given period of time. That is, prevalence-based studies estimate present and future costs that result from the problem investigated or treatments that occur during the given period of time. Incidence-based studies measure the lifetime cost of new cases of the problem that occur during a given time period. Incidence-based studies are more appropriate when measuring the effect of particular interventions, whereas prevalence-based studies are useful for planning and budget decisions. The drawback with incidence-based studies is that they require considerable knowledge and information about the problem in question and the costs that occur as a result thereof. This is a major problem, especially when dealing with societal phenomena, which normally makes a prevalence-based study the better choice (Kobelt, 2002).

However, the design of this study is a mixture of the prevalence and incidence approach, which is the customary design for Cost-of-alcohol studies (Jarl & Gerdtham, 2005). Included in the overall result are some costs that accrue during the year investigated, while other costs occur in the future. Examples of costs that accrue during the year are health care and social service costs, which are calculated for health and social problems that occur during the year but are often due to alcohol consumption during previous years. Costs that are expected to occur in the future are the productivity costs resulting from premature mortality and early retirement. They are calculated based on the number of deaths and early retirements that occur during the year, but as the effects are expected to continue to affect the economy during coming years, the future costs are included in the present year calculations, albeit discounted to account for the lower valuation of future costs.

2.8 Costs included: social costs vs. transfer costs

Transfer, e.g. tax payments, social payments, social allowances and insurance premiums, are not considered a social cost and are thus not included in this study. The reason for this is that transfers do not affect the amount of resources available in society. The cost for the payer of the transfer is countered by the benefit to the receiver. Connected to transfers is the administrative cost of organising the transfers, which is an actual resource consumption that would not exist in the counterfactual scenario (see below). This administrative cost will be estimated where appropriate. Theft can also be considered an involuntary transfer and therefore not a cost. However, theft often reduces the value of the stolen good and this value reduction can be considered an actual societal cost. Property destroyed as a result of criminal actions should be considered a cost.

2.9 Costs included: private vs. social, internal vs. external

The consumption of alcohol gives rise to two different kinds of costs: external and internal costs, the former being costs that affect others than the consumer and the latter costs that affect the consumer. External costs are the larger part of what is counted as social costs, since the internal costs are considered to be offset by benefits from consumption. However, if the consumer is not aware of the cost of consumption (or part thereof), there will be no private benefit to offset that cost. This part of the internal costs are therefore counted as social costs, i.e. when the costs are not knowingly and freely borne by the consumer. The social cost calculated in this study therefore includes all external costs and internal costs not knowingly and freely borne by the consumer. It is also now obvious that transfers within a society, e.g. taxes or social allowance, should not be counted as a social cost, as these are benefits to the receiver. The above definitions follow those used by Markandya and Pearce (1989), where adverse effect of consumption is defined as (1) a cost not borne by the consumer, (2) a cost borne by the consumer but which the consumer was unaware of at the time of consumption. Private (internal) costs are defined as costs that are "knowingly and freely borne by the consumer or producer himself" (Markandya & Pearce, 1989), p. 1139-1140).

Single et al. (2003) use a very stringent definition of private costs, involving rationality as a condition for private costs, making all costs related to *abuse* a social cost. Even though the terminology used in this study is different from Single et al. (2003) (we use "consumption" rather than "abuse"), the practical implication is the same, since the concept of abuse was used to denote all adverse effects.Arguments have been made that consumption decisions are made within the family, which would imply that no external costs can arise within a family. This is not the view of the current study. A member of a family could, in some situations, be assumed to adjust the consumption level to avoid costs within the family. However there are a number of problems that reduce the plausibility of such an action, for example lack of information and the bargaining position of family members. In the social policy context, furthermore, there are no doubts that alcohol consumption by care-givers gives rise to social costs, in terms of adverse living conditions for other family members, such as children or spouses. The present study thus includes effects on the family and other close relatives as a external cost and thus a social cost.

2.10 Protective effects of alcohol: gross vs. net social cost

Alcohol consumption increases the incidence of a large number of diseases, but it has also been found in a number of studies to have protective effects, in particular for ischaemic heart disease (IHD) and ischaemic stroke, and especially at regular low to moderate levels of consumption (Corrao et al., 2000; Thun et al., 2000). Thus there have been studies that estimate that alcohol saves more lives than it causes deaths (Duffy, 1995). But the life-saving effects tend to be for older age, while the negative effects are for younger age, resulting in a net loss in terms of life-years. There are also analyses suggesting that excess mortality of abstainers (compared to moderate drinkers) can be 'explained' by negative selection or health-related drift to the abstaining group with increasing age (Melberg, 2006). This means that common illnesses/diseases such as depression and nervous illness are more common in non-drinkers as compared with moderate drinkers, contributing to elevated mortality rates in the former group. Some caution is therefore suggested when interpreting the 'protective effect' and cost reductions, since there is considerable dissensus on this issue (Sjögren et al., 2000a; Hemström, 2001; Fillmore et al., 2006; Room, 2006). There are also different scientific standards in cost-of-alcohol studies in which cost areas the protective effect should be modelled: it is often not modelled for sickness absence although well-designed prospective studies cannot explain away a U-shaped association between alcohol and sickness absence (Upmark et al., 1999) or the fact that wages are highest among low- to moderate alcohol drinkers and in particular for male drinkers (Zharkin et al., 1998). This tells us that in terms of productivity, low- to moderate alcohol drinkers perform better than abstainers and heavy drinkers. In any case, the role of alcohol consumption in disease, public health and societal costs is complex. Factors contributing to the population-level balance of protective and detrimental effects of alcohol include: (1) the distribution of alcohol consumption in the population; (2) the distribution of diseases and causes of death in the population; (3) the population-specific disease risk for sub-groups of alcohol consumers and non-drinkers; (4) the pattern of alcohol consumption in the population.

In cost-of-alcohol studies, as in the present study, the distribution of alcohol drinking is estimated by self-reports of alcohol drinking in samples representative of the general population (see section 3.2). Sex and age groups differ in their drinking quantity, and the balance between harmful and beneficial effects of alcohol will consequently also differ across population subgroups. This net cost will also depend on the relative prevalence of different diseases in the population. In populations and subgroups with a low share of IHD (the largest disease category with evidence of benefits of alcohol), cost reductions will be smaller than if this disease makes up a dominant share of the disease burden. In a comparison of IHD mortality rates in 15 European countries, Sweden showed the highest proportion of deaths from IHD as a share of all deaths among both women and men aged 30+ (Hemström, 2001). This indicates a potential for relatively large cost reductions from alcohol in Sweden. However, mortality from causes of deaths where alcohol is a necessary condition (such as the alcohol dependence syndrome, alcohol intoxication) tend to be more common in Sweden (as well as in Norway, Finland and Denmark) than in most other European countries (Ramstedt, 2002). On the other hand, chronic diseases which are partially caused by alcohol, such as cirrhosis and certain cancers are probably higher in other countries than in Sweden, at least as indicated by country differences in cirrhosis mortality (Ramstedt, 2001a).

Population-specific disease risks obtained from meta-analyses based on a number of longitudinal studies are necessary to estimate the number of alcohol-related cases. The risk function for a specific disease sometimes differs between different populations and subgroups, such that the protective effect of alcohol tends to be greater in Mediterranean countries at a higher level of consumption than in other western European countries (Corrao et al., 2000). Populations differ not only in quantity of drinking but also in the pattern of drinking, that is the share of alcohol consumed with meals, binge drinkingepisodes, choice of beverage, etc. Sweden has been classified as a country with a relatively hazardous drinking culture in particular due to a predominance of binge drinking episodes rather than frequent low to moderate drinking episodes (Rehm et al., 2003). The drinking pattern is most important when estimating the costs of alcohol for injuries. We know that there are differences across populations and subgroups regarding the role of alcohol in injuries (Mäkelä, 1998; Rehm et al., 2003).

As this study aims to estimate the costs of alcohol consumption, and applies the counterfactual scenario of no alcohol consumption, the study will estimate the net costs. Since the relationships between consumption and cost for some diseases are "J"-shaped, the protective effects of alcohol consumption will be estimated in these cases because the benefits are closely connected to the costs and the cost calculations. The benefits accruing because of the protective effects will be termed "cost-reductions" since in most societies the benefits are assumed only to reduce the total costs and not yield a net positive result, an assumption that is doubtless true for Sweden. The benefits of alcohol consumption to be included are determined by the same distinction between social and private benefit as in the case of the distinction between social and private cost (see above), so that for example pleasure of consumption is excluded, as it is a private benefit, while a reduction in mortality is deemed a social benefit. Benefits included (from the downward slope on the "J"-shaped curve) are assumed not to be a part of the individual decision to consume and therefore counted as social benefits. The results will be presented as total gross cost as well as total net cost where the cost-reductions (in healthcare and productivity) are deducted from the gross cost. This is the strategy used in previous studies (e.g. Single et al., 1998) and recommended in the international guidelines (Single et al., 2003).

2.11 Calculation of the Alcohol Attributable Fraction

The relative risks of alcohol-related disease and injury for a particular alcohol consumtion group in combination with that group´s proportion of the population are used for the calculation of cases that can be attributable to alcohol consumption, the alcohol attributable fractions, AAFs.
The attributable fractions are calculated using the following formula, where no consumption is used as the counterfactual scenario:

$$AAF=[\sum_{i=1} P_i*(RR_i-1)] / [(\sum_{i=0}P_i*(RR_i-1)+1]$$

-- where i denotes drinking categories, i=0 abstention, 1 low, 2 hazardous and 3 harmful; P_i is the prevalence rate; and RR_i is the relative risk of the i^{th} category compared to no consumption (UK Strategy Unit, 2003; see also Rehm et al., 2006).

The number of alcohol-related cases is calculated by applying the attributable fractions for a certain disease to the total number of cases for that disease, differentiated for age and gender. The same attributable fractions are applied for all levels of healthcare as well as for mortality and early retirement costs, where appropriate (3.3).

2.12 Some previous Cost-of-alcohol studies

There are a large number of previous cost-of-alcohol studies. Seven of these studies were reviewed by Jarl (2005). These seven studies are also deemed most appropriate for comparison with the present study, as they were recently performed (Catalyst Health Economics Consultants, 2001; Collins & Lapsley, 2002; UK Strategy Unit, 2003; Gjelsvik 2004), have had considerable impact on the cost-of-alcohol methodology (US NIDA, 1992; Single et al., 1998; Collins & Lapsley, 2002) or were performed in neighbouring countries or in Sweden (Johnson 1983; Gjelsvik, 2004). Table 2.1 reprints (with some additions) a summary table from the review. The differing results, expressed in per capita costs in PPP (purchasing power parity) US$[2] for the year 2003, are explained by differences in both cost items included and methodology. Note that the highest estimate is found in the Swedish study by Johnson (1983), which is the oldest of the included studies. The Johnson (1983) study was done before the era of international guidelines; hence the study differs significantly in methodology from the other studies. If we set aside Johnson's estimate, the other estimates all fall within a range of USD $282 per capita (for Canada) and $760 (for the U.S.A.). The relatively high estimate of lost productivity pushes up the U.S. estimate, though on the other hand the U.S. study assigns relatively low costs for crime due to alcohol. In general, these studies have been done on developed societies with middle-range levels of alcohol consumption and levels of hazardous drinking (Rehm et al., 2004), and with medium to high health and welfare expenditures. It seems likely that variations in methods and inclusion criteria are at least as likely as variations in actual attributable costs to be producing the differences in results (Baumberg, forthcoming)

2.13 The purpose of Cost-of-alcohol studies

It is evident from different reviews of social cost-of-alcohol studies that there is a trend toward methodological homogeneity. The establishing of international guidelines, and probably also an increased

[2] PPP US$ is an artificial currency, created for international comparisons, that takes into account differences in purchasing power between nations (Schreyer & Koechlin, 2002).

Table 2.1. Cost-of-alcohol studies, in millions PPP US$ 2003. (Costs per capita, in parenthesis).

Study	Healthcare	Productivity loss	Criminal Justice System	Societal inter-Vention	Intangible costs	Other	Total Societal Cost
Sweden (Johnson, 1983)	3 267 (393)	7 885 (948)	408[d] (49)	1 508[g] (181)		2 827[j] (340)	15 896 (1 911)
Canada (Single et al., 1998)	1 385 (49)	4 406 (155)	1 447 (51)	207[h i] (7)		567[k l] (20)	8 011 (282)
Scotland (Scottish Executive, 2001)	158 (31)	1 026[a] (203)	442 (87)	142 (28)			1 767 (349)
United States (NIDA, 2002)	24 665 (97)	140 166[b] (550)	8 269 (32)	895[h] (4)		19 924[m] (78)	193 908 (760)
Australia (Collins & Lapsley, 2002)	192 (10)	1 516 (80)	944 (50)		1 726 (91)	2 084[n] (110)	6 464 (343)
England & Wales (UK Strategy Unit, 2003)	2 299 – 2 787 (44 - 45)	8 538 – 10 532[c] (164 - 202)	18 675[e f] (359)		580[c] (11)		30 090 – 32 572 (578 - 626)
Norway (Gjelsvik, 2004)	98 – 177 (22 - 39)	1 298 – 1 405 (288 - 312)	593[f] (132)	42 (9)			2 030 – 2 217 (451 - 492)
Canada (Rehm et al., 2006)	2 710 (90)	5 840 (195)	2 518 (84)	97[h i] (3)		762[l o] (25)	11 927 (397)

a. incl. non-working population
b. incl. crime-related
c. drinking driving
d. criminal care and prevention.
e. incl. intangible costs
f. incl. crime anticipation
g. social care & prevention
h. administrative costs
i. research & prevention
j. property damage and alcohol production
k. drug testing and promotion programs at work
l. fire & traffic accidents
m. motor vehicle crashes & fire
n. road accidents and resources used in abusive consumption
o. incl. workplace costs

Source: Jarl, 2005, with additions

awareness of the importance of comparability (Jarl, 2005), has narrowed the range of the cost estimations. The current study aims to contribute to the developing tradition of more comparable studies. However, full comparability is a difficult goal to reach even for comparisons within a single society (Bloom et al., 2001). Comparability across societies is even more difficult if a cost-of-illness study is to be taken as an indicator of the size of the problem in different societies (Polder et al., 2005). This is because many of the costs in such a study reflect general societal decisions about investment in health, social welfare, and other systems of response to health and social problems. A cost-of-alcohol study thus includes within it both costs directly reflecting the drinker's decisions about drinking behaviour and costs reflecting intimate, local and societal reactions to the behaviour – and often the costs of thesereactions reflect general societal decisions about welfare provision, intensity of policing, etc. The results will also depend on general social policy decisions about employment, the valuation of unpaid labour, etc. (van Roijen et al., 1995). Therefore great care should be taken if estimates of the total societal cost-of-alcohol are used as a comparator for the size of alcohol problems in different societies.

A minimum argument for the usefulness of cost-of-alcohol studies is that they identify gaps in knowledge about the size of alcohol problems, and how social and other responses to the problems could be valued. These studies could also contribute to knowledge about areas in which polices and preventive action has been deficient or neglected. Beyond this, the studies have been useful in pointing to the "shape" of alcohol problems in the society – the relative size of costs and investments in different problem-areas, different subpopulations, different levels of government, etc., within a given society. As comparability improves in the international literature, comparisons of subcomponents of the cost estimates, rather than of the total costs, are likely to provide useful and illuminating cross-national comparisons. Cost-of-illness studies cannot, of course, offer any indication of the cost-effectiveness of alternative approaches to reducing the costs they identify; for that, cost-effectiveness studies are needed. But a further purpose of cost-of-illness studies is to prepare the ground, in terms of epidemiological and economic indicators which will be needed, for such cost-effectiveness studies.

3. BACKGROUND DATA

The study aims to estimate the social costs of alcohol in Sweden in the year 2002. As in other alcohol COI studies, the general method of proceeding for illness, disability and death is to start from a list of specific disease categories in which prospective epidemiological studies have found that alcohol plays some role, and to estimate the relative risk (compared to abstainers) for each of several levels of drinking. With knowledge of the fraction of the population at each level of drinking, the Alcohol Attributable Fraction (AAF) for the disease category can be calculated and applied to the register data on morbidity and mortality. These calculations are made separately within each sex and age subgroup, and the results summed. These epidemiological results are then converted into cost data in chapter 5 using estimates of the average cost of treatment and handling of each disease category, as well as productivity costs due to alcohol-related conditions. For some other categories of cost in chapter 5, for instance with alcohol-related costs of crime, the AAF is more directly estimated on the basis of crime-specific studies and applied to the crime statistics, without reference to the distributions of levels of drinking. Carrying out the study thus required developing estimates of rates of drinking at different levels in the Swedish population in 2002, collecting data on morbidity and mortality from different causes, and obtaining the relative risk of illness or death from each cause for each level of drinking, which is reported in this chapter.

3.1 Age groups

The study covers the total Swedish population in the year 2002, divided into seven age groups, see Table 3.1. The year 2002 was chosen as being the most recent year for which a sufficient amount of data was available at the time of the study.The study's age groups are chosen mainly for their policy relevance and Swedish administrative reasons and differ somewhat from previous studies. Because of lack of detailed consumption data, we have assumed that children under the age of 15 years do not drink alcohol. All children aged 0-14 are thus included in the consumption category Abstinence. There are however surveys reporting that among 11-year-olds, around 2% of the girls and 6% of the boys consume alcohol every week, with an increase in the proportions among 13-year-olds to 8% of the girls and around 12% of the boys (Schmid and Gaghainn, 2004). This consumption might have acute health consequences, which is why the costs for fully attributable diseases reported for children (0-14 years) are included in the health care costs. Intoxicated children might also take part in some

Table 3.1. Age groups and population in 2002, men and women.

Age group		Men	Women
0-14	children	829 246	786 862
15-17	adolescents	166 325	157 165
18-29	young adults	659 300	634 028
30-49	middle-aged	1 245 801	1 198 421
50-64	older middle-aged	863 099	851 877
65-79	young elderly	487 994	578 096
80+	old elderly	166 095	300 819
Total		**4 417 860**	**4 507 268**

criminal activities, such as damage, which are also included in the cost estimates. Furthermore, the children might be affected by somebody else's alcohol consumption, in particular as victims of injuries or crime. Adolescents (15-17 years), are an important target group for alcohol preventive measures, which is why data on the costs accrued by them is judged interesting for policy reasons. The age group 18-29 has the peak of intoxicated drinking in the life cycle, and is therefore also important for alcohol-related injuries of all sorts. The official retirement age in Sweden was 65 years until 1999 after which employees have been able to postpone retirement to 67 years. However, in 2002 most retirements were no later than 65, so this is the age limit used in this study. The division of the elderly into two age groups, 65-79 years and 80+, is due to the markedly higher morbidity among the very old.

3.2 Estimated prevalence of different levels of alcohol consumption

3.2.1 The consumption categories

In the Global Burden of Disease (Rehm et al., 2004), WHO has recommended consumption groups to be used for estimation analyses of prevalence within different drinking categories on the general population level. The limits are based on average consumption of pure alcohol in terms of grams per day, categorized as follows – separately for men and women:

Abstinence (no alcohol within last year)
Low consumption (females 0-19.99 gr pure alcohol per day, males 0-39.99 gr per day),
Hazardous consumption (females 20-39.99 gr, males 40-59.99 gr),
Harmful consumption (females 40+ gr, males 60+ gr).[3]

The division of costs between consumption groups for some cost items is based on the inpatient medical care costs. For those 19 diagnoses where relative risks are available, the formula for the calculation of the attributable fraction has been modified so that an attributable fraction for each consumption group was produced. Since this method results in more alcohol-related cases than the baseline method, we apply the proportion of each consumption group to the whole (on the basis of the modified formula) to the baseline attributable fraction calculation (the original formula) and thereby divide the cost per diagnosis between the different consumption groups. This method was not possible for those diagnoses where no relative risks are available and therefore we were forced to make some further assumptions regarding the cost division. Chronic diagnoses without relative risks were assumed to affect only the highest consumption group, i.e. those with harmful consumption, while accidents were assigned in equal proportions to the harmful and hazardous consumption groups.

3.2.2 Prevalence in the adult population, 16-79 years old: The Monitoring study 2002

Since June 2000, 1,500 individuals aged 16-80 have been interviewed monthly by telephone about their purchases and private imports of alcohol during the past 30 days (Leifman & Gustafsson, 2003). Later on, beverage-specific quantity frequency (QF) questions on actual consumption were added. Using this method, the respondent is asked how often s/he has been drinking wine, beer or spirits, and in the next step, for each beverage, s/he is asked to report the usual amount of each beverage consumed on an occasion.

[3] We have used the terms "hazardous" and "harmful consumption" here for convenience, but it should be recognized that our usage does not fully match WHO definitions. WHO's definition of "harmful use" refers to drinking that is already causing physical or mental health harm (rather than just risk of such harm); thus in WHO parlance, the top two categories would constitute two levels of hazardous use. (http://www.who.int/substance_abuse/terminology/who_ladt/en/index.html)

Table 3.2. Proportion in different drinking groups in 2002*

	16-17 years	18-29 years	30-49 years	50-64 years	65+ years
Women (n=9433)					
Abstinence	0.4070	0.2250	0.2248	0.2474	0.4594
Low consumption	0.5420	0.6848	0.7088	0.6950	0.5257
Hazardous cons.	0.0468	0.0671	0.0509	0.0450	0.0116
Harmful cons.	0.0041**	0.0231	0.0156	0.0125	0.0033*
Men (n=8617)					
Abstinence	0.3614	0.1097	0.1127	0.1459	0.2954
Low consumption	0.5891	0.7692	0.8112	0.7959	0.6772
Hazardous cons.	0.0106*	0.0589	0.0384	0.0334	0.0133
Harmful cons.	0.0390	0.0621	0.0377	0.0248	0.0140

* Estimated by the Monitoring survey
** Less than 10 observations

For these questions, unlike the usual standard (drinking in the past 12 months), the recall period has been the past 30 days. The answers from each month of 2002 were then aggregated into the average volume for this particular year. In Table 3.2, proportions of the population in the four drinking groups are shown, for men and women in five different age groups.

The estimated proportion of abstainers is far too high in this table, in comparison to a large number of other studies on drinking in Sweden. This is very likely a result of the unusual reference period of the past 30 days (typically, the respondent is asked to refer to the past 12 months). The 30-day reference period was chosen because earlier studies (Kühlhorn et al., 2000) had shown that those interviewed tend to recall their consumption with higher precision if the reference period is as close in time as possible to the actual interview occasion. Reporting back on the past 30 days is probably easier than recalling drinking events during the past 12 months. However, this implies that the responses in some cases refer to an untypical month. On the aggregated level the discrepancies can be assumed to even out – some underreporting their usual consumption and some doing the opposite. But many of those who reported no consumption during the past 30 days were probably drinking on at least some occasion during the year. These are, though, incorrectly classified as whole-year-abstainers.

3.2.3 Weighting down the proportion of abstainers by Monitoring study data from 2004

A reliable way to adjust the high proportion of abstainers measured by the last 30 days scale is to use the Monitoring data from July-September 2004. During this period, the quantity-frequency questions were asked of the same individuals referring to both the past 30 days *and* the past 12 months, which makes a direct comparison possible. It confirmed the assumption described above about overestimating the abstinence rate when asking about the past 30 days. With reference to the past 12 months, 9.4% of men and 14.8% of women were classified as abstainers, while the corresponding figures for the past 30 days were 15.7 and 26.0%. This indicates that there is a considerable share of Swedish men and women that drinks alcohol on a very infrequent basis, and is on the borderline between abstaining and low consumption. In order to arrive at a best estimate, the proportion of abstainers for 2002 has been weighted down using the estimates of the difference between responses yielded by using the two reference periods for 2004. Table 3.3 shows the data for 2004 – 30-day estimates weighted by the 12-month estimates. The proportions finally used in this study are shown in Table 3.5, where the 2002 estimates (Table 3.2) are weighted by the 2004 estimates (Table 3.3). The

Table 3.3. Proportion in different drinking groups, adjusting to 12-month abstinence*

	16-17 years	18-29 years	30-49 years	50-64 years	65-years
Women					
Abstinence	0.3103	0.0847	0.0927	0.1167	0.3169
Low consumption	0.6274	0.8198	0.8241	0.8216	0.6619
Hazardous cons.	0.0332	0.0521	0.0690	0.0544	0.0174
Harmful cons.	0.0291	0.0434	0.0142	0.0073	0.0038
Men					
Abstinence	0.1726	0.0668	0.0602	0.0874	0.1963
Low consumption	0.7822	0.8189	0.8492	0.8596	0.7542
Hazardous cons.	0.0105	0.0458	0.0490	0.0328	0.0441
Harmful cons.	0.0347	0.0685	0.0416	0.0202	0.0054

*Fall 2004 (3 months) – Monitoring, 30 days scale weighted by 12 months scale for abstinence and low consumption

weighting procedure was only applied to redistribute the proportion of abstainers and low consumers. The prevalence of hazardous and harmful drinking was directly taken from the 2002 data.

3.2.4 The young and the old

People below 16 and over 80 years of age are not included in the survey data. For these groups, a different procedure has been used in order to estimate the prevalence. Considering the population aged 14 and below, the assumption is made that no alcohol is consumed. For the group 15-17 years old, two data sets were combined: those 16-17 years old included in the Monitoring study, and those 15-16 years old from the 2002 data from the School survey conducted yearly by CAN (Centralförbundet för alcohol- och narkotikaupplysning, 2004). The School surveys have been conducted since 1971 and in the past decade about 5,500 students from 9th grade of elementary school have responded every year. For both studies, the prevalence was estimated separately using the WHO limits, and in the next step the mean value of both was calculated (see Table 3.4). There are some methodological differences between the CAN study and the Monitoring data. Firstly, while the Monitoring data is collected via telephone, the School studies use self-administered questionnaires and show a rather low non-response rate (10-15% compared to about 40% in the Monitoring). Secondly, the same questioning technique is used in both studies, i.e. the beverage quantity-frequency scale, but in the School survey, no reference period is specified ('How often do you usually drink beer, wine, etc…?').

Table 3.4. Proportion in different drinking groups in 15-17 year-olds*

	15-16 years (CAN studies)	16-17 years (Monitoring data)	15-17 years (mean value)
Women			
Abstinence	0.2538	0.3141	0.2840
Low consumption	0.6553	0.6350	0.6451
Hazardous cons.	0.0586	0.0468	0.0527
Harmful cons.	0.0323	0.0041	0.0182
Men			
Abstinence	0.2991	0.1719	0.2355
Low consumption	0.6698	0.7785	0.7241
Hazardous cons.	0.0159	0.0106	0.0133
Harmful cons.	0.0152	0.0390	0.0271

Table 3.5. Proportions of the population in drinking volume groups, by age and gender, 2002*.

	15-17 years[1)]	18-29[2)] years	30-49[2)] years	50-64[2)] years	65-79[2)] years	80+[3)]
Women						
Abstinence	0.2840	0.0852	0.0943	0.1172	0.3187	0.4434
Low consumption	0.6451	0.8246	0.8392	0.8253	0.6659	0.5477
Hazardous cons.	0.0527	0.0671	0.0509	0.0450	0.0119	0.0067
Harmful cons.	0.0182	0.0231	0.0156	0.0125	0.0035	0.0022
Men						
Abstinence	0.2355	0.0663	0.0612	0.0869	0.2005	0.2951
Low consumption	0.7241	0.8127	0.8627	0.8549	0.7706	0.6786
Hazardous cons.	0.0133	0.0589	0.0384	0.0334	0.0141	0.0129
Harmful cons.	0.0271	0.0621	0.0377	0.0248	0.0148	0.0134

*Abstainers weighted down by Monitoring data from Fall 2004
1) Prevalence among 15-17 years old is estimated by merging CAN's School study (15-16 year olds) with the Monitoring study (16-17 years olds), see Table 3.4.
2) Monitoring survey (abstainers and low consumers weighted by Monitoring 2004)
3) The prevalence among the oldest, not included in the survey data, is estimated by the observed consumption decrease between ages 65-72 and 73-79; the same decrease is assumed between ages 73-79 and ages 80+.

In addition, the frequency scales are similar but not identical. It is likely that these differences, to some extent, affect the validity of our results. For instance, for girls 15-16 years old, the estimated prevalence is rather high, compared to boys of the same age. Even though the mean drinking volume is higher for boys, applying the gender-specific WHO limits gives a different picture for this particular age group in the School study. The difference is smaller when both data sets (i.e. School study and Monitoring study) are merged in order to make an estimate for the whole group of 15-17 years old. The methodological issues should, however, be kept in mind when interpreting the results. For information on drinking among those 15 years old, no other, more comparable data could be found.

There are not many studies focusing on drinking among the elderly. They are usually not included in ordinary surveys – either because there is an age limit to start with (as in the Monitoring study) or because they are difficult to reach for interview. Thus, for people 80 years old and above[4] an estimate was made the following way: the group of those 65-79 years old in the Monitoring data was split into two groups 65-72 and 73-79 years old. The difference between these two groups was calculated, showing an expected overall decrease in consumption. The assumption was then made that a corresponding proportional decrease continues among those 80+ compared to the whole group of 65-79 years old (see Table 3.5).

[4] A number of respondents aged 80 were included in the Monitoring survey, but these were not as well represented as other age groups. Thus, the survey estimates are used for those 16-79 years old.

Table 3.6. Estimated population size by age, gender and drinking group. Year 2002.

	0-14 years	15-17 years	18-29 years	30-49 years	50-64 years	65-79 years	80+	Total
Women								
Abstinence	786 862	44 635	54 019	113 011	99 841	184 412	133 383	1 416 163
Low consumption	0	101 387	522 820	1 005 715	703 054	385 070	164 759	2 882 805
Hazardous cons.	0	8 283	42 543	61 000	38 334	6 706	2 015	158 881
Harmful cons.	0	2 860	14 646	18 695	10 648	1 908	662	49 419
Population size	*786 862*	*157 165*	*634 028*	*1 198 421*	*851 877*	*578 096*	*300 819*	*4 507 268*
Men								
Abstinence	829 246	39 170	43 712	76 243	75 003	97 989	49 015	1 210 378
Low consumption	0	120 436	535 812	1 074 752	737 863	376 683	112 711	2 958 257
Hazardous cons.	0	2 212	38 833	47 839	28 828	6 490	2 143	126 345
Harmful cons.	0	4 507	40 943	46 967	21 405	6 832	2 226	122 880
Population size	*829 246*	*166 325*	*659 300*	*1 245 801*	*863 099*	*487 994*	*166 095*	*4 417 860*

3.2.5 Estimating population size for each consumption group

As the last step, these proportions have been related to the actual population size within each age group in 2002. Table 3.6 shows the estimated absolute numbers of abstainers, low consumers, hazardous and harmful drinkers in the whole population, by age and gender. These are then used throughout the study as background data for certain cost estimates.

3.3. Disease and injury risks

3.3.1 Chronic disease risks

The alcohol-related diseases included are taken from Rehm et al. (2006) and supplemented with other diseases, all of them fully attributable to alcohol, taken from UK Strategy Unit (2003) and Jarl et al. (2006), see Table 3.8. One possibly relevant disease category according to Rehm et al. (2006), which previously has been excluded due to lack of data on the alcohol-related relative risks (Ridolfo and Stevenson, 2001) is heart failure and ill-defined complications of heart disease. The category comprises a number of ICD diagnoses, but data on hospitalizations produced for this study revealed that the category almost exclusively consists of ICD diagnosis I50, heart failure. To evaluate the possible role of alcohol in this disease we examined the aggregate-level relationship between alcohol consumption and mortality in heart failure in Sweden in a time series analysis of annual data. The analysis showed no significant relationship and therefore the disease category heart failure and ill-defined complications of heart disease is excluded from the study. Another disease that also is excluded is low birth weight, for which a protective effect of alcohol consumption was reported for low consumption, along with a harmful effect for higher consumption (Gutjahr et al., 2001). The main reason for this exclusion is that there is no biological evidence for a protective effect of low consumption.

Table 3.7. Attributable fraction of depression, in percent.

	Prevalence of alcohol dependence EUR-A	Prevalence of alcohol dependence Sweden	AAF EUR-A	AAF Sweden*
Men	5.61	5.50	6.91	6.77
Women	1.18	2.05	1.39	2.41

* Same quotient applied for AAF as for prevalence

Table 3.8. Alcohol-related chronic diseases

Condition	ICD-10	Relative risks						Sources
		Low		Hazardous		Harmful		
		Wom.	Men	Wom.	Men	Wom.	Men	
Malignant neoplasms								
Mouth and oropharynx cancers	C00-C14	1.45	1.45	1.85	1.85	5.39	5.39	Gutjahr et al., 2001
Stomach cancer	C16	1.07	1.07	1.15	1.15	1.32	1.32	Bagnardi et al., 2001
Oesophageal cancer	C15	1.80	1.80	2.38	2.38	4.36	4.36	Gutjahr et al., 2001
Liver cancer	C22	1.45	1.45	3.03	3.03	3.60	3.60	Gutjahr et al., 2001
Laryngeal cancer	C32	1.83	1.83	3.90	3.90	4.93	4.93	Gutjahr et al., 2001
Breast cancer	C50	1.14	na	1.41	na	1.59	na	Ridolfo & Stevenson, 2001
Other neoplasms	D00-D48	1.10	1.10	1.30	1.30	1.70	1.70	Rehm et al., 2004
Diabetes								
Diabetes mellitus	E10-E14	0.92	0.99	0.87	0.57	1.13	0.73	Gutjahr et al., 2001
Neuro-psychiatric conditions								
Alcoholic psychoses	F10.0, F10.3–F10.9	wholly attributable to alcohol						
Alcohol abuse	F10.1	wholly attributable to alcohol						
Alcohol dependence syndrome	F10.2	wholly attributable to alcohol						
Unipolar major depression	F32-F33	0.0677 AAF for males 0.0241 AAF for females						See Table 3.7
Degeneration of nervous system due to alcohol	G31.2	wholly attributable to alcohol						
Epilepsy	G40-G41	1.34	1.23	7.22	7.52	7.52	6.83	Gutjahr et al., 2001
Alcoholic polyneuropathy	G62.1	wholly attributable to alcohol						
Cardiovascular diseases								
Hypertensive disease	I10-I15	1.40	1.40	2.00	2.00	4.10	4.10	Corrao et al., 1999
Ischemic heart disease	I20-I24, I25.1-I25.9	0.82	0.82	0.83	0.83	1.00	1.12	Rehm et al., 2004
Alcoholic cardiomyopathy	I42.6	wholly attributable to alcohol						
Cardiac arrhythmias	I47-I49	1.51	1.51	2.23	2.23	2.23	2.23	Gutjahr et al., 2001
Cerebrovascular disease								
Haemorrhagic stroke	I60-I62	0.74	1.12	1.04	1.40	1.94	1.54	Rehm, pers. com.
Ischemic stroke	I63-I66	0.66	0.94	0.84	1.13	1.53	1.19	Rehm, pers. com.
Oesophageal varices	I85	1.26	1.26	9.54	9.54	9.54	9.54	Gutjahr et al., 2001
Digestive diseases								
Alcoholic gastritis	K29.2	wholly attributable to alcohol						
Cirrhosis of the liver	K70, K74	1.30	1.30	9.50	9.50	13.00	13.0	Rehm et al., 2004
Cholelithiasis	K80	0.82	0.82	0.68	0.68	0.50	0.50	Gutjahr et al., 2001
Acute and chronic pancreatitis	K85, K86.1	1.3	1.3	1.8	1.8	3.2	3.2	Corrao et al., 1999
Chronic pancreatitis (alcohol induced)	K86.0	wholly attributable to alcohol						

Table 3.8. Alcohol-related chronic diseases, cont´d.

Condition	ICD-10	Relative risks						Sources
		Low		Hazardous		Harmful		
		Wom.	Men	Wom	Men	Wom.	Men	
Skin diseases								
Psoriasis	L40	1.58	1.58	1.60	1.60	2.20	2.20	Gutjahr et al., 2001
Conditions arising during the perinatal period								
Fetal alcohol syndrome	Q86.0	wholly attributable to alcohol						
Excess blood alcohol	R78.0	wholly attributable to alcohol						
Other:								
Alcohol induced pseudo-cushing syndrome	E24.4	wholly attributable to alcohol						UK Strategy Unit, 2003
Alcoholic myopathy	G72.1	wholly attributable to alcohol						UK Strategy Unit, 2003
Maternal care of suspected damage to the foetus from alcohol	O35.4	wholly attributable to alcohol						Jarl et al., 2006
Foetus and newborn affected by maternal use of alcohol	P04.3	wholly attributable to alcohol						Jarl et al., 2006
Toxic effect of alcohol	T51	wholly attributable to alcohol						UK Strategy Unit, 2003
Problems related to lifestyle alcohol use	Z72.1	wholly attributable to alcohol						UK Strategy Unit, 2003

Main source: Rehm et al., 2006.

The sources for the relative risk of diseases are also taken from Rehm et al. (2006) apart from three conditions. The relative risks for ischemic and haemorrhagic stroke are taken from a reanalysis by Rehm (pers. com. 2005-10-07). For unipolar major depression no appropriate relative risks for Sweden were available; instead we use the alcohol attributable fraction for depression from the Global Burden of Disease and adjust it with the Swedish prevalence of alcohol dependence (see Table 3.7). The Swedish dependence rate was obtained from the Swedish PART study (pers. com. Kerstin Damström-Thakker 060404).

3.3.2 Injury risks

The alcohol attributable fractions for injury deaths, except for motor vehicle accidents where actual Swedish data from 2002 are used (see below), are taken from a Finnish study (Mäkelä, 1998), as those injury AAFs were deemed appropriate also for a Swedish setting. The fractions are reported as the proportion of injury deaths during 1987-1993 whose causes of death, underlying or contributory, mention some alcohol diagnosis (ICD-9 codes). The fractions are reported by gender in four age groups. To arrive at this study's age groups, some adjustments had to be performed. As the injury deaths are related to the victim's alcohol consumption, special consideration for the youngest is needed. Children are, as discussed above, assumed not to consume alcohol and are therefore not considered to carry costs. There are a few exceptions to this: children with fully alcohol-related diagnoses are included as well as children as victims of others drinking. Because of lack of information regarding the latter, it is assumed that children 0-14 years old have an AAF of half that of the age group 15-17 years. This is only applied for injuries where others drinking is most evident, i.e. accidents involving motor vehicle, water traffic and drowning, fires and homicide.

It should be noted that the AAFs for injuries in the Mäkelä study refer only to the drinking of the injured person. Thus they do not include any contribution from the drinking of others, although it is known that many injuries and deaths, both intentional and unintentional, are caused by another person's drinking. To this extent, the cost estimates related to injuries and injury deaths in the present

Table 3.9. AAFs for injuries

	ICD-10	0-14 years	15-17 years	18-29 years	30-49 years	50-64 years	65-79 years	80+ years
Women								
Unintentional injuries								
Motor vehicle accidents	*	see Table 3.10						
Water traffic accidents and drownings	W65-W74, V90-V94	0.32	0.65	0.65	0.61	0.29	0.03	0.03
Falls	W00-W19	0	0.47	0.47	0.37	0.19	0.01	0.01
Fire, flames, heat and cold	X00-X09, X31	0.39	0.79	0.79	0.70	0.55	0.11	0.11
Other accidents	Rest of ICD-10 chapters V, W, X & Y	0	0.14	0.14	0.31	0.14	0.01	0.01
Accidental alcohol poisoning	X45	wholly attributable to alcohol						
Intentional injuries								
Suicide and self-inflicted injuries	X60-X84, Y87.0	0	0.17	0.17	0.15	0.10	0.02	0.02
Homicide	X85-Y09, Y87.1	0.18	0.37	0.37	0.41	0.38	0	0
Undetermined injury	Y10-Y34, Y87.2	0	0.35	0.35	0.41	0.26	0.07	0.07
Men								
Unintentional injuries								
Motor vehicle accidents	*	see Table 3.10						
Water traffic accidents and drownings	W65-W74, V90-V94	0.30	0.61	0.61	0.71	0.61	0.30	0.30
Falls	W00-W19	0	0.58	0.58	0.62	0.45	0.08	0.08
Fire, flames, heat and cold	X00-X09, X31	0.40	0.81	0.81	0.84	0.77	0.45	0.45
Other accidents	Rest of ICD-10 chapters V, W, X & Y	0	0.24	0.24	0.39	0.26	0.07	0.07
Accidental alcohol poisoning	X45	wholly attributable to alcohol						
Intentional injuries								
Suicide and self-inflicted injuries	X60-X84, Y87.0	0	0.43	0.43	0.40	0.26	0.10	0.10
Homicide	X85-Y09, Y87.1	0.31	0.63	0.63	0.74	0.52	0.36	0.36
Undetermined injury	Y10-Y34, Y87.2	0	0.56	0.56	0.57	0.43	0.24	0.24

* V02.1-V02.9, V03.1-V03.9, V04.1-V04.9, V09.2, V09.3, V12.3-V12.9, V13.3-V13.9, V14.3-V14.9, V19.4-V19.6, V20.3-V20.9, V21.3-V21.9, V22.3-V22.9, V23.3-V23.9, V24.3-V24.9, V25.3-V25.9, V26.3-V26.9, V27.3-V27.9, V28.3-V28.9, V29.4-V29.9, V30.4-V30.9, V31.4-V31.9, V32.4-V32.9, V33.4-V33.9, V34.4-V34.9, V35.4-V35.9, V36.4-V36.9, V37.4-V37.9, V38.4-V38.9, V39.4-V39.9, V40.4-V40.9, V41.4-V41.9, V42.4-V42.9, V43.4-V43.9, V44.4-V44.9, V45.4-V45.9, V46.4-V46.9, V47.4-V47.9, V48.4-V48.9, V49.4-V49.9, V50.4-V50.9, V51.4-V51.9, V52.4-V52.9, V53.4-V53.9, V54.4-V54.9, V55.4-V55.9, V56.4-V56.9, V57.4-V57.9, V58.4-V58.9, V59.4-V59.9, V60.4-V60.9, V61.4-V61.9, V62.4-V62.9, V63.4-V63.9, V64.4-V64.9, V65.4-V65.9, V66.4-V66.9, V67.4-V67.9, V68.4-V68.9, V69.4-V69.9, V70.4-V70.9, V71.4-V71.9, V72.4-V72.9, V73.4-V73.9, V74.4-V74.9, V75.4-V75.9, V76.4-V76.9, V77.4-V77.9, V78.4-V78.9, V79.4-V79.9, V80.3-V80.5, V81.1, V82.1, V83.0-V83.3, V84.0-V84.3, V85.0-V85.3, V86.0-V86.3, V87.0-V87.8, V89.2

Source: Mäkelä, 1998 (except motor vehicle accidents, see 3.3.3) study could be underestimated. However, if there is a car crash having two deceased drunk passengers, but a sober and surviving driver, there will be an overestimate of the causal role of alcohol. It should be clear that there could be an overestimate as well as an underestimate of the alcohol involvement in various injuries (Sjögren, 2000b). There are two further sources of possible bias in the estimates based on the Mäkelä study. (1) The AAFs are based on the number of cases with a blood-alcohol level (BAL) of 1.0 per mille (.10%) or greater. On the one hand, alcohol can play a causal role at a lower blood alcohol level, and these cases are not counted. On the other hand, alcohol does not play a causal role (even in the limited sense of conditional causation which concerns us here) in all incidents where it is present, even at a BAL of 1.0 per mille or greater. An older US study estimated that alcohol played a causal role in about half the drinking-driving incidents with a BAL at such a level (Reed, 1981). (2) The AAFs derived from injury deaths are also used for injury morbidity in this study. There is some evidence in the literature that the AAFs should be lower for non-fatal injuries than for fatal (e.g. Cherpitel, 1996). Therefore adjustments will be made following suggestions from Rehm et al. (2004 and 2006). For traffic accidents mortality figures are multiplied by 2/3, while all other accidents (not homicide) are multiplied by 4/9. It is not clear whether the net result of these various sources of information on injury-specific AAFs will be an overestimate or an underestimate of the Swedish injury cost-of-alcohol. One clear indication from this study is that there is a need to develop better epidemiological data on the role of alcohol in injuries in Sweden, including the role of drinking by others as well as by the injured person.

3.3.3 Motor vehicle accidents

Studies on alcohol-related road accidents are numerous, but they are also somewhat unreliable. This is partly due to the difficulty in measuring the driver's alcohol intoxication when for example he or she is severely injured and rapidly taken to hospital. An injured person could die after some time at the hospital and a follow-up autopsy will not show any alcohol level in the blood. The driver could also have left the scene of the accident. So the figures of alcohol-related cases are most likely underreported.

Deaths

A study from the Swedish Road Administration (Lindholm, 2004) investigated all fatal accidents with private cars that occurred in 2002 where the driver had been intoxicated with alcohol. In total, 462 fatal accidents occurred and 479 people were killed. The latter figure is from the Swedish register of causes of death. In 91 of these accidents alcohol was involved. 53 drivers with confirmed alcohol intoxication were killed, and another 21 individuals died as a result of drinking driving. In other alcohol-related traffic accidents with a fatal outcome, another 28 people died. These cases include intoxicated pedestrians being hit by a car, motorcycle- and moped drivers and bicycle drivers. Bus drivers have not been involved in any alcohol-related fatal accidents since 1997 and intoxicated truckdrivers cause fatal accidents to a very low extent (SOU 2006:72). Thus, a total of 102 people died (confirmed cases) in traffic accidents related to alcohol in 2002. The AAF for all alcohol-related traffic/motor vehicle accidents resulting in deaths is thus 21.3%. In order to get an estimate of children injured and dead in alcohol-related motor vehicle accidents we have chosen to halve the AAF for 15-17 year olds and apply that to the children aged less than 15. This actually raises the number of deaths for motor vehicle accidents with 2 individuals. This procedure was chosen in order to have a consequent method in line with other areas concerning children in the report. The AAFs are however calculated through the original number of deaths for motor vehicle accidents. This procedure was however not appropriate regarding drinking driving deaths. The AAFs for children under age 15 in Table 3.10 were thus not applied in the calculations regarding drinking driving in Table 5.13.

This AAF is similar to the AAF reported for Finland by Mäkelä (1998), which was 19.9%. This is noteworthy, as our AAF of 21.3% includes victims who had not consumed alcohol which was not the case for the AAF from the Finnish study. The AAF calculated for Sweden is however for both men and women and all age groups. This is an unreasonable assumption, since alcohol involvement in traffic accidents differs considerably between sex and age group (Mäkelä, 1998). Therefore we distributed the number of deaths proportionally according to Mäkelä`s (1998) Finnish data on alcohol-related deaths. There is good reason to believe that the Finnish and the Swedish cases of alcohol-related traffic accidents have a similar age and gender distribution.

The applied age distribution gives us no alcohol-related injuries for children under 15 since the Finnish data is for drivers. In order to get an estimate of the number of children injured and deceased in alcohol-related motor vehicle accidents we have chosen to halve the AAF for 15-17 year olds and apply that to the children aged less than 15. This actually raises the number of deaths for motor vehicle accidents with 2 individuals in the calculations. The procedure was chosen in order to have a consequent method in line with other areas concerning children in the report, such as homicide, water traffic accidents, drowning, fires, flames, heat and cold. The AAFs for all injuries in motor vehicle accidents are calculated through the original number of deaths for motor vehicle accidents (see below on injuries). This procedure was not appropriate regarding drinking driving deaths, since the consequences of adjusting the number of deaths could be substantial. The AAFs for children under age 15 in Table 3.10 were thus not applied in the calculations regarding drinking driving in Table 5.13. The dark figures in this area is however large and it is also possible that for example drunken pedestrians or bicycle drivers cause traffic accidents without being involved in the consequences of the accident themselves. The number of deaths in motor vehicle accidents and drinking driving related accidents is either way most likely an underestimate.

Injured
The AAF for those injured in road traffic accidents has been calculated at 14.1%. This AAF derives from the method used in Rehm et al. (2004 and 2006), where the AAF for mortality is multiplied by 2/3. The Finnish AAF for injured was 13.7%; we therefore assume that the AAF for injuries is the same as for severe injuries. The age and gender distribution is estimated from the Mäkelä (1998) distribution, using the same method as for mortality.

Table 3.10. AAFs for motor vehicle accidents and drinking driving related accidents resulting in deaths and injuries by sex and age.

	Age						
	0-14[5]	15-17	18-29	30-49	50-64	65-79	80+
Men							
Motor vehicle accidents							
Deaths	0.19	0.38	0.36	0.38	0.23	0.03	0.03
Injuries	0.06	0.13	0.26	0.26	0.21	0.07	0.08
Drinking driving accidents							
Deaths	0.17	0.33	0.30	0.33	0.18	0.03	0.04
Injuries	0.07	0.13	0.24	0.22	0.17	0.03	0.04
Women							
Motor vehicle accidents							
Deaths	0.07	0.14	0.13	0.10	0.05	0.00	0.00
Injuries	0.03	0.06	0.06	0.02	0.02	0.00	0.00
Drinking driving accidents							
Deaths	0.07	0.14	0.10	0.10	0.05	0.00	0.00
Injuries	0.02	0.04	0.05	0.02	0.02	0.00	0.00

[5] AAF for drinking driving deaths thus not applied for 0-14 year olds in table 5.13.

3.3.4 Homicide

As mentioned and shown above (see Table 3.9), this study employs the AAF from Mäkelä (1998) for mortality from homicide which, in a Swedish setting, gives an aggregated AAF of 50%. For morbidity from assaults etc., we have chosen not to adjust the figures as recommended in Rehm et al. (2004, 2006), i.e. using 4/9 of the mortality AAF as morbidity AAF. Instead we use the estimations from the crime section (see 4.3.4), indicating that 40% of all non-fatal violent crimes is alcohol-related. The gender and age proportion from Mäkelä's study is used and the AAF is adjusted so the aggregated AAF is 40% for each medical care level (inpatient, outpatient and primary care). This implies that the AAF for a specific age and gender category might be different for different medical care levels, as a result of different age and gender distributions.

4. METHODS AND MATERIAL

4.1 Health care costs

Disease-specific attributable fractions, differentiated by age, sex and consumption group, are used for calculating the number of care episodes (cases) that can be attributed to alcohol consumption. The average disease-specific cost is multiplied by the number of alcohol-related cases to arrive at the health care costs attributable to alcohol.

4.1.1 Inpatient care

Information regarding the number of inpatient cases is taken from the Swedish national inpatient discharge register, while the costs are taken from the Skåne Region and Stockholms läns landsting (SLL; Stockholm county health authority). These two large Swedish administrative districts for health care collect data where each inpatient care episode is assigned a cost. The actual cost of each inpatient case is unknown in both areas, as the costs are determined by an administrative process which results in "shadow-prices". For Region Skåne the diagnoses are weighted by the total cost for the relevant ward, clinical department or hospital for each year (Region Skåne, 2003). Every inpatient episode is assigned a DRG-code which has a certain weight, called DRG-points.[6] The total number of DRG-points for a ward/clinic is summed and related to the total costs for that ward/clinic, giving a certain cost per DRG-point. These are later summed to attain the cost per DRG-code, which are the costs used for calculating the average cost per diagnosis in this study. For a small number of wards/clinics not using DRG-codes especially in psychiatric care, the costs are calculated using the ward's/clinic's average/standard cost per care day. Some costs to the healthcare system are not included, for example costs for central administration and research.

A similar method for establishing costs for each inpatient episode is used in Stockholm. The cost is based on the DRG-code, which has a certain number of DRG-points attached to it according to a "price" list (VAL, 2005).[7] Every DRG-point is then priced by a standard value, which however might differ between hospitals. Some additional costs are added to the DRG-code cost if the inpatient episode carries extraordinary costs, for example longer hospitalization or intensive care. The definitions of the disease-specific costs from the two health care regions are similar, both in actual cost and in concept. There is no obvious trend in the differences that exist between the datasets, and since neither of the methods to achieve "shadow-prices" can be said to be preferable to the other, the two datasets are merged and average costs are calculated using information from both administrative areas. The average costs are calculated without differentiating for gender or age. One reason for this is that the number of cases for each category would in many cases be too few to render precise average costs (i.e. keeping the confidence interval as narrow as possible). Another reason is that there should be no policy attention to differences in health care costs between population groups, according to health care policy. A total of 2,026 observations (<0.8%) are excluded when calculating average costs because of missing values, i.e. missing costs. The above method was not applicable to most diseases related to pregnancy, so an average cost for specialised somatic inpatient care is used. The cost is calculated in

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[6] DRG refers to Diagnosis-Related Groups, a coding of conditions based on ICD-type diagnoses according to the average cost of caring for cases in the group, see (www.socialstyrelsen.se/Om_Sos/organisation/Epidemiologiskt_Centrum/Enheter/CPK/NordDRG.htm)

[7] VAL is the name of Stockholm County Council's databases for the quasi-market transactions between purchasers and providers within the county council.

the same manner as for outpatient and primary care below and is adjusted for type of care episode. It sums up to SEK 33,762 per inpatient somatic care visit, and only affects very few cases.

4.1.2 Outpatient and primary care

The costs for outpatient and primary health care are estimated as for inpatient care, i.e. by taking the number of alcohol-attributable cases and multiplying them by a cost per case. The cost is a standard cost per care episode weighted for different resources used for different types of episodes and medical personnel. The calculations are based on the information on cost and visits supplied by Landstingsförbundet (Landstingsförbundet, 2003) for the year 2002 and sums up to SEK 2,135 for an outpatient care and SEK 1,485 for a primary care episode. The total number of cases in outpatient and primary care is based on data from Västra Götalandsregionen, an administrative area where a project has been running for several years for coding outpatient and primary care according to the ICD-10 codes. Although the project's coverage rate is increasing each year, it is still rather low for the year 2002. This is the reason why, for primary care, data from 2003 are being used instead. The coverage rate of coding diagnoses in the data material used is 26.9% for primary care and 45.0% for outpatient care, the latter for the year 2002. The low coverage rate makes it necessary to adjust the number of cases. It is therefore assumed that the population with missing diagnoses has the same distribution of diseases as the population with registered (known) diagnoses as well as other characteristics. To arrive at the national number of cases, the adjusted Västra Götalandsregion data is divided by 0.1686 (which is the proportion of the Swedish population living in the Västra Götalandregionen as of November 1st 2002).

4.1.3 Total gross healthcare cost

As mentioned above, the medical care (inpatient, outpatient and primary care) costs will be presented as total net costs, i.e. cost after deduction of the cost reductions following protective effects of alcohol consumption. However, this cost will also be divided into gross cost and gross cost reductions, i.e. costs are also presented without adjusting for protective effects. Gross cost reduction (the beneficial effects of alcohol consumption) is also presented in the same manner. There are some methodological problems with such a division of the total net cost, primarily as some diseases have both harmful and beneficial effects, depending on alcohol consumption level. Two methods are available for calculating gross cost and gross cost reduction for these diseases: 1) set the protective effects to one (i.e. RR=1 if RR<1) to calculate the costs and vice versa for calculating the cost reductions, and 2) calculate the cost per consumption group. Both methods have certain flaws: the first changes the reference group, causing the results to be biased, while the second gives higher attributable fractions, resulting in higher costs and cost reductions. Both methods will be used and compared. Because of the methodological problems, the divided gross cost and gross cost reductions will not sum to the total net cost as they should. However, the difference is minor.

4.1.4 Pharmaceuticals

The alcohol-related pharmaceuticals are defined according to the WHO ATC-classification system (www.whocc.no) where N07BB is the code for "Drugs used in alcohol dependence". Use of other drugs that are not included in this code but could be expected to be partly alcohol-related, i.e. medication for all those diagnoses listed in Tables 3.8 and 3.9, are not included in the estimation. The reason is the difficulty of defining the AAF for each pharmaceutical, a problem that certainly will lead to an underestimation of the total alcohol-related cost of pharmaceuticals. However, cost of pharmaceuticals used in inpatient care or during a health-related visit is included in the cost of treatment above. Thus, this section estimates only cost of sales of pharmaceuticals. Information on sales is available through the Swedish pharmaceutical monopoly, Apoteket AB (www.apoteket.se), for the year 2003. Only marginal changes, if any, in sales took place between 2002 and 2003 (Apoteket, 2004), we therefore deem it appropriate to use the 2003 data for our study year 2002. The valuation of the drugs is the sales price excluding VAT.

4.1.5 Co-morbidity

In the cost-of-alcohol context, co-morbidity is regarded as the extra medical care cost incurred by patients with concurrent alcohol problems. The calculation of co-morbidity will be an extended version of the method used in Single et al. (1998). The costs are calculated as the excess number of bed days for treatment of patients for each diagnosis (ICD-10 three digits), comparing patients with alcohol-related secondary diagnoses with patients with no alcohol-related secondary diagnoses. The co-morbidity cost is thus calculated by taking the average difference in length of stay times the number of cases with an alcohol-related co-morbidity. This excess in care days will be valued according to the average cost divided by the average length of stay per diagnosis. However, only cost data from Region Skåne will be used, since the costing method of Stockholms läns landsting might partly adjusts for inpatient episodes that carry extraordinary costs. For 10 diagnoses costs are missing, and instead the average cost of the disease chapter is used. Co-morbidity is defined as having a secondary diagnosis that is fully attributable to alcohol, and the analysis will exclude all episodes where the main diagnoses have a causal link to alcohol (see the diagnoses in Table 3.8).

4.1.6. Non-state funded health care

Non-state funded health care is rare in Sweden, but many employers are financing employer assistance programs (EAP [Företagshälsovård]), i.e. non-acute medical care services supplied through the workplace. The EAP handles some alcohol-related activities such as education/advice on alcohol issues for executives and smaller-scale rehabilitation for the employee in case of alcohol problems. The costs for EAP was estimated from a governmental report (Statskontoret, 2001), which described the total costs for EAP in Sweden in the year 2000 and also presented an estimate of the forecast increase in cost for the year 2001. We assume that the forecast increase took place both in 2001 and 2002. The proportion of different kinds of activities in the EAP was reported, as well as the proportion of rehabilitation cases for different kind of problems. The proportions were quoted for alcohol and narcotics combined, so we assumed that around half of the combined proportions are alcohol-related.

4.2 Social services

There is no regular documentation of costs within the social services that are specifically related to alcohol. The total yearly cost for various forms of measures and treatment of alcohol or drug abuse among adults are indeed presented in yearly reports (e.g. National Board of Health and Welfare, 2004), but the expenditures for alcohol and for drug cases are not separated. Further, costs for measures directed to younger people (<21), related to drinking problems in the family are concealed in the overall costs in the area “Child and youth welfare” [Barn och ungdomsvård], with no specification of how many cases are alcohol-related. These statistics cover expenditures for various inpatient as well as outpatient measures and include also administrative costs. In order to estimate costs related to alcohol from these statistics we draw on findings from the so-called IKB-study, where clients in different kinds of treatment, including social services, are examined. This study is carried out every second year, and since no data was collected in 2002, we decided to use the data collected in 2001 (National Board of Health and Welfare, 2003). The report gives, among other things, information about the main type of substance use among almost all clients in treatment in Sweden during a single day (April 1, 2001), and the fraction treated for alcohol problems within social service is then applied to the total costs presented in the above mentioned yearly reports. Alcohol-related costs within “Child and youth welfare” are more difficult to estimate, since this work to a larger extent is related to other social problems than alcohol and drugs and since involvement of alcohol and drugs are not mentioned in the statistics. We therefore refer to a review of studies with information on various problems (including alcohol and drugs) among parents and children involved in investigations carried out within this area (Sundell & Egelund, 2000). The average proportion of cases involving alcohol and/or drug problems in these studies is then used in the estimation and this fraction is in turn adjusted with the alcohol fraction found in the IKB-study.

4.3 Crime

4.3.1 Different categories of costs

In previous English studies (Brand & Price, 2000; UK Cabinet Office Report, 2003) crime costs have been classified into three different categories. These are costs that arise in anticipation of crime, costs resulting from consequences of crime and finally costs attributed to responses to crime. Costs in anticipation of crime may well constitute the category that is most difficult to calculate. The English studies have, however, mainly included one type of cost, namely those related to preventive measures associated with property crime. At the theoretical level, there are several different types of cost that might be considered in this context, including everything from additional security officers to the installation of alarm systems and additional protective barriers and locks of various kinds. Since it is extremely difficult to estimate the proportion of the work of the security industry directly focused on crime prevention, and given the general lack of data in the field, costs of subscriptions to burglar alarms in private homes are the only costs included. This cost has been attributed to responses to crime.

We have thus only included, in the presentation of results, the two latter categories of costs: consequences of crime and responses to crime. Consequences include healthcare costs resulting from personal injuries and the loss of productivity for victims of homicide. Another consequence is the loss of productivity for victims of assault and injured in drinking driving related accidents. This cost was however not possible to separate from other accidents and injuries included in the productivity section. Consequences of crime also include the damage to and destruction of property resulting from arson and vandalism. The costs resulting from thefts fall within this category. Also included in consequences of crime are productivity losses due to early deaths from drinking driving and health care costs for the injured in drinking driving-related motor vehicle accidents. Drinking driving costs are however presented separately, and the costs are included in other parts of the report. Some studies also include other costs for drinking driving, such as damaged property. This has not been calculated in this report.

Responses to crime involve costs that are borne primarily by the justice system in the form of police investigations, convictions and sanctions in the form inter alia of prison sentences. The information on the costs primarily derives from crime statistics and annual accounts for the Police and the Prison Service. Regarding "police investigation" costs, the National Police Board presents accounts for various categories of crime. The Swedish police organization, like the Prison Department, is under state authority and its services are paid for by the state. According to a British study (Harries, 1999, p.2), the costs associated with criminal proceedings and courts amount to approximately one third of total criminal justice expenditures, with the remainder being accounted for by the police. These proportions are assumed to be accurate also in Sweden and have therefore been used in the calculation for costs of 'procedure' and courts. The prison costs are calculated on the basis of the National Prison Board's annual accounts. The cost for an average prison day is 1,700 SEK (Kriminalvårdens årsredovisning, 2002), giving a figure of 51,000 SEK per month. The loss of production among persons serving prison sentences has been calculated at 35,035 SEK per person per month.[8] Another two costs are included: the administrative costs for insurance, and costs related to detecting drinking driving with breathalyzers.

4.3.2 Some particulars: registered crimes, thefts, insurances and vandalism

As regards the victims of violent crime, information on homicides has been drawn from the cause of death registry. This is due to the fact that the police statistics in this area have shown themselves to be very unreliable (BRÅ, 2004). There are a number of options in relation to other forms of violent crime. One option is to utilize information on offences reported to the police, whereas another would be to

[8] This cost is calculated on the basis of a male aged 30-49 years, see Table 4.6.

use data from victim surveys, which in Sweden are conducted by Statistics Sweden (SCB) within the framework of the ULF project (Statistics Sweden, 2004a; Statistics Sweden, 2006). This latter source also includes data on what is known as "hidden criminality", i.e. crimes that are not reported to the police and therefore not registered. The source best suited as the basis for cost calculations depends on the type of costs one is trying to estimate. Since we have chosen to focus on what might be termed "tangible costs" we can move directly onto crime that has resulted in a need for care provision, which expresses itself in health sector statistics. Healthcare costs have also been calculated in the relevant section of the project, but are also shown in the presentation of crime results. By employing this approach it becomes possible to achieve a reasonable course of action in the choice between "registered" and "actual - total" violent crime, since health care data also capture those violent crimes that are not reported to the police.[9]

Costs resulting from property lost as a result of vandalism and theft offences are somewhat difficult to estimate. One method of estimating these costs would be to follow Brand & Price (2000) and employ data from national crime victim surveys. However, these only cover the costs incurred by private individuals, and in the case of Sweden, victim surveys do not investigate the value of the property stolen or destroyed, which is probably due to the very high level of insurance coverage in Sweden. To the extent that a thief enjoys or realizes the full value of the article stolen, a theft might be regarded as a transfer, and the value of the goods is thus not included in the cost calculations. However, stolen items are typically "fenced" or otherwise disposed of at much less than their full market value, and the difference between this disposal price and the full market value can be treated as a social cost. We have used a method based on Collins & Lapsley (2002) which resulted in a reduction of the cost of 43%. This percentage is based on the estimate that property on a stolen goods market will raise about 30% of its new value whereas on a legitimate second hand market the price would be 70% of its new value. Since insurance companies payout claims represents the value of the item at the time of the theft, the social cost has been calculated by the difference between the two prices divided by the price the rightful owner would gain by selling the item. In other words, thefts cause social costs of about 57% of the value of the property stolen at the time of the theft.

Considering the lack of data on thefts, we have used the payouts from insurance claims by the insurance companies with an AAF of 10% (see choice of AAF below) to achieve an estimate of the alcohol-related social cost in connection with burglaries and thefts. The payouts from insurance companies, however, would not represent the social costs solely but also include the transfer costs. Another difficulty with our data is that the figures we received regarding payouts for burglaries include both payouts for stolen items and for damaged property during the burglary. Damaged property represents a social cost whereas the stolen property, as mentioned before, consists of both transfer costs and social costs. We have therefore used the proportions in Brand & Price (2000) between the value of stolen and damaged property during a burglary. 32% of the total cost due to burglary represented damaged property. This means that we have kept 32% of the alcohol-related payouts for burglaries as social costs and the remaining sum is reduced by 43% as mentioned above. Concerning vandalism offences, calculations made by the local authority in Stockholm on costs relating to smashed windows and graffiti in the city's school buildings (SISAB, 2005) have been employed as the point of departure. In Stockholm, these costs amounted to between 10 and 12 million SEK over the course of a year which has been used as the basis for projecting to the whole of Sweden.Insurance premiums and payouts constitute a transfer in cost of crime studies and should not be counted as a social cost. Thus, only the administrative costs incurred by the insurance companies should be included in the cost-of-crime calculations (Brand & Price, 2000 p.18).

[9] When it comes to responses to crime, the crimes of relevance are of course primarily those recorded by the police.

4.3.3 Intangible costs

When it comes to calculating costs resulting from crime, one has to make a number of choices. There are types of costs that as a result of their nature are particularly difficult to calculate. These include, for example, how one is to relate to the issue of the fear and worry created by crime in society. Lack of suitable data prevents us from including these quality-of-life losses arising because of fear of crime. Another issue is the "emotional costs" associated with the loss of quality of life that result from crime. These may involve what is known as "pain and suffering" and "insult and humiliation" etc., but also the experience of losing a relative. Losses of this kind may for example constitute ground for compensation and might also result in the payment of compensation by the perpetrator of the offence, as well as by state agencies dealing with criminal injuries. It has been found, however, that the values placed on costs of this type vary dramatically not only between different countries, but also between different sectors within one and the same country. Furthermore, there are several ways of estimating emotional cost. In a recent article by Dolan et al. (2005), a method for estimating the quality-of-life losses for victims of violent crimes was developed. In this study, the quality-of-life losses for victims of crimes are valued in QALYs, following the methodology in the UK cost-of-crime-study (Dubourg et al., 2005) (see section 5.6.4).[10]

4.3.4 Choice of relevant types of crime and AAF

One important question is which categories of criminal offences are to be regarded as relevant for an analysis with a focus on alcohol's significance for crime. This choice has been made on the basis of the frequency and costs of different types of crime and also on what is known about the significance of alcohol for these crimes.

Drinking driving

In the choice of relevant crimes the most obvious one is drinking driving offences, which are irrefutably alcohol-related and which also generate the largest number of alcohol-related deaths resulting from crime. The data used is the Swedish register of causes of death from Statistics Sweden and a report from the Swedish Road Administration (Lindholm, 2004). In order to calculate the number of deaths as a result of drinking driving, drunken pedestrians and bicycle drivers should be removed from the total since these are not crimes. There were 462 people who died in motor vehicle accidents, and out of these 85 individuals died in accidents where alcohol had been involved. The AAF for drinking driving resulting in deaths is then 18.4%. However, in the calculations using AAF, this figure had to be adjusted to 17.7% because of a database problem: it was not possible to subtract those individuals who die in road traffic accidents not involving drinking driving from the cause of death statistics, where all deaths from road traffic accidents are included. The number of alcohol-related deaths remains the same in doing so. The age-specific AAFs have been adjusted according to the lower adjusted AAF. Based on the calculations made by Mäkelä (1998), we distributed the number of deaths proportionally according to the Finnish data on alcohol-related deaths by gender and age groups (see 3.3.3).

The AAF for injury in road traffic accidents has been calculated as 11.8%. This AAF is obtained by multiplying the adjusted AAF for deaths, 17.7%, by 2/3, following the procedure of Rehm et al. (2004 and 2006), to account for the higher risk of mortality in alcohol-related traffic accidents as compared to the morbidity. Usually one only looks at the severely injured in alcohol-related road traffic accidents, but since the AAF calculated came so close to the Finnish AAF for all injuries, we chose to include all injuries. For the age and gender distribution, the same method as for the deaths has been used, i.e. based on the findings reported by Mäkelä (1998). In other words, this means that we are applying the distribution by age and sex of the deceased to the injured. The applied age distribution gives us no alcohol-related injuries for children under 15 since the Finnish data is for drivers. In order to get

[10] Both the English and the Norwegian study referred to included "emotional costs" valued in monetary terms, which also involved them to attempting to estimate the costs of "hidden criminality". This approach leads to dramatic differences in costs and in part explains why these studies arrived at much higher estimates specifically in relation to "consequences of crime".

an estimate of children injured due to an intoxicated driver we have chosen to halve the AAF for 15-17 year olds and apply that to the children aged less than 15.

Violent crimes

The next category for consideration is violent crimes, where we have a relatively well-founded understanding of the significance of alcohol (Kühlhorn, 1984; Rying, 2000). The AAF refers to the proportion of violent crime where alcohol played a decisive role in the offences being committed. The point of departure for this type of calculation is the proportion of perpetrators and/or victims under the influence of alcohol at the time of the offence. This proportion usually lies at around 70-80% for violent offences reported to the police (Wikström, 1985). Against this background, one approach would simply be to take this proportion and estimate the number of alcohol-related violent crimes as corresponding to this percentage.

Using the proportion of offenders under the influence of alcohol in the crime situation to calculate an AAF is problematic, however. The existence of a statistical relationship does not per se constitute a causal effect. Therefore other scientific approaches have been used, such as time series analyses. This method is better adapted to conducting a causal analysis, and it has been found that alcohol probably played a decisive role in the commission of the offence only in approximately half of such cases (Lenke, 1990). This method includes controls to ensure, amongst other things, that the correlations found in time series estimates are not the result of a common background variable. This approach has also been recommended by Room & Rossow (2001), and was applied in the cost-of-alcohol study conducted by the UK Cabinet Office Strategy Unit (2003). This approach has been used with Swedish data by Lenke (1990) and Norström (1998). On the basis of Swedish data, Norström (1998) has calculated the AAF for assault offences at approximately 40% and for homicide at approximately 50% (rather than about 70-80% as indicated by alcohol influence in the offender and/or the victim).

Rape, arson, vandalism and violence against public servants

There are a number of other offence types, such as violence against public servants, rape (Brå Rapport 2005:7), arson (Andersson, 1995) and vandalism (Roos, 1986), where a substantial proportion of the offenders are under the influence of alcohol at the time of the offence. These crime categories should therefore be included in the calculations, but estimates of their respective AAFs are very uncertain. In the case of arson, there is information recorded for those offences that are solved, specifying the proportion of offenders that were under the influence of alcohol. This proportion was found in a previous study to be approximately 30% (Andersson, 1995), which has been employed in the calculations. For the remaining offence types (Roos, 1986 for vandalism, Brå-Rapport 2005:7 for rape) the proportions are larger than this, and the AAF has therefore been assumed to be the same as for violent offences, i.e. 40%.

Theft

For other offence types, however, no calculations of the AAF have been conducted in Sweden, inter alia in relation to the very large category of theft offences. As regards these offences, it is known that they are nowadays much more commonly drug-related than alcohol-related. At the same time, there are several indications that both alcohol abuse and being under the influence of alcohol also play a significant role in crimes of this kind. In the USA, Canada and the UK, data collected by means of interviews with arrested offenders have therefore been used in relation to this type of crime. Those arrested for offences have been asked to what extent they were under the influence of (drugs and/or) alcohol at the time of the offence, and also to what extent they judged alcohol to have been a decisive factor in relation to their committing the offences in question (Pernanen et al., 2000, p. 13; Pernanen et al., 2002, p. 86). With the assistance of such methods, AAFs for theft offences have been estimated to be approximately 20% in these studies, and the calculation of alcohol-related costs has been based on this figure. A complication arises in that one cannot proceed from an assumption that the AAF is proportional to the value of what is stolen.[11] Robberies and burglaries that are carried out on a professional basis involve much greater costs than offences committed by alcohol abusers or youths acting under the influence. Similarly, the value of stolen cars is undoubtedly highly skewed, so that the theft of a small number of new cars carries much greater value than the theft of a much larger number of older vehicles that are taken for use rather than to capture the value of the car. Against this background, the AAF for these types of crime has been specified for the purposes of the current study at a lower level than that of the AAFs employed in the English and Norwegian studies, at 10%.

Public drunkenness

The last category is public drunkenness (no longer a criminal act, but instead involving the police in the task of bringing the drunken person into a safe environment). In 2002, the police brought 44,000 persons into care or custody with reference to the LOB Act (CAN, 2004, Table 38). The costs for this activity are not specified in the annual accounts of the National Police Board (RPS, 2004). A UK Cabinet Office study estimated the average cost of such interventions in England to be around SEK 1,500 (UK Cabinet office report, Annex XXVIII, 2003), an estimate that is assumed similar to the Swedish costs, and thus also employed in the current study.

4.3.5 Quantification and measurement

When it comes to calculating the social costs of alcohol-related crime, there are a number of different possible approaches, each of which makes different demands in terms of data and data sources. The method employed in the current analysis is modelled on the English studies referred to earlier. These studies also provided the model for the Norwegian study conducted by Gjelsvik (2004). The current study deviates from the English model in a number of respects, however, as a result of the lack of a Swedish data set corresponding to the extensive material produced in the project "The social costs of crime" (Brand & Price, 2000). For the current project, this has meant that the costs for the different categories, consequences of crime and responses to crime, have been calculated individually, without attempting to calculate an average cost for each type of crime, as was the case in the English study. One advantage with the approach employed in the current study is the simplification that is achieved by avoiding having to estimate the size of the “dark figure” of unreported crimes for different offence types. It also means that one does not at the outset have to decide which types of costs are to be included in the “average cost” for each type of crime. This argument will be framed in more concrete terms for each category of costs in connection with the presentation of results. To take one example, measures of “actual” crime (as against police-recorded crime) are relevant in relation to the calculation of costs that arise as a consequence of crime, but the police and the justice system investigate and respond only to those crimes that are reported to them.

4.3.6 A comparison of estimated AAFs with AAF in UK Cabinet office report

As can be seen from Table 4.1, the AAFs from the English study do not deviate greatly from those employed in the current Swedish project. The difference is most notable in relation to “sexual offences”, but this is because the English study includes all sorts of sexual offences, whereas the Swedish AAF is based on rape (BRÅ-Rapport 2005:7). A crime like rape involves more violence than less aggressive sexual offences, hence the higher alcohol involvement. Since many crimes have been excluded from our study, based on the fact that the correlation between other types of crimes and alcohol involvement is less established, the costs could possibly be underestimates.

[11] See Knutsson (1979, p. 27) on the subject of the skewed distribution of the value of items stolen in connection with residential burglaries.

Table 4.1. AAFs used by the UK Cabinet Office and AFF used in current study

Crime	AAF used by the UK Cabinet Office, Strategy Unit	AAF used in this study
Violence against person	0.37	0.4
Sexual offences	0.13	0.4
Robbery	0.12	Not included
Burglary	0.17	0.10
Theft & handling stolen goods	0.13	0.10
Fraud & forgery	0.16	Not included
Criminal damage	0.47	Not included
Drug offences	0.19	Not included

4.4 Research, policy and prevention

The first step in estimating the alcohol costs of research, policies and prevention was trying to identify the agencies involved. The focus has been on the largest and most influential agencies that work on the alcohol issue. The next step was to estimate costs of alcohol-related activities from the different sources. Very few agencies have specific data on their costs classified by their diverse activities. In those cases various assumptions of the alcohol-related costs were made. Overall, the costs are most likely underestimated, as there are a number of agencies that are not included, mainly at the local and regional level, because of difficulties in obtaining data.

4.4.1 Research

Concerning research, comprehensive data was previously collected by Lorraine Midanik, who did a study on biomedicalization and alcohol research in Sweden (Midanik, 2006). Midanik looked at funding for the years 1990-2003. Based on interviews and discussions with people working in the field she found multiple sources. The following agencies were listed in her results.

- → Swedish Research Council (Vetenskapsrådet)
- → Swedish Alcohol Retailing Monopoly Foundation (Systembolagets fond)
- → The Bank of Sweden Tercentenary Foundation (Riksbankens Jubileumsfond)
- → Ministry of Health and Social Affairs (Socialdepartementet)
- → Insurance Companies
- → Vin & Sprit Co.
- → Other foundations
- → National Institute of Public Health (Folkhälsoinstitutet, FHI)
- → Swedish Council for Working Life and Social Research (Forskningsrådet för Arbetsliv och Socialvetenskap, FAS)
- → Traffic Safety
- → The National Board of Institutional Care (Statens Institutionsstyrelse, SiS)

Midanik also found that data from other sources for alcohol research funding were not available. The most important such source is probably research funded by the regional county health administrations as part of general hospital budgets. A recent review of public health research financing in Sweden noted that "the largest volume of Swedish health research is done within the hospitals", with the costs reimbursed to the county councils by the national government. However, as the report notes, "traditionally, these substantial funds have been distributed locally with a relative lack of transparency and accountability" (Kamper-Jørgensen et al., 2004, p. 18), and they were thus not possible to include in the present estimate.

4.4.2 Policy and prevention - national level

Agencies have been selected on the basis of the project personnel's prior knowledge of important agencies in the field. Data have been collected by telephone interviews and from annual reports. In some cases it was not possible to get the exact costs specified for alcohol. Estimates were done either by the contact at the organisation or by the research team. There is a risk of double counting, since many of these agencies are handling resources among and between each other. It became clear that it is hard to get data on this subject within the time of the project, since the area is complex. An obvious source on the national level is *The Alcohol Committee* (www.alkoholkommitten.se), from which data is drawn (personal communication with the Ministry of Social Affairs, October 2005; Governmental letter - Committee report 2004/05:103). Another source on the national level is *The National Institute of Puplic Health* (Nils-Eric Tovesson, The National Institute of Public Health, FHI, pers. com January 2006). In addition, figures were obtained, from *The National Board of Health and Welfare*. State grants to non-governmental organisations (NGOs) and other actors in the preventive alcohol- and drug sector were included (Socialstyrelsen, 2003). Many of the grants were given to projects that dealt with both alcohol and drugs. On the basis of informed advice, we assumed that 60% of the combined alcohol and drugs grants are alcohol-related (Ulf Malmros, The National Board of Health and Welfare, pers. com. Mars 2006). For *The Swedish Council for Information on Alcohol and other Drugs* (CAN), 50% of the costs were assumed to be alcohol-related: however the assumption was by no means self-evident (Björn Hibell, CAN, pers.com November 2005). All figures were collected from their annual report 2002 (CAN, Annual report 2002). Note that costs on the national level are difficult to separate from costs on the regional and local level.

4.4.3 Policy and prevention - regional level

On the regional level data includes activity from *The County administrative board*.[12] Since there are 21 counties we tried to find information at the National Institute of Public Health. Data could only be found from 1999 at the latest: these were employed on the assumption that no major changes happened in the field between 1999 and 2002 (Alkoholinspektionen, 1999).

4.4.4 Policy and prevention - local level

Concerning the costs for school activities (ANT, alcohol, drugs and tobacco education, student welfare) in the municipalities, data have been collected for the year 2003 by the National Board of Health and Welfare (Hansson, forthcoming). The costs are most likely about the same in 2002 and therefore the figures from 2003 are used in this study. Since the ANT education is not only about alcohol, we made an assumption that at least 50% of the costs were alcohol related. Costs for *supervision for on-premise alcohol licenses in the municipalities* are also included. An estimate of all wage costs was carried out for the whole of Sweden, based on a report that included percentages of work hours on the issue (Eriksson & Fonden, 2006) and wage statistics (Statistics Sweden, 2003a).

4.5 Productivity costs

4.5.1 Lost production because of mortality

The data material is the Swedish Cause of Death Register (dödsorsaksregistret) from the National Board of Health and Welfare (Socialstyrelsen). The number of deaths attributable to alcohol will be estimated by applying the relative risks and attributable fractions reported above to the total number of deaths in Sweden during 2002. The number of life-years lost will be reported as the number of poten-

[12] The County Administrative Board is a supervisory authority. They provide training in the laws and rules (related to serving of alcohol at restaurants) to municipal employees. (www.lst.se/lst_e.PDF)

tial years of lost life (PYLL) defined as the difference between average life expectancy at the time of death and the age of the premature death (Statistics Sweden, 2002a).

4.5.2 Lost production because of early retirement

We decided to make estimations of productivity losses due to alcohol for newly-granted early retirements for men and women in the age group 18 to 64, using the same disease risk functions as for inpatient care diagnoses. Calculation of costs could be assumed to be similar to early deaths (no gainful work in the future). However, an early-retired individual continues to contribute to non-market production in the domestic sphere. Moreover, an early retirement in Sweden can be granted at various levels (25, 50, 75 or 100% reduced working capacity), and a decision can be re-evaluated in the future. Therefore, we assumed the loss of production as the mean level granted for the gender-, age- and disease-specific subcategories described elsewhere in the present report (chapter 3).

The distribution of diseases leading to reduced working capacity and early retirement is considerably different from such distributions for inpatient care and causes of death. The leading causes for early retirement are diseases of the musculoskeletal system and mental diseases (Skogman Thoursie et al., 2004). In most of these diseases the role of alcohol has not been thoroughly analysed. High alcohol consumption has been found to be an underreported causal factor for an early retirement in Sweden (Upmark, 1999). Although heavy drinkers have the highest risks of early retirement, we should also acknowledge that abstainers tend to have higher such rates than low to moderate drinkers (Upmark et al., 1999), probably reflecting a “sick quitter” effect (Shaper et al., 1988). The analysis on early retirements is based on registry-linked data. It includes all cases newly granted early retirement that were given a primary and a secondary ICD-10 code in the year 2000 (a small share (3.1%) had ICD-9 codes), and also uses information on income in the prior 5-year period, 1995-99. The linkage was made possible through personal identification numbers.

A limitation of the classification of diseases causing an early retirement is that the most detailed level of the ICD-10 codes are not used. This makes it a particular analytic task to determine the proportion of alcohol-related cases for pseudocushing syndrome (E24), degeneration of the nervous system (G31), polyneuropathy (G62), myopathy (G72), cardiomyopathy (I42), gastritis (K29) and problems related to lifestyle (Z72). These diseases/conditions were first grouped under “non-specific coding”. Cardiomyopathy was the greatest subgroup (49% of the male and 37% of the female cases, respectively). We attempted to assign AAFs for this group of diseases on the bases of the reported share of the specific alcohol-related code as a cause of death in each of the above diseases for men and women in various age groups (National Board of Health and Welfare, 2002). This was most relevant for the proportion of alcoholic cardiomyopathy and alcoholic gastritis in the group of cardiomypathy and gastritis, respectively. This procedure revealed a relatively high proportion of alcoholic cardiomyopathies among men (35%) and women (20%), but lower for gastritis (20% in men and 10% in women). The remaining diseases (E24, G31, G62, G72, Z72) could not be included because no AAF could be estimated (alcohol was not mentioned as a specific cause of death in these categories).

4.5.3 Lost production because of long-term sickness absence

Lacking current and appropriate data, we base the estimates for long-term sickness absences (absences longer than 14 days and paid by the national sickness insurance) on the early retirement data. We thus assume that the long-term sickness absences have a similar disease structure as early retirement. We should observe that there probably are some differences in the conditions leading to an early retirement as compared with long-term sickness absence, but a majority of the productivity loss is due to mental or musculoskeletal diseases for sickness absence (55-56%) as well as for early retirement (57-67%) and for men and women alike (Table 4.2).

Table 4.2. A comparison of broad disease structure for long-term sickness absences* and for newly granted early retirements (%)**

	Women		**Men**	
Diseases	Sickness absence	Early retired	Sickness absence	Early retired
Mental	18	19	15	23
Circulatory	3	5	10	13
Musculoskeletal	38	48	40	34
Injuries	11	5	16	7
Other	30	23	19	23
Total	**100**	**100**	**100**	**100**

***** as reported by Lidwall and Skogman Thoursie (2000) for the year 1998.
** by Hemström (2002) for the year 2000

The overall fraction of alcohol-related early retirements by sex was applied to the total number of long-term sick-days. In the period January 1st to June 31st 2002, the National Social Insurance Office ("Försäkringskassan") reported that the total number of absent days paid by the national insurance were 35 million for women and 21 million for men (RFV, 2002). This corresponds to 70 and 42 million days of absence for the whole year, and it was recalculated to productivity years, assuming there are normally 260 working days in a calendar year. The total number of productivity years lost due to long-term sickness absence (paid by social insurance) was estimated to 430,769 years. The sex-specific fractions of early retirement for the different age groups were then used to redistribute the alcohol-related sick-days between the age groups.

4.5.4 Lost production because of short-term sickness absence

The estimate for short-term sickness absence is based on an analysis performed within this study on a large national representative sample of the Swedish population aged 16+ years which was interviewed in 2002. This survey — the Swedish Survey of Living Conditions — is performed annually by Statistics Sweden and includes a large number of areas such as work, family, health, socioeconomic conditions, social relations, health behaviours etc. (Statistics Sweden, 2006). There were a total of around 6,000 respondents in the survey with a response rate of 75%, and 4,562 were in the age group 16-64 years (the relevant age group for sickness absence). Our analysis drew on those that had answered a question on sickness absence as well as questions on alcohol drinking in the last year: 3,335 respondents, or 75% of all aged 16-64. In the survey, there were only two items measuring the respondents' drinking behaviour in the past year: one that estimated the typical frequency of drinking (from daily to abstention) and one that estimated the number of drinks in a typical drinking occasion (linear expression). We mainly used responses to the latter question to classify three groups of alcohol consumers and abstainers (abstention, 1-2 drinks, 3-4 drinks, 5+ drinks) in relation to short-term sickness absence days per year (1-7, 8-24 and 1-24 days).

First, we observed a clearly significant difference between respondents that did work (a necessary condition for having a productivity loss from sickness absence) and those that did not (unemployed, students, early retired or other non-wage earning individuals such as unpaid home workers) in relation to alcohol consumption. A higher share of those that did not work reported abstention (16 vs 6% among men and 22 vs 8% among women) and 5+ drinks as the usual consumption among men (32 vs 20%) and women (9 vs 4%). The consequences of these findings in relation to costs of productivity loss due to sickness absence will be discussed further in chapter 7. Logistic regressions were run in SPSS, comparing the abstainers' probability for absence with alcohol consumers, on several combinations of the alcohol questions as well as stratified gender- and age groups.

Table 4.3. The role of alcohol consumption* for the probability of short-term sickness absence.**

Alcohol consumption (glasses per occasion)	Absence 1-7 days Odds ratios (95% CI)	Absence 8-24 days Odds ratios (95% CI)
Abstainers	1	1
1-2	1.44 (1.06-1.95)	1.07 (0.67-1.73)
3-4	1.35 (0.98-1.86)	1.46 (0.89-2.39)
5+	1.32 (0.92-1.90)	2.46 (1.45-4.20)
N	3 335	3 335
Significance	p = 0.132	P < 0.001

* number of glasses in a usual drinking occasion.
** Men and women aged 16-64 years. Results of logistic regression analyses. Models adjusted for age (linear representation) and sex.

The combined alcohol questions, i.e. the calculated number of drinks during the years, showed no clear tendency, with few significant differences between the alcohol consumption groups and the abstainers. The number of drinks per occasion however revealed a more consistent pattern, with significant differences between the consumption groups (abstainers, 1-2 drinks per occasion, 3-4 drinks per occasion and 5+ drinks per occasion) in the probability of absences for 8-24 days. When the data was disaggregated by age group and gender, however, most of the consistent pattern remained, but the differences between the groups turned insignificant, probably reflecting the relatively small number of individuals in each age- and gender-group. We thus base our estimates of the increased short-term sickness absence for alcohol consumers (defined as the normal number of drinks on a drinking occasion) on the increased probability of absences for 8-24 days, as shown in Table 4.3, even though the uncertainty surrounding the validity of the data must be recognized. For absences 1-7 days there is no difference between the alcohol consumption groups, but, for example, there is an increased probability of absence for 8-24 days of 7% among the low consumers (1-2 drinks) in comparison with the abstainers.

Using the age- and gender-specific prevalence of absence for 8-24 days for abstainers from the survey (see Table 4.4), the ORs were used to calculate the proportion of alcohol consumers that were absent. This was then converted into the increased proportion of the alcohol consumers absent for 8-24 days in comparison with abstainers. Applying the number of people in the consumption groups used throughout this study, we thus obtained the excess number of people that had been absent 8-24 days during the year. Assuming that each person had been absent for an extra 13 days, i.e. the difference between the class middles (3 vs 16 days), and using the productivity costs valuation, we arrive at the total productivity costs because of excess short-term sickness absence, for the different classes of alcohol consumers in comparison with abstainers.

Table 4.4. Prevalence of absence 8-24 days per year for abstainers (% of individuals).

	Per cent absent	
Age	Women	Men
16-29	11.1	5.0
30-49	4.3	6.5
50-64	8.2	25.8

4.5.5 Valuation of productivity costs

The productivity costs are estimated according to the human capital method, a method that assumes no unemployment. The valuation of the productivity costs includes both market (i.e. paid work) and non-market work (i.e. unpaid work), as recommended (Single et al., 2003), and is stratified by sex and age group. The market production costs are calculated until the standard Swedish retirement age of 65 years, while the non-market production is calculated during the individuals' expected remaining life-years, as measured by the PYLLs (i.e. during the expected remaining number of life years at different ages (Statistics Sweden, 2002a). For individuals with sickness absence or early retirement, only the market productivity costs are included, while for mortality also the non-market production is included. The costs are discounted 3% annually, according to Swedish recommendations in cost-effectiveness analyses (Gold et al., 1996; Swedish Pharmaceutical Board, 2003), The market values are taken from official Swedish wage statistics (Statistics Sweden, 2003a), covering all the employed population in both the private and public sectors. The average wages are reported in 5-year age groups, and the average of the corresponding 5-year age groups was used to calculate the average wages for the present study's age groups. Wage taxes of 40% were added to the monthly wages. No adjustments for labour market participation nor productivity on the job were made. No future changes in productivity were assumed.

The non-market productivity costs are based on a study on the time use of the population aged 20-84 years, including 6,218 individuals or households, performed by Statistics Sweden in the years 2000/2001 (Statistics Sweden, 2002b). The study gives a detailed account of the time used in a total of five categories, of which home work is one category, further divided into household work (such as cleaning and cooking), maintenance work, care of own children and care of others, as well as shopping and travelling connected to home work. The study also reports other uses of time but as the time used for voluntary and community work outside the family is difficult to separate from some other time uses, the non-market production as estimated here includes only domestic work. The study results are reported according to family condition, gender-specific and in some cases also age-specific. A number of assumptions were thus needed to calculate the average time used for home work for the age groups in the present study. The proportion of people in different family situations in the age groups were based on two other studies from Statistics Sweden (Statistics Sweden, 2004b; Statistics Sweden, 2005b) and some re-calculations, based on averages, were also needed in order to adjust estimates for the age groups of the present report. Because of lack of data, no time for home work is assumed for children (0-14 years) and adolescents (15-17 years). The time used for home work is thus not a complete estimate, see Table 4.5.

Table 4.5. Time used for domestic work, in hours per day, years 2000/2001.

Age group	Women	Men
0-14	0	0
15-17	0	0
18-29	3.23	2.24
30-49	4.19	2.78
50-64	4.03	3.05
65-79	5.00	4.00
80+	4.32	4.22

Source: Adapted from Statistics Sweden, 2002b.

Table 4.6. Productivity costs valuation, per month, in SEK 2002.

	Market		Non-market*		Total	
Age group	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
0-14	0	0	0	0	0	0
15-17	0	0	0	0	0	0
18-29	24 500	26 740	12 387	8 584	36 887	35 324
30-49	28 700	35 035	16 046	10 666	44 746	45 701
50-64	28 793	36 120	15 443	11 686	44 236	47 806
65-79	0	0	19 163	15 330	19 163	15 330
80+	0	0	16 544	16 160	16 544	16 160
Average, ages 18-65	**27 331**	**32 632**	**14 625**	**10 312**	**41 956**	**42 944**

* valued as low waged-based.

The base case valuation of non-market work is based on the replacement cost principle (also called proxy goods principle; Van den Berg et al., 2004), which states that non-market production should be valued according to the market price of similar services (Gold et al., 1996). The replacement costs principle is also recommended by the international guidelines (Single et al., 2003). It is not clear what the market price of similar services would be, but we use, in the base case, the trade union negotiated lowest wage for cleaners, 126 SEK per hour. In Table 4.6, the productivity cost valuations are detailed.

4.6 Intangible costs

In this study, intangible costs (pain, worries, suffering) are quantified by means of estimating losses in quality-of-life because of alcohol, measured by QALYs (quality-adjusted life-years lost). As mentioned, life length is measured in life-years, with a life-year lived in full health valued as 1. A life-year lived in less-than-perfect health is however valued less, with the value depending on the quality-of-life (QoL). The QoL scores range between 1, indicating a state of perfect health, to 0, corresponding to being dead. For instance, when QoL is valued to 0.9 for a particular year, it corresponds to a loss of 0.1 QALYs during that year. The quality-of-life loss related to alcohol consumption for the alcohol consumers' relatives and friends is based on a survey initiated within this study (Hradilova-Selin, forthcoming). Besides that, the estimates of losses of quality-of-life also include the QALY losses for the alcohol consumers themselves, for some victims of crime and for alcohol-related mortality. The result is reported as the number of QALYs lost because of alcohol consumption in Sweden during the year 2002, where the different QALYs lost have been summed for the total population.

4.6.1 Mortality

The life-years lost because of alcohol-related mortality are valued by average age- and gender-specific Swedish population quality-of-life (QoL) weights, see Table 4.7. They are taken from a study that mapped the health-related quality-of-life instrument EQ-5D[13] on a 1995-96 interview survey (Survey of Living Conditions) of a representative sample of the Swedish general population aged 16-84 years, totalling over 11,000 persons (Burström et al., 2001). The reported age groups are somewhat transformed, mainly by calculating averages, to fit this study's age groups. The QoL for those 0-14 years old is assumed to be 1. As the QoL decreases with age, the QALY value of a life-year lost among the elderly is less than the value of a life-year lost among the younger.

[13] EQ-5D was developed by the EuroQol group, and is one of the most commonly used instruments to measure health-related quality-of-life.

Table 4.7. Average quality-of-life weights.

Age group	Women	Men
0-14	1	1
15-17	0.89	0.93
18-29	0.88	0.93
30-49	0.85	0.89
50-64	0.78	0.80
65-79	0.70	0.77
80+	0.57	0.68

Source: Burström et al. 2001.

4.6.2 Consumers themselves

The QoL losses for the alcohol consumers are taken from a study that measured the population view on QoL for different alcohol consumption groups (Kraemer et al., 2005). The study presented scenarios on alcohol-related health states, with statements such as "...You find drinking alcohol helps you relax and makes social occasions more enjoyable. ..." (p. 543) for the moderate drinker scenario, and "...Even though you know alcohol is hurting you, you can't seem to stop. ..." (p. 543) for the alcohol abuse scenario, to 200 US adults. The respondents were then asked to rate the health state. We use the TTO (Time-Trade-Off)[14] weights, presented in Table 4.8.

The mean ratings for all groups are below 1, which means that on average no group attains a full QoL. However, the ratings might be heavily affected by a few respondents with low ratings, as suggested by the interquartile range which shows that at least 75% of the respondents rated the health states for the two lowest consumption groups as 1. Given the small number of respondents and the conceptual difficulties experienced by some respondents (Kraemer et al., 2005), the mean QoL weight might thus be biased downwards. We instead usethe median QoL weights for the different consumption groups. The average of the ratings of the two categories named At risk-drinking and Alcohol abuse have been assumed to fit this study's consumption group Hazardous consumption. To obtain the QALY losses for the alcohol consumers, the weights are applied to the number of people in the different alcohol consumption groups, to obtain the total number of QALYs lost for the alcohol consumers in Sweden during 2002.

Table 4.8. Alcohol-related quality-of-life weights.

	QoL weight		
Consumption group	**mean**	**median**	**25%-75% range**
Abstinence	0.97	1.00	1.00-1.00
Low consumption	0.94	1.00	1.00-1.00
Hazardous cons.	0.78	0.94	0.53-1.00
Harmful consumption	0.54	0.70	0.05-0.85

Source: Adopted from Kraemer et al. 2005

[14] The TTO (Time Trade-Off) method is one of several methods employed to value health states for QALY measures. The respondents are asked to state the number of years that are valued the same as a certain number of healthy years; i.e. the respondents are asked to trade-off time in different health states. The TTO is one of the recommended methods for QoL valuations (Dolan, 2001).

4.6.3 Relatives and friends of heavy drinkers

Monitoring study

The unique study design of the Monitoring study (see section 3.2.2) makes it possible to include new questions for one or two measuring occasions (i.e. for one or two months). We have made use of the possibility and in October and November 2005, the Monitoring questionnaire was expanded by adding a battery of quality-of-life questions, the WHOQOL-BREF. Also, questions on prevalence of drinking problems among the relatives and friends of the respondent have been asked (see Appendix 2). Thus, 'drinking problems' of these significant others are subjectively defined by the respondents. In this particular analysis only individuals 16-80 years old are included, since this is the target population in the Monitoring data.

WHOQOL-BREF

WHOQOL (http://www.who.int/evidence/assessment-instruments/qol/index.htm) has been constructed in order to measure different dimensions of quality-of-life. Health is defined by the World Health Organization as "a state of complete physical, mental and social well-being, not merely the absence of disease". The breadth of this definition and the emphasis on mental as well as social wellbeing is particularly relevant for this study. Quality-of-life, in turn, is described by WHO as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". Thus, the main idea behind WHOQOL is to measure the quality-of-life subjectively experienced by an individual. The psychometric properties of the instrument are well tested (Skevington et al., 2004) and show excellent reliability and satisfactory validity. WHOQOL is available in 20 different languages and has been constructed in collaboration with 15 research centres around the world in order to reach comparability across different cultures. WHOQOL-BREF is an abbreviated 26-item version of the original WHOQOL-100 (100 items), covering four domains, physical health, mental health, social relationships and environment. Each domain is covered by several items. There is an authorised Swedish translation available, with the Umeå University Department of Nursing responsible for use of the instrument in Sweden.

Besides the WHOQOL-BREF battery (see Appendix 2), a number of follow-up questions have been asked to which the quality-of-life scores are related. The main focus has been on experiences of those who have a close relationship with a person with drinking problems. The hypothesis has been that there is a difference in quality-of-life scores depending on whether you have a relative or friend who drinks too much; for those who do, the experienced quality-of-life is expected to be lower. It is also hypothesised that the kind of relationship has an impact – the closer the respondent is to the drinker in terms of family bonds, sharing a household or not, or frequency of contacts, the more likely it is that the quality-of-life gets affected. The raw scores received from each respondent are then transformed into domain-specific quality-of-life (QoL) scores using a standardized formula. The domain-specific QoL scores range between 0 and 1, where 1 is assumed to be full quality-of-life. Lacking a WHO recommendation on how to obtain overall QoL from the four domain-specific scores, we resorted to calculating the average QoL score from the four scores. In that manner, we obtain an overall QoL score per individual. In the next step, QALYs, i.e. quality-adjusted-life-years, are calculated. The WHOQOL-BREF refers to the past six months and the scores resulting from the responses are considered to indicate the overall QoL during a period of one year. Different groups of relatives and friends (see below) will be compared regarding their quality-of-life and the estimates will be translated into losses of QALYs on the population level, i.e. taking into consideration the estimated population size.

Table 4.9. Quality-of-life losses for victims of crime

	Expected QALY loss
Wounding	0.033
Common assault	0.007
Rape	0.561
Sexual assault	0.160
Robbery	0.028

Source: Dubourg et al. 2005.

4.6.4 Victims of crime

The estimates on the QoL lost for crime victims are taken from the UK cost of crime study (Dubourg et al., 2005). The study reports the expected QALY loss for five different violent crime types (see Table 4.9). The QALY losses were calculated from the probability that a certain violent crime would result in a certain injury, based on injuries sustained in the UK, with a certain QoL loss valuation attached to each injury, as reported by Dolan et al. (2005). The QoL weights were mainly taken from the Global Burden of Disease calculations (and are thus not really QALYs but DALYs).[15] Note that the estimates also include psychological health states, such as for example acute stress disorder, valued at a loss of 0.01 QALY on a full year basis. The expected QALY loss per crime victim was applied to the number of crimes, as reported in the crime section, and summed. All losses were assumed to last for the year. The QALY loss for woundings was assumed to correspond to our combined estimate of woundings and assaults.

[15] DALYs (disability-adjusted life-years) is a measure of the disability caused by diseases, and is the commonly used WHO measure of burden of disease. The DALY measure, just like the QALYs, combines life-years lost with disability during diseased year. Even though the measures seem similar some conceptual differences exist between them, why DALYs are not the recommended health measure within health economics.

5. RESULTS

5.1 Healthcare costs

The total net health care cost due to alcohol consumption, as estimated in this study, sums to 2.2 billion SEK (see Table 5.1). Almost the full cost derives from state funded medical care while employer funded care (EAP) is marginal. These costs are divided below into smaller components, e.g. different types of medical care, as well as different consumption groups. The costs are also presented as gross cost and cost reduction.

5.1.1 Medical care

The total net medical care cost of alcohol-related diseases sums to 2,056 million SEK, derived from 761,600 care episodes (cases) (see Table 5.2 and details in Appendix 5). Inpatient care is burdened by the highest cost, although primary care has almost ten times the number of cases. About 70% of total net cost but only 56% of the cases are attributable to men. More than 94% of the inpatient costs are attributable to men. For costs and cases per alcohol-related diagnosis, by sex and age groups, see Appendix 5.

Table 5.1. Total alcohol-related health care net cost, millions SEK.

Health care	**Costs, Millions SEK**
Medical care	2 056.3
Pharmaceuticals	21.8
Co-morbidity	58.0
EAP	53.0
Total	**2 189.1**

Table 5.2. Alcohol-related total medical costs

	Men		**Women**		**Total**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	31.8	729.2	7.9	44.8	39.7	774.0
Outpatient	197.8	422.4	125.2	267.3	323.0	689.7
Primary	199.6	296.5	199.3	296.1	398.8	592.6
Total	**429.2**	**1 448.2**	**332.3**	**608.2**	**761.6**	**2 056.3**

Table 5.3. Alcohol-related chronic disease medical costs

	Men		Women		Total	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	22.2	334.9	4.6	-88.5	26.7	246.5
Outpatient	113.7	242.8	92.4	197.3	206.1	440.1
Primary	199.1	295.8	199.1	295.8	398.2	591.6
Total	**335.0**	**873.6**	**296.0**	**404.6**	**631.0**	**1 278.1**

Table 5.4. Alcohol-related injury medical costs

	Men		Women		Total	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	9.7	394.3	3.3	133.3	13.0	527.5
Outpatient	84.1	179.6	32.8	70.0	116.9	249.7
Primary	0.5	0.7	0.2	0.3	0.7	1.0
Total	**94.2**	**574.6**	**36.3**	**203.6**	**130.6**	**778.2**

5.1.2 Chronic diseases

Separating the net cost of chronic diseases from the total net cost shows that the cost is 1,278 million SEK for a total of 631,000 cases (see Table 5.3). The highest cost and the greatest number of cases are for primary care, although the average cost in inpatient care is about six times higher. The net cost for women in inpatient care sums to a cost reduction of almost 90 million.

5.1.3 Injuries

Separating out injuries from net cost (see Table 5.4) shows that the cost is 778 million SEK, attributable to 130,600 cases. Very few cases end up in primary care which could in part be due to data deficiency. Instead most cases are in outpatient care, although the highest costs are for inpatient care. Of total injury net cost and cases, more than 70% are from men's consumption. This fraction is insensitive to type of care.

5.1.4 Gross healthcare cost

Gross cost and cost reduction are calculated using the method of setting RR to 1 for the protective effects when calculating the costs and vice versa when calculating the cost reductions (see 4.1.3), resulting in figures that should be seen as an estimation of the true gross cost/cost reduction.

Table 5.5. Alcohol-related gross costs for medical care, chronic diseases

	Men		Women		Total	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	32.8	749.1	16.3	402.9	49.2	1 152.0
Outpatient	141.0	301.0	115.1	245.8	256.1	546.8
Primary	224.3	333.2	234.9	349.1	459.2	682.2
Total	**398.1**	**1 383.3**	**366.4**	**997.8**	**764.5**	**2 381.1**

Table 5.6. Alcohol-related gross cost reductions for medical care, chronic diseases.

	Men		Women		Total	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thou-sands)	Cost (millions)
Inpatient	-10.7	-416.3	-11.8	-493.6	-22.5	-909.8
Outpatient	-27.4	-58.4	-22.8	-48.7	-50.2	-107.1
Primary	-25.3	-37.5	-36.0	-53.4	-61.2	-90.9
Total	**-63.4**	**-512.2**	**-70.6**	**-595.7**	**-133.9**	**-1 107.9**

The difference when using the alternative method is however marginal (see also the discussion in chapter 7), i.e., the results are insensitive to what method is used. We therefore conclude that the possible bias is negligible. Since there are no protective effects of alcohol consumption on injuries, the total gross costs resulting from injury are therefore the same as in Table 5.3.

Cost

Alcohol-related gross medical cost from chronic diseases sum to 2,381 million SEK, attributable to 764,500 cases (see Table 5.5). Inpatient care carries almost half of these costs, while most cases occur in primary care. Fifty-eight percent of gross costs are attributable to men, but only 52% of all cases, indicating a more even gender distribution for gross costs than net cost. The male domination seen for net inpatient costs is much lower for gross costs, about 65%. The total gross cost (chronic and injuries) thus sums to 3,159.3 million SEK derived from 895.0 thousand cases.

Cost reductions

Total cost reductions from alcohol consumption for medical care are 1,108 million SEK, resulting from 133,900 avoided cases (see Table 5.6). Most cost reductions, but the least cases avoided, was found for inpatient care. Women's alcohol consumption shows greater cost-reduction than men's, 54% vs. 47% with about the same proportions for avoided cases. Only for outpatient care are the cost-reductions greater for men.

5.1.5 Cost per consumption group

For methodological issues of division by consumption group see section 3.2.1. Table 5.7 presents the proportion attributable to each consumption group of the alcohol-related net costs, while Table 5.8 shows the actual medical care net cost attributable to each group. A large number of cases are related to the lowest consumption group. This must, however, be considered in relation to the number of individuals in each group and the costs. A division of the cost by age groups as well as gender and consumption groups is presented in Table 5.9.

Table 5.7. Proportion of alcohol-related net cost per consumption group.

	Men			Women		
	Low	Hazardous	Harmful	Low	Hazardous	Harmful
Cases	0.363	0.150	0.486	0.572	0.145	0.283
Costs	0.085	0.241	0.674	0.114	0.298	0.588

Table 5.8. Total net medical care cost per consumption group.

	Men			Women		
	Low	Hazardous	Harmful	Low	Hazardous	Harmful
Cases (thousands)	155.9	64.5	208.8	190.1	48.3	93.9
Costs (millions)	123.3	349.2	975.6	69.1	181.2	357.8

5.1.6 Pharmaceuticals

The cost of drugs used in alcohol dependence (N07BB) amounts to 21.8 million SEK (Apoteket, 2005). This is an underestimation of alcohol-related cost of pharmaceuticals, as costs for drugs for treating alcohol-related cases with drugs not specifically and solely for treating alcohol dependence are excluded. The exception to this is drugs used in direct connection to medical care which are included in Tables 5.2-5.6.

5.1.7 Co-morbidity

The net excess treatment for patients in inpatient care with a secondary diagnosis fully attributable to alcohol but a primary diagnosis not linked to alcohol amounted to 21,900 care days. This totalled to a net cost of 58.0 million SEK to be included to the total cost of alcohol-related health care. The gross cost of co-morbidity amounted to 60.3 million SEK. It was not possible to conduct co-morbidity calculations for outpatient and primary care at this time due to data deficiencies.

Table 5.9. Proportions of cases and costs, differentiated for age, gender and consumption group, based on medical care.

			Alcohol-related cases			
Age group		**Men**			**Women**	
	Low	Haz	Harm	Low	Haz	Harm
0-14	0	0.392	0.608	0	0.289	0.711
15-17	0.107	0.381	0.512	0.144	0.334	0.522
18-29	0.124	0.329	0.546	0.294	0.265	0.442
30-49	0.185	0.186	0.629	0.347	0.187	0.465
50-64	0.375	0.110	0.515	0.550	0.163	0.288
65-79	0.677	0.059	0.263	0.832	0.067	0.101
80+	0.718	0.076	0.206	0.878	0.051	0.071
Average	**0.363**	**0.150**	**0.486**	**0.572**	**0.145**	**0.283**
			Alcohol-related costs			
0-14	0	0.339	0.661	0	0.225	0.775
15-17	0.056	0.389	0.555	0.057	0.330	0.614
18-29	0.068	0.381	0.551	0.121	0.334	0.546
30-49	0.079	0.236	0.685	0.180	0.255	0.564
50-64	0.095	0.181	0.724	0.259	0.253	0.488
65-79	0.170	0.181	0.648	0.214	0.277	0.509
80+	-0.155	0.413	0.741	-1.420	0.165	0.255
Average	**0.085**	**0.241**	**0.674**	**0.114**	**0.298**	**0.588**

5.1.8 Non-state funded health care

The total cost for the EAP in 2002, including non-alcohol-related costs, was estimated at 3,314 million SEK, paid by employers. The share of alcohol in the overall activities was estimated at 1%, as well as 3% of the rehabilitation activities, which in turn formed around 20% of the overall activities (Statskontoret, 2001). The costs are thus estimated to 33 million in alcohol-related activities plus 20 million in alcohol-related rehabilitation, totalling 53 million SEK.

5.2 Social services

5.2.1 Treatment of adults with substance abuse

The social service spent 4 billion SEK in 2002 on various services given to adults aged 21 years and older due to substance abuse (Socialstyrelsen, 2004). One-half of the expenditures, 2 billion SEK, went to institutional treatment (round-the-clock care) and another 100 million was spent on treatment in group homes (Table 5.10). The remaining costs were from various forms of individual needs-tested outpatient care and housing assistance. Examples of outpatient care are: structured day care, individual support, talk therapy and having a case manager. Housing assistance also consists of various different forms like boarding homes, shelters and special apartments where the social service holds the contract.

According to the IKB-study (Socialstyrelsen, 2003), 49% of the substance use clients in social service were treated for alcohol misuse only and 32% for both alcohol and drug problems. Assuming that 50% of the mixed cases were caused by alcohol, we estimate that 65% were spent on various forms of treatment of alcohol misuse in 2002 within the social service. Since it is not possible to get information about the role of alcohol in the various specific treatment measures, we applied this fraction for each kind of treatment service. Summarising these numbers, we get a total of 2.6 billion SEK, of which 1.4 refers to institutional treatment and the rest, 1.2 billion, to non-institutional measures.

Table 5.10. Estimation of treatment expenditures related to alcohol abuse among adults within the social services (millions SEK).

Treatment adults	Total cost for 2002	AAF, percent	Alcohol-related costs
Inpatient	*2 100*	*65*	*1 365*
- institutional treatment	2 000	65	1 300
- group homes	100	65	65
Outpatient	*1 900*	*65*	*1 235*
- housing assistance*	800	65	520
- individual needs-tested care**	600	65	390
- other	500	65	325
Total	**4 000**	**65**	**2 600**

*e.g. boarding homes, shelters and special apartments where the social service holds the contract.
**e.g. structured day care, individual support, talk therapy, case management.

Table 5.11. Estimation of expenditures related to alcohol abuse among children and young people (<21 years) within the social service (millions SEK).

Child and youth welfare	Total cost for 2002	AAF, percent	Alcohol-related costs
Inpatient	*7 000*	*18*	*1 260*
- institutional treatment	4 300	18	774
- family homes	2 700	18	486
Outpatient	*2 800*	*18*	*504*
- needs-tested outpatient care (e.g. contact person/family,)	1 700	18	306
- other (e.g. day care, family centres)	1 100	18	198
Total	**9 800**	**18**	**1 764**

5.2.2 Child and youth welfare

Alcohol misuse in the family is suggested to be one of the most important causes behind child welfare investigations [barnavårdsutredningar] carried out by the social service (Sundell & Egelund, 2000). In 2002, in total 9.8 billion SEK were spent on child and youth welfare [Barn och ungdomsvård] (Socialstyrelsen, 2004). About 70% was spent on institutional treatment and family homes and the rest on various forms of outpatient measures (Table 5.11). To estimate the role of alcohol in these cases we draw on findings in a review of Swedish studies about various problems among parents and children involved in child welfare investigations (Sundell & Egelund, 2000). According to 10 different studies, 10 to 45% of the cases the parents had a problem with drug or alcohol abuse, whereas the corresponding range for youth/children was 0-27%.

While there is no information about to what extent abuse was overlapping between parents and youth we applied only the average estimate for parents in order to avoid double counting, i.e., 28%. Our calculation thus starts out from the assumption that 28% of the cases are related to alcohol or drug abuse. Secondly, in order to estimate the role of alcohol, we apply the same alcohol attributable fraction as for adults in social services handling, i.e., 65%, which yields an estimate of 18%. This leads to a total estimate of 1.8 billion SEK, 1.3 for institutional measures and 500 millions for outpatient measures. The final estimate of alcohol-related costs to the social service in 2002 thus amounts to approximately 4.36 billion SEK.

5.3 Crime

5.3.1 Costs resulting from the consequences of crime

Firstly, consequences of crime include the value of stolen property. We have chosen to make use of the stolen property values estimated by insurance companies,[16] applying an AAF of 10%. In relation to theft offences, this involved alcohol-related cost for burglaries in private dwellings and for thefts of and from cars in the amount of 143 million SEK paid out by insurance companies (see Table 5.12). Vandalism on smashed windows and graffiti in schools involves a figure of approximately 100 million SEK. With an AAF of 30%, this means that 30 million SEK has been included in our calculations in relation to these offences. In addition, there are arson offences, which have been estimated to have a total value of approximately 300 million SEK.[17] Of this, 100 million SEK have been included in our alcohol-related cost calculations. Certain theft and vandalism offences could not be

[16] Data from the Swedish Insurance Federation.
[17] Data from the Swedish Fire Protection Association.

Table 5.12. Costs resulting from consequences of alcohol-related crimes, millions SEK

Recorded crimes	Total cases	AAF %	Productivity costs (victims)***		Total health care cost (victims)		Property costs
			Men	Women	Men	Women	
Homicides	103*	0.5	186.4	55.5	-	-	-
Woundings & assaults	55 000	0.4	-	-	37.3	7.9	-
Violence against the police	3 928	0.4	-	-	-	-	-
Rape**	2 184	0.4	-	-	-	-	-
Burglaries & Thefts	686 000	0.1	-	-	-	-	143
Arson & Vandalism	140 000	0.3	-	-	-	-	130
Total costs (millions)							**273**

* According to Swedish cause of deaths statistics, there were 103 cases of homicides in 2002. This is the figure employed in the calculations.
** Health care costs for rape victims are included in woundings and assaults.
*** Productivity costs for homicides concerns the victims of homicides. The productivity costs for individuals convicted and sentenced to prison for homicide is presented in Table 5.15.

included in the calculations as a result of shortcomings in the available data. Medical care costs — inpatient, outpatient and primary care — for woundings and assaults are calculated at 45.2 million SEK. A total of 5,786 visits to the medical care services on behalf of alcohol-related injuries resultingt from violent crimes were made by men and 1,802 visits by women. The productivity costs for individuals who have lost their life due to homicide are calculated to 242 million SEK. These costs are included under the respective headings.

Drinking driving resulting in deaths and injuries
The cost associated with drinking driving belongs to consequences of crime. But since these costs are included and accounted for in other parts of the report they are only described in this section. A total of 85 people died as a result of drinking driving. Table 5.13 shows no alcohol-related cases for children 0-14 years old. This is not true, but it was not possible to separate the children from our data. Hence, children are included in the total number of alcohol-related cases but are thus spread between the other alcohol-related cases. This will thus give a smaller underestimation of the productivity costs. The productivity cost due to early deaths from drinking driving accidents is calculated at 401 million SEK. The lost life-years and the QALY losses because of deaths are included elsewhere.

Table 5.13. Alcohol-related productivity costs due to early deaths in road traffic accidents involving drinking driving incidents *

Age	Men			Women		
	Total cases	Alcohol-related cases	Alcohol-related productivity cost	Total cases	Alcohol-related cases	Alcohol-related productivity costs
0-14	12	0	0	4	0	0
15-17	12	4	17.0	7	1	3.9
18-29	98	30	145.6	29	3	13.1
30-49	95	31	163.4	19	2	9.8
50-64	60	11	42.4	20	1	3.6
65-79	35	1	1.5	21	0	0
80+	28	1	0.9	22	0	0
All	**340**	**78**	**370.8**	**122**	**7**	**30.5**

* 3% discount rate, million SEK

Table 5.14. Drinking driving related injuries. Alcohol-related total medical costs

	Men		Women		Total	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Inpatient	1 222.6	57.3	83.2	3.9	1 305.8	61.2
Outpatient	4 168.9	8.9	284.9	0.6	4 453.8	9.5
Primary	78.2	0.1	5.8	0.0	84	0.1
Total	**5 469.8**	**66.3**	**373.9**	**4.5**	**5 843.6**	**70.9**

In Table 5.14 we can see that the costs calculated for alcohol-related health care for injuries resulting from drinking driving is calculated to be 70.9 million SEK, where inpatient care has the highest cost. Productivity costs for those injured are included in accidents/injuries in the productivity part of the report. It was not possible to separate this cost. The total amount linked to the *consequences* of alcohol-related crime has been calculated at 273 million SEK. If the health care costs (woundings & assault and injured in drinking driving related accidents) and productivity costs (homicide victims and drinking driving related deaths) are included, the costs would amount to 1,032 million SEK .

5.3.2 Costs resulting from responses to alcohol-related crime

The second form of costs is for *responses* to alcohol-related crimes. These costs are presented in Table 5.15. The AAFs for violent crimes (40%) and thefts (10%) are used to calculate the proportion to be included here. For *all* violent crimes, the total investigation costs in 2002 amounted to 1.6 billion SEK, which with an AAF of 40% amounts to 640 million SEK. For thefts and burglaries the total police investigation costs amounted to 1.4 billion SEK, of which the costs with an AAF of 10% are included, resulting in an alcohol-related cost of 140 million SEK. Overall, the costs for police investigations amounted to 846 million SEK and procedure and courts amounted to 390 million SEK together. The total costs for prison sentences resulting from alcohol-related crime amount to 895 million SEK resulting from slightly over 17 535 prison months. The loss of production among persons serving prison sentences has been estimated at 35,035 SEK per person per month, which produces a total cost of 614 million SEK. Police activities associated with the conduct of breathalyzer tests have also been included in this category of costs. The total average cost for every breathalyser test conducted at traffic police control points can be broadly estimated at 200-300 SEK, including overheads, planning and subsequent testing etc (SOU 2006:72). With a total of 1.7 million tests being conducted annually in Sweden, this cost amounts to 340 - 510 million SEK per annum. For the year 2002, 400 million SEK have been included in the calculations for these activities.

The insurance industry's administrative costs in relation to theft offences have been included, with an AAF of 10%. There are no available and reliable statistics on the amount of alarms and locks in Sweden at the moment. However, a rough estimate from the Swedish Theft Prevention Association (SSF) was that about 20,000 alarms were in use in 2002 (personal discussion with SSF 30/5-06). This does not mean that the users installed and paid for the alarm in 2002. Therefore the purchase of the alarm has been left aside and only the yearly subscription, 3,000 SEK annually has been included. The cost has been calculated with an AAF of 10%. This means that the alcohol-related cost for alarms is a minimum estimate. Finally, cases of "public drunkenness" are assumed to cost 1,500 SEK each for the police, based on a study by Harries (1999) referred to in the UK Cabinet office report (2003). A total of 44,000 cases then produces a cost of 66 million SEK, which is the figure included in the total cost calculation. The largest sums in this area relate to police investigations, prison costs and lost productivity among prison inmates. The total cost resulting from "responses to alcohol-related crime" amounts to approximately 3,191 million SEK.

Table 5.15. Costs resulting from responses to alcohol-related crimes, million SEK.

Recorded crimes	Total cases	Alcohol-related cases, prison	Prison months	Police investi-gation	Prison costs	Produc-tivity costs	Proce-dure	Courts	Insur-ance (adminis-trative costs)	Breath-alyzers	Burglar alarms (fee)
Homicides	100	43	3 700		190	130			-	-	-
Woundings & assaults	55 000	705	5 600		284	195			-	-	-
Violence against the police	3 928	244	855		44	30			-	-	-
Rape	2 184	38	1 470		75	52			-	-	-
All violent crimes above				*640**	-	-	*160**	*160**	-	-	-
Burglaries & Thefts	686 000	261	1 900	140	97	67	35	35	40	-	6
Arson & Vandalism	140 000	11	350	n.a.	18	12	n.a.	n.a.	-	-	-
Drinking driving	14 900	2 287	3 660	n.a.	187	128	n.a.	n.a.	-	400	-
Public drunkenness	44 000	-	-	66	-	-	-	-	-	-	-
Total costs				**846**	**895**	**614**	**195**	**195**	**40**	**400**	**6**
Sum (millions)											**3 191**

* Since it is not possible to split the sum for police investigations, courts and procedure between homicides, woundings & assaults, violence against the police and sexual assaults, this sum represent the total for all the violent crimes mentioned above.

The final sum of the costs included for alcohol-related crimes is approximately 3.5 billion SEK. When excluding productivity costs for inmates, as in Table 5.32, the sum amounts to 2,850 million SEK. If one were to include those cost items that are included in other parts of the report: productivity costs due to early deaths from homicide, health care costs for woundings & assaults, productivity costs due to early deaths from drinking driving, and health care costs for those severely injured in drinking driving related accidents, the total amount of costs for alcohol-related crimes sums to 4.2 billion SEK. The QALY losses because of some violent crimes amounted to 1,216 QALYs, and are included elsewhere.

5.4 Research, policy and prevention

Table 5.16 shows funds for alcohol research for 2000-2003, while Table 5.17 shows the costs (2002) for policy and prevention agencies identified within this study. The sum for 2002 amounts to nearly 480 million SEK. The costs are most likely an underestimate, as the costs for some important agencies are not included, in particular at the regional and local level.

Table 5.16. Funding for Alcohol Research by institution (millions SEK): 2002.

Institution	Costs (millions SEK)
Swedish Research Council	3.8
Swedish Alcohol Retailing Monopoly Foundation	3.0
The Bank of Sweden Tercentary Foundation *	-
Ministry of Health and Social Affairs	10.4
Insurance Companies	2.0
Vin & Sprits	0.9
Other foundations	0.2
National Institute of Public Health, FHI *	-
Swedish Council for Working Life and Social Resarch (FAS)	15.0
Traffic Safety	0.7
The National Board of Institutional Care (SiS)	-
Total	**36**

Source: Midanik, 2006
* No figures vere found for for this year.

Table 5.17. Costs for actors in the policy- and prevention field (millions SEK), 2002

Institutions	Costs (millions SEK)
National level	
The Alcohol Committee	32.1
National Institute of Public Health, FHI	28.4
The National Board of Health and Welfare	5.8
Swedish Council for Information on Alcohol and other Drugs	16.5
State grants to voluntary organizations and other preventive work	60.6
Regional level	
County administrative board	8.4
Local level	
School activities (ANT education, student welfare) in the municipalities	248.0
Supervision for on-premise alcohol licenses in the municipalities	43.4
Total	**443.2**

Table 5.18. Alcohol-related productivity costs due to mortality (using a 3% discount rate).

	Men		Women		Total	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Chronic diseases	-571	103.7	-1 320	-1 251.5	-1 891	-1 147.9
Injuries	893	3 619.1	149	597.7	1 042	4 216.8
Total	**322**	**3 722.7**	**-1 171**	**-653.8**	**-849**	**3 068.9**

5.5 Productivity costs

5.5.1 Lost production because of mortality

Total net costs

There was a total net productivity costs from mortality of 3,069 million SEK (Table 5.18). For chronic diseases, the net was a cost reduction of 1,148 million SEK. Although there was a net benefit of alcohol consumption among men in terms of chronic disease cases, there was a net (low) cost in terms of productivity years of life lost among them. This is because most of the cost reduction is concentrated in chronic diseases among the oldest. Nearly all net costs were to be found for injuries, and among men. As for health care, data on each chronic disease and injury (deaths, PYLLs and costs) is shown by age and sex in Appendix 5 (Table A5.14).

Gross costs and cost reductions

The total gross alcohol-related cost for chronic diseases amounted to 4,303 million SEK (2,747 million for men and 1,556 for women). The gross cost was 4,217 million SEK for injuries, adding to a total of 8,520 million SEK (Table 5.19). This figure is based on the productivity years of life lost (PYLL) for the 3,022 cases that were found to be alcohol-related. The cost reduction from chronic diseases (3,871 cases) was found to be 5,451 million SEK.

Overall, there were low numbers of alcohol-related deaths and low alcohol-related costs due to mortality in the Swedish population, after the estimated cost reductions of low to moderate drinking were included. It is notable that among men, the estimated number of alcohol-related deaths (322) is clearly lower than the total number of male deaths from alcoholic psychoses, alcohol abuse, alcohol dependence syndrome, alcoholic cardiomyopathy, alcoholic pancreatitis and accidental poisoning by alcohol (411 deaths).

Table 5.19. Alcohol-related productivity costs and cost reductions due to mortality (using a 3% discount rate).

	Men		Women		Total	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Gross						
Chronic diseases	1 184	2 747.4	796	1 556.2	1 980	4 303.6
Injuries	893	3 619.1	149	597.7	1 042	4 216.8
Total	*2 077*	*6 366.4*	*945*	*2 153.9*	*3 022*	*8 520.3*
Gross reductions	-1 755	-2 643.7	-2 116	-2 807.7	-3 871	-5 451.4
Net total	**322**	**3 722.7**	**-1 171**	**-653.8**	**-849**	**3 068.9**

Table 5.20. Alcohol-related productivity costs due to early retirement*.

	Men		Women		Total	
	Cases	Cost (millions)**	Cases	Cost (millions)**	Cases	Cost (millions)**
Chronic diseases	402	1 521.2	89	273.4	490	1 794.6
Injuries	128	404.9	84	223.1	212	628.0
Total	**530**	**1 926.0**	**173**	**496.5**	**702**	**2 422.6**

* Discount rate 3%.
**Calculated as mean years of market production losses (until age 65) from the mean age of granted early retirement in each sex-, age- and disease-specific category. Losses are weighted by level of reduction of work capacity in each sex-, age- and disease-specific category.

5.5.2 Lost production because of early retirement

Total net costs
The total net costs of alcohol for early retirements (when balancing costs saved from low to moderate consumption with those that were caused by alcohol) amounted to 2,423 million SEK, see Table 5.20. Of the total costs, 79% was found in the male population and most of the contribution (1,795 million SEK) was from chronic diseases: a smaller amount (628 million SEK) was from injuries. On closer inspection (see Appendix 5, Table A5.15, for such details), about two-thirds of the net cost (68%) was from cases where alcohol is a necessary condition (AAF = 100%).

Gross costs and cost reductions
The alcohol-related costs for chronic diseases amounted to 2,549 million SEK (1,953 among men and 596 among women). This cost was 628 million for injuries and the total gross cost was 3,177 million SEK (Table 5.21). The cost reductions from chronic diseases were found to be 755 million, somewhat greater for men (432 millions) than for women (323 millions).

5.5.3 Lost production because of long-term sickness absence

The total numbers of sick days in long-term sickness absences (+15 days) divided by gender was re-calculated into a total of 430,769 productivity years. Applying the alcohol-related fractions from the early retirement (0.85% for women and 3.45% for men) the total number of productivity years lost because of alcohol amounted to around 7,900 years (1.8% of the total productivity years lost). The distribution of the cost by age and sex was also based on the early retirement data. The cost for this alcohol-related production loss was found to be 3,167 million SEK (Table 5.22), with the majority of the costs falling on men in the age groups 30-49 and 50-64. This is a net cost, since cost reductions

Table 5.21. Alcohol-related productivity costs and cost reductions due to early retirement*.

	Men		Women		Total	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Gross						
Chronic diseases	610	1 953.2	264	596.0	874	2 549.2
Injuries	128	404.9	84	223.1	212	628.0
Total	*738*	*2 358.1*	*348*	*819.1*	*1086*	*3 177.2*
Gross reductions	-208	-432.0	-176	-322.6	-384	-754.6
Net total	**530**	**1 926.0**	**173**	**496.5**	**702**	**2 422.6**

* Discount rate 3%.

Table 5.22. Net productivity costs due to long-term sickness absence

	Productivity years lost due to alcohol	Distribution of loss by gender and age group	Alcohol-related productivity loss (years)	Cost due to alcohol (million SEK)
Women				
16-29		0.0224	51.3	15.1
30-49		0.4826	1 104.3	380.3
50-64		0.4950	1 132.9	391.4
Total	*2 288.5*	*1*	*2 288.5*	*786.8*
Men				
16-29		0.0082	45.6	14.6
30-49		0.4191	2 335.5	981.9
50-64		0.5728	3 192.0	1 383.5
Total	*5 573.1*	*1*	*5 573.1*	*2 380.1*
All				
16-29			96.9	29.7
30-49			3 439.8	1 362.2
50-64			4 324.8	1 775.0
Total	**7 861.5**		**7 861.5**	**3 166.9**

from long-term absences are included from the net number of alcohol-related cases.Using the gross number of alcohol-related cases for the early retired (Table 5.21) we also estimated the gross alcohol-related cost for long-term sickness absence (1.71% for women and 4.82% for men). This gave a total gross cost for alcohol-related long-term sickness absence of 4,908 million SEK (1,583 for women and 3,325 for men).

5.5.4 Lost production because of short-term sickness absence

The short-term sickness absence was estimated from the increased risk for alcohol consumers to be absent 8-24 days per year, in comparison with abstainers, taken from an analysis on ULF-data, the Swedish population health survey. The excess number of people absent for 8-24 days in the alcohol consumption groups was estimated from the prevalence of absence among the abstainers, from the increased risk for absence for alcohol consumers based on the data, and from the number of people in the consumption groups. The excess number of people estimated to have been absent for 8-24 days per year amounts to over 60,000, with twice as many men as women (Table 5.23). The majority of the individuals are found in the low consumption group, as this population group is the largest, thus offsetting the higher absence rates among the hazardous and harmful consumption groups. Assuming that these people are absent 13 days each per year, leads to a total of 810,000 days of absence, which translates into productivity costs of around 1.2 billion SEK during 2002. There was no difference in the absence 1-7 days per year between the groups.

Table 5.23. The estimated excess sickness absence 8-24 days per year for alcohol consumers.

	Prevalence absent for 8-24 days, in%				Excess no. people absent 8-24 days				Productivity costs (millions SEK)			
	Consumption group				Consumption group			Total	Consumption group			Total
	abstinence	low	hazarous	harmful	low	hazarous	harmful		low	hazarous	harmful	
OR	1	1.07	1.46	2.46								
Women												
16-29	11.1	11.88	16.21	27.31	4 062	2 172	2 374	8 608	58.8	31.4	34.4	124.6
30-49	4.3	4.60	6.28	10.58	3 027	1 207	1 174	5 407	51.3	20.5	19.9	91.7
50-64	8.2	8.77	11.97	20.17	4 036	1 446	1 275	6 756	68.7	24.6	21.7	115.0
Sum					*11 125*	*4 825*	*4 822*	*20 772*	*178.8*	*76.5*	*76.0*	*331.3*
Men												
16-29	5.0	5.35	7.30	12.30	1 875	893	2 989	5 757	29.6	14.1	47.2	91.0
30-49	6.5	6.96	9.49	15.99	4 890	1 430	4 457	10 778	101.2	29.6	92.3	223.1
50-64	25.8	27.61	37.67	63.47	13 326	3 421	8 063	24 810	284.4	73.0	172.1	529.5
Sum					*20 091*	*5 745*	*15 509*	*41 345*	*415.3*	*116.7*	*311.6*	*843.6*
Total					**31 216**	**10 570**	**20 331**	**62 117**	**594.1**	**193.3**	**387.5**	**1 174.9**

Table 5.24. Number of alcohol-related deaths, potential years of life lost (PYLL) and Quality-adjusted life-years (QALYs) due to mortality (net estimates).

Age groups	Men			Women		
	Deaths	PYLLs	QALYs	Deaths	PYLLs	QALYs
0-14	6	454	348	2	162	116
15-17	12	777	638	4	234	180
18-29	149	8 207	6 904	25	1 500	1 178
30-49	381	14 616	11 849	82	3 304	2 470
50-64	397	9 668	7 537	83	2 334	1 654
65-79	-195	-1 843	-1 324	-312	-3 780	-2 348
80+	-429	-2 071	-1 408	-1 054	-5 599	-3 191
Total	**322**	**29 807**	**24 544**	**-1 171**	**-1 845**	**59**

5.6 Intangible costs

5.6.1 Mortality

For men, the total number of life-years lost (PYLL) amounted to nearly 30,000, with the majority coming from deaths in the age group 30-49 years. In the older age groups, alcohol consumption is estimated to have saved nearly 4,000 life-years. Expressed in QALYs, the alcohol consumption led to a net loss of nearly 25,000 years in full health for the men. For women, alcohol consumption is estimated to have saved around 1,800 life-years (PYLL). The life-years saved in the ages above 65 years more than offset the deaths caused by alcohol in the younger age groups. However, as the QoL is lower in the older age groups, the number of QALYs lost reached 59, with the highest losses of healthy life-years accruing from age group 30-49. Overall, the total number of life-years lost amount to around 28,000 (29 807 and -1 845 for men and women respectively), while the QALYs lost amount to nearly 25,000 (24 544 and 59) (Table 5.24). The gross estimates resulted in a loss of around 3,000 lives (2,077 males and 945 females), which translates into nearly 64,000 PYLLs lost (47,563 for men and 16,399 for women) and around 48,000 QALYs (36,781 for men and 11,387 for women).

5.6.2 Consumers themselves

When the estimated QoL losses for the different alcohol consumption groups (Kraemer et al., 2005) are applied to the number of people in each group, the QALY losses amount to nearly 70,000 QALYs (Table 5.25). No alcohol-related QoL loss was estimated for the two groups with the lowest

Table 5.25. QALYs lost for the alcohol consumers themselves.

	QoL loss	0-14 years	15-17 years	18-29 years	30-49 years	50-64 years	65-79 years	80+ years	Total
Women									
Abstinence	0.00	0	0	0	0	0	0	0	0
Low	0.00	0	0	0	0	0	0	0	0
Hazardous	0.06	0	497	2 553	3 660	2 300	402	121	9 533
Harmful	0.30	0	858	4 394	5 609	3 194	572	199	14 826
Men									
Abstinence	0.00	0	0	0	0	0	0	0	0
Low	0.00	0	0	0	0	0	0	0	0
Hazardous	0.06	0	133	2 330	2 870	1 730	389	129	7 581
Harmful	0.30	0	1 352	12 283	14 090	6 422	2 050	668	36 864
Total		0	2 840	21 559	26 229	13 646	3 414	1 117	68 804

consumption. Even though there are a small number of people in the highest consumption group, harmful consumption, the majority of the losses accrue to that group, as the estimated QoL loss per individual was estimated at nearly one third of a year. The losses are twice as high for men as for women and highest in the age groups 18-29 and 30-49 year-olds.

5.6.3 Relatives and friends to heavy drinkers

In the WHOQOL-BREF telephone interview performed in October and November 2005, 775 respondents (26%) out of the 2,981 who answered the question reported that there was somebody among their relatives or friends who had a drinking problem, when referring to the situation during the

Table 5.26. A comparison between different categories of respondents with or without a relative or friend with a drinking problem (DP).*

	Nobody close with a DP (n=2 206)	**Somebody close having a DP (but not sharing the household) (n=715)**	**Sharing a household with somebody having a DP (n=60)**
General quality of life	4.2	4.1	4.1
General health	4.0	3.8	3.4
Physical health			
Pain and discomfort	4.4	4.4	3.8
Energy and fatigue	3.9	3.8	3.3
Sleep and rest	3.8	3.6	3.4
Dependence on medication	4.3	4.3	3.7
Mobility	4.3	4.3	4.2
Activities of daily living	4.1	4.0	3.5
Working capacity	4.1	4.0	3.5
Psychological health			
Positive feelings	4.2	4.2	4.1
Negative feelings	4.2	4.0	3.7
Self-esteem	4.1	4.0	3.8
Thinking, learning, memory, concentration	4.0	3.9	3.7
Body image	3.9	3.9	3.7
Spirituality, religion and personal beliefs	4.2	4.2	4.1
Social relationships			
Personal relationships	4.3	4.3	4.2
Sex	3.8	3.8	3.3
Practical social support	4.3	4.2	4.1
Environment			
Financial resources	3.6	3.5	3.2
Information and skills	4.0	4.0	4.0
Recreation and leisure	3.7	3.6	3.3
Home environment	4.3	4.3	4.2
Access to health and social care	4.0	3.9	4.0
Physical safety and security	4.1	4.1	4.0
Physical environment	3.9	3.9	3.9
Transport	4.1	4.0	3.8
Average	**4.0**	**4.0**	**3.7**

* Item-level analysis of mean scores of WHOQOL-BREF

Table 5.27. Transformed scores (TS) for each domain with an average-based total QoL-value; pooled t-test*.

Domain	Nobody close with a DP (n=2 206)	Somebody close having a DP (but not sharing a household) (n=715)		Sharing a household with somebody having a DP (n=60)	
		TS	p > t	TS	p > t
Physical health	0.78	0.77	0.3925	0.65	<0.0001
Psychological health	0.77	0.77	0.3667	0.71	<0.0001
Social relationships	0.78	0.78	0.9165	0.72	0.0004
Environment	0.74	0.73	0.0375	0.69	0.0006
Total QoL	**0.77**	**0.76**	**0.1969**	**0.69**	**0.0001**

* Each category compared to those not related to a person with DP

past 12 months. The prevalence of experiencing drinking problems in the close social environment is higher among women (30%) than it is among men (23%). In Table 5.26, the mean scores are presented for each of the WHOQOL-BREF items within their particular domains, comparing three categories of respondents: 1) those without a relative or friend who has a drinking problem, 2) those reporting somebody close with a drinking problem and 3) those who report sharing a household with a person having a drinking problem (mutually excluding categories). The mean values are based on 5-point scale, where 1 indicates poor and 5 good quality of life. There is no particular difference between the first two columns, i.e. between those who report having a relative or friend with drinking problems and those who do not. But even though the difference is not large, there is a clear tendency towards impaired life quality among those who report sharing a household with the person in question. The latter tend especially to experience impaired physical health – such as more pain and discomfort, less energy, bad sleep, impaired working capacity, negative feelings (anxiety, etc.) and a poor sex-life. Also financial problems and less satisfaction with recreation and leisure time are a rather frequent phenomenon. At the same time, both the financial situation and the sex-life seem to be less satisfactory than other aspects of life even among those who do not have to deal with anybody's excessive drinking.

In Table 5.27, the raw scores have been transformed into QoL-weights, ranging between 0 and 1, using the WHOQOL-BREF algorithm, for each of the four domains. In order to arrive at an overall quality-of-life measure, a mean QoL-value has then been computed based on the four values received per domain. Despite the low number of observations in some of these categories, a significant decreas For those sharing a household with a problem drinker, a particular impairment seems to be experienced also within the physical health domain. Overall, people who reported feeling affected by someone else's drinking have 1 unit lower QoL than to those who are not related to a problematic drinker. Among those sharing the household with the drinker, the QoL loss is 8 units. e in quality-of-life is observed among those sharing household with somebody having a drinking problem, compared to individuals without having somebody close with a drinking problem. This is true of all the domains but the difference is most pronounced when it comes to physical and psychological health. Respondents reporting having a problem drinker among their relatives or friends but not sharing a household with the person has also somewhat lower QoL scores, but the result is significant only for the environment domain[18]. Table 5.28 shows the average differences over the domains in QoL-values, i.e. the estimated loss of quality-of-life among the categories of respondents related to somebody who has a drinking problem, compared to those who are not affected by such a relationship.

[18] Even though the total QoL difference is not statistically significant in this case, a significant impairment can be observed for one of the domains. The assumption is made that the difference observed for the total QoL level (0.01) is genuine and the figure is included in a sensitivity analysis.

Table 5.28. Loss of quality-of-life among respondents closely related to a person with drinking problems.*

Domain	**Somebody close having a DP** (but not sharing the household) (n=715)	**Sharing a household with somebody having a DP** (n=60)
Physical health	0.01	0.13
Psychological health	0	0.06
Social relationships	0	0.06
Environment	0.01	0.05
Average QoL-loss	**0.01**	**0.08**

* Each category compared to those not related to a person with DP

Table 5.29. Numbers of quality-adjusted life years (QALYs) lost.*

	Proportion in population (%)	**Population size** (aged 16-80)	**Estimated QoL-loss**	**QALYs** (Population size x QOL-loss)
Somebody close having a DP	24	1 630 089	0.01	**16 301**
Sharing a household with some-body having a DP	2	135 841	0.08	**10 867**
Total				**27 168**

* QoL-estimates of the total population 16-80 years old resident in Sweden 2002.

The next step in the analysis has been to apply these estimations to the actual population size for year 2002 (see Table 5.29). As an example, 60 respondents reported sharing a household with a heavy drinker. This corresponds to 2% of the whole sample. The population size of this group for year 2002, i.e. Swedes aged 16-80[19] years, is 6,792,036 inhabitants and 2% correspond to 135,841 inhabitants suffering a QoL loss assumptively due to living in the same household with somebody who has a drinking problem. When multiplying the figure with our estimate of loss of QoL in this category (135,841 x 0.08), the result will be 10,867 QALYs (quality adjusted life years) lost. In a similar way, 16,301 QALYs lost is the estimation for those 24% who reported being related to somebody with a drinking problem (irrespective of kind of relationship).

5.6.4 Victims of crime

Based on the number of alcohol-related violent crime victims from the crime section and the QALY loss valuation from Dubourg et al. (2005), the number of QALYs lost from violent crime during the year amounted to 1,216 QALYs (Table 5.30). This must be regarded a minimal estimate, as most of the crimes are not included. We are also only assuming the effects to last for the study year and no QoL losses because of fear of crime are included.

Table 5.30. QALY lost for victims of crime.

	Number of alcohol-related cases	**QALY loss per case**	**Total**
Woundings and assaults	22 000	0.033	726
Sexual offences*	874	0.561	490
Total			1 216

* The category only includes cases of rape.

[19] Note that the base case is 15-80+ years, which implies an underestimation (only 16-80 years old were interviewed in the Monitoring)

5.7 Total costs and health effects

In Table 5.31 the health effects because of alcohol consumption in Sweden in 2002 are summarized, while table 5.32 shows the cost estimates. Both tables shows the net estimates as well as the gross.

If no beneficial health effects are subtracted, the number of deaths because of alcohol in the year 2002 amounts to more than 3,000. However, if they are included, as cases prevented in the net estimates, alcohol consumption led to a saving of about 850 people's lives. However, as detailed in Table A.5.14 in Appendix 5, the net reductions in lives lost are mainly found among the age groups 65-79 and 80+. This means that on a life-year basis, even if the reductions are included, alcohol consumption led to a loss of 28,000 life-years, as well as to nearly 800,000 visits in the medical care system during one year. Alcohol consumption also led to losses in quality-of-life for victims of crime, for the hazardous and harmful consumers themselves and for their friends and relatives, totalling over 97,000 QALYs. If also the mortality is valued in QALYs, the total number of QALYs lost is over 120,000 QALYs. These QALY estimates are, however, taken from a number of differing data sources which may not be compatible, and should be regarded as highly uncertain.

The total costs according to the base result, in Table 5.32, which includes the cost reductions because of beneficial effects and the valuation of lost life-years as productivity costs, amounts to 20.3 billion SEK. This is equivalent to 2,800 SEK per person over the age of 15 years in Sweden during the year 2002, and to around 1% of the GDP. If the mortality productivity costs are excluded, i.e. if lost life-years are not valued as lost productivity but as QALYs, the result is reduced by 3.1 billions, leading to costs of around 17,3 billion SEK. In parallel to the health effects, the costs are heavily affected if the beneficial effects of alcohol are disregarded; the total costs increase by 9 billion, to around 29.4 billion SEK. The main effect stems from productivity costs because of mortality, over 5 billion SEK, while the health care costs, the early retirement productivity costs, and the long-term sickness absence productivity costs increase by around 1.1, 0.8 and 1.7 billion respectively.

Half of the total costs are found for productivity costs, of which the production lost because of mortality and early retirement amount to 3.1 and 2.4 billion SEK. Only a fraction of these costs will appear during 2002, as the estimates also include the value of future productivity lost. These costs are however assumed to include the productivity lost because of deaths and early retirements that occurred during previous years, which are affecting the productivity also during the present year. The costs for sickness absence, both the long-term and short-term, are however accruing in full during the year 2002, as are all the other costs, totalling 14.8 billion SEK.

Table 5.31. Summary health effects because of alcohol in 2002.

	Net health effects	Gross health effects
Number of deaths	-849	3 022
Number of PYLLs*	27 962	63 962
Number of medical care cases**	761 565	895 043
Number of QALYs lost		
from mortality	24 603	48 168
for consumers	68 804	68 804
for friends and relatives	27 168	27 168
for victims of crime	1 216	1 216

* PYLLs=Potential Years of Life Lost, calculated from the age-specific life expectancy.
** Excluding co-morbidity

Table 5.32. Summary of net and gross costs of alcohol in Sweden in 2002, in million SEK.

	Net costs	Gross costs
Health care costs	2 189	3 292
Social service costs	4 364	4 364
Crime costs*	2 850	2 850
Research, policy, prevention, etc	479	479
Productivity costs		
From mortality	3 069	8 520
From early retirement	2 423	3 177
From crime	614	614
From long-term sickness absence	3 167	4 908
From short-term sickness absence	1 175	1 175
Total costs	**20 330**	**29 379**

* Excluding the productivity costs among prison inmates, included under crime productivity costs.

Most of the costs apart from the productivity costs are paid by the public sector in Sweden, and might be divided between the different sectors. This is not a so-called budgetary impact analysis, which would include all payments and incomes for respective sector, i.e. also transfers, but a mere calculation of which sector that carries the social costs. The highest costs are found for the municipalities, around 4.7 billion SEK, which carries the costs for social services but also for some prevention and policy costs. In Sweden, the county councils are responsible for health care, thus paying for most of the health care costs of around 2 billion, and for some supervision of alcohol licensing included in the Research, policy and prevention costs, totalling around 2.1 billion. On a gross basis, setting aside the calculated reductions in costs for beneficial health effects, the counties' costs are 1.1 billion higher. The state carries all costs for crime responses and most of the costs for Research, policy, and prevention, totalling around 3 billion SEK.

6. SENSITIVITY ANALYSES

In order to investigate how the total result is affected by alternative assumptions concerning both data material chosen and methods employed, a large number of sensitivity analyses are performed. All analyses, except the last, are so-called univariate, i.e. one assumption is changed at the time, while all the other data remains the same as the base case. The main purpose is to investigate which assumptions affect the result to a large extent, i.e. that the result is sensitive to, which thus should be discussed thoroughly. Another purpose is to give an overall picture of the uncertainty of the results, and also to increase the comparability of the study with other studies that have employed alternative methods. All sensitivity analyses are reported in the summary Figure 6.3 below, grouped into categories labelled A to M.

6.1.1 Age groups 0-64 years

The result of the analysis is found under A in Figure 6.3.

One sensitivity analysis only includes costs for the population aged 0 to 64 years because (1) age- and sex-specific relative risks among the old could be biased, (2) the approximation of alcohol consumption prevalence for the oldest is uncertain because the oldest tend to be missing in alcohol surveys, (3) register quality (validity) in selecting one principle disease code among the old is much poorer as compared with middle-aged and young people. For instance, multiple disease codes are common and autopsies are seldom performed among the old (Hemström, 1998). This is further discussed in chapter 7. Costs affected in this analysis are health care and productivity costs due to mortality.

Health care costs
The alcohol-related medical cost for individuals under 65 years of age sums to 1.8 billion based on 540,700 cases (see Table 6.1). This is a reduction compared to the base case of 14 and 29% respectively, i.e. the number of cases is more affected than the total cost. The downward change in cost is most distinct for injuries (21%) while the change in number of cases is mostly attributed to chronic diseases (34%). Most interesting to note is that the number of cases and cost actually increase for women in inpatient care when only including individuals below 65 which is a result of the large protective effect found in the base case for elderly women. The cost increase is around 174 million, somewhat higher for chronic diseases where the cost changes from a net cost reduction to a cost (see Table 5.3 and 6.2 for comparison).

Table 6.1. Alcohol-related total net medical care cost, under 65.

	Men		**Women**		**Total**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	29.1	617.6	9.4	218.4	38.4	836.0
Outpatient	171.9	367.1	104.0	222.0	275.9	589.2
Primary	121.5	180.5	104.9	155.8	226.4	336.3
Total	**322.5**	**1 165.2**	**218.2**	**596.2**	**540.7**	**1 761.5**

Table 6.2. Alcohol-related net medical care costs for chronic diseases, under 65.

	Men		Women		Total	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	20.5	365.6	6.3	94.7	26.8	460.3
Outpatient	90.6	193.4	72.2	154.1	162.7	347.5
Primary	121.0	179.8	104.7	155.5	225.7	335.3
Total	**232.1**	**738.8**	**183.1**	**404.3**	**415.2**	**1 143.1**

Table 6.3. Alcohol-related net medical care costs for injuries, under 65.

	Men		Women		Total	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	8.6	252.0	3.1	123.7	11.7	375.8
Outpatient	81.4	173.7	31.8	68.0	113.2	241.7
Primary	0.5	0.7	0.2	0.3	0.7	1.0
Total	**90.4**	**426.4**	**35.1**	**192.0**	**125.5**	**618.4**

Mortality

The total net costs due to mortality productivity costs among those aged less than 65 years (Table A5.16 was double (6.2 billion SEK) the cost for the whole population (3.1 billion). The difference is mainly due to the lower number of prevented cases among those aged less than 65 years (see Table 6.4), as compared with the whole population (although there was also a cost reduction of 1.4 billion in the population under 65). The cost for injuries is also higher than the findings for the whole population.

6.1.2 Size of consumption groups

The result of the analyses is found under B i Figure 6.3.

Proportion abstainers and low consumption

In base case, the approximation of the proportion of abstainers and low consumers was based on two different surveys, employing different recall periods in the alcohol questionnaire. As discussed in section 3.2.2, the one-month recall period risks overestimating the proportion of abstainers, so the base

Table 6.4. Alcohol-related productivity costs due to mortality (under age 65 years).

	Men		Women		Total	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Gross						
Chronic diseases	475	1 945.5	208	790.0	683	2 735.5
Injuries	742	4 162.6	131	687.0	873	4 849.6
Total	*1 217*	*6 108.1*	*339*	*1 477.0*	*1 557*	*7 585.1*
Gross reductions	-271	-913.7	-144	-473.7	-415	-1 387.4
Net total	**947**	**5 194.4**	**195**	**1 003.3**	**1 142**	**6 197.7**

* using a 3% discount rate.

Table 6.5. Sensitivity analysis on the size of the abstaining group for early retirement and long-term sickness absence (costs in million SEK).*

	Gross costs			Cost reductions	Net costs
	Chronic diseases	Injuries	Total		
Early retired					
Women					
Base case	596.0	223.1	819.1	-322.6	496.5
One-month abstention	570.3	223.1	793.4	-233.9	559.5
Men					
Base case	1 953.2	404.9	2 358.1	-432.0	1 926.0
One-month abstention	1 939.8	404.9	2 344.7	-399.5	1 945.1
Total					
Base case	2 549.2	628.0	3 177.2	-754.6	2 422.6
One-month abstention	2 510.1	627.9	3 138.0	-633.4	2 504.6
*Long-term sickness absence***					
Women					
Base case					786.8
One-month abstention					879.8
Men					
Base case					2 380.1
One-month abstention					2 422.1
Total					
Base case					3 166.9
One-month abstention					3 302.0

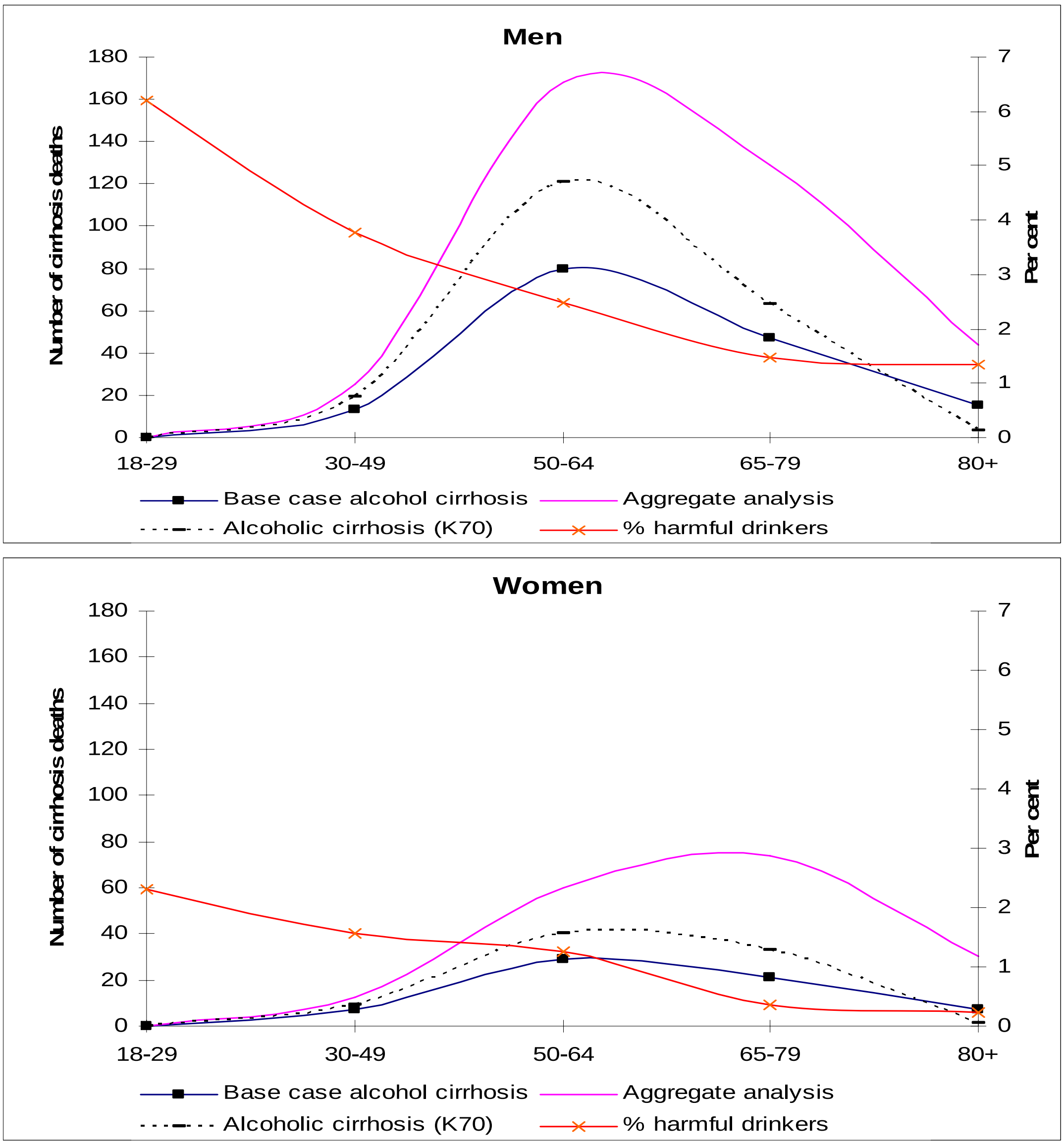
* Based on a 12 months (base case) or a one-month recall period (no weighting of monitoring data) for early retirement (alcohol-related cases and costs in millions using a 3% discount rate).
****** AAF was 0.0095 for women and 0.0351 for men, obtained from the sensitivity analyses on early retired in this table.

case fraction of abstainers was weighted downwards. As it is unlikely that alcohol consumption on a very infrequent basis (typically once in three months time) has a causal long-term effect on disease risk (either benefit or harm), we used the one-month fraction of abstainers in one analysis. This leads to a decrease in the proportion of low consumers, thus decreasing the number of people with an alcohol consumption which might be expected to lead to cost reductions. This sensitivity analysis is performed for early retirement and long-term sickness absence.

Weighting down the size of the abstaining group to a one-year abstention period rather than one-month abstention had small impact on the costs (Table 6.5). On the one hand, the difference between the two approximations of consumption levels was small: 82 million SEK more for early retirement and 135 million more for long-term sickness absence as compared with base the case. The difference is due to lower cost reductions when using a one-month recall period of alcohol consumption. This is because diseases with cost reductions from alcohol are more common than diseases which are caused by alcohol in Sweden (also among those of working age). Although this analysis shows small differences for approximating the size of the abstaining group, it is of interest that costs were somewhat higher when the prevalence of abstaining was greater. However, it probably has greater implications for the estimation of the net costs among the oldest where nearly all people are low consumers or abstainers, and diseases with a benefit from alcohol heavily dominate the disease burden.

Simulating an alternative size of consumption groups
We should acknowledge that all assumptions of alcohol consumption levels in the present as well as in all previous COI studies are based on self-reported consumption in survey samples. Thus we do not know the exact distribution of alcohol consumption in the population. Most surveys suffer from non-response and it is most likely that the proportion of low to moderate consumers is overrepresented as compared to marginal groups such as abstainers and heavy drinkers.If there is a great underreporting of alcohol consumption in surveys, we will underestimate the population size of harmful and hazardous drinkers and hence underestimate the costs also for health care and productivity. It is possible to validate the self-reported consumption data using a disease known to have a high fraction of alcohol-relatedness, such as cirrhosis. For the period 1987-1995, Ramstedt (2002) reported that the proportion of cirrhosis attributable to alcohol by the disease code in Sweden (42%) is clearly lower than in Finland (90%), Norway (79%), Denmark (65%), the Netherlands (61%) and France (56%) but about the same as in the UK (45%). In 2000, 52% of male and 42% of female cirrhosis deaths were attributed to alcohol by cause of death (that is the proportion of ICD-10 codes K70 of the

Figure 6.1. Number of alcohol-related cirrhosis deaths using three different methods, and the proportion of harmful drinkers in five age groups.



sum of K70 + K74) according to the national Cause-of-Death-Registry (The National Board of Health and Welfare, 2002), suggesting that the share of alcoholic cirrhosis in all cirrhosis deaths has probably increased in Sweden after the period 1987-1995.

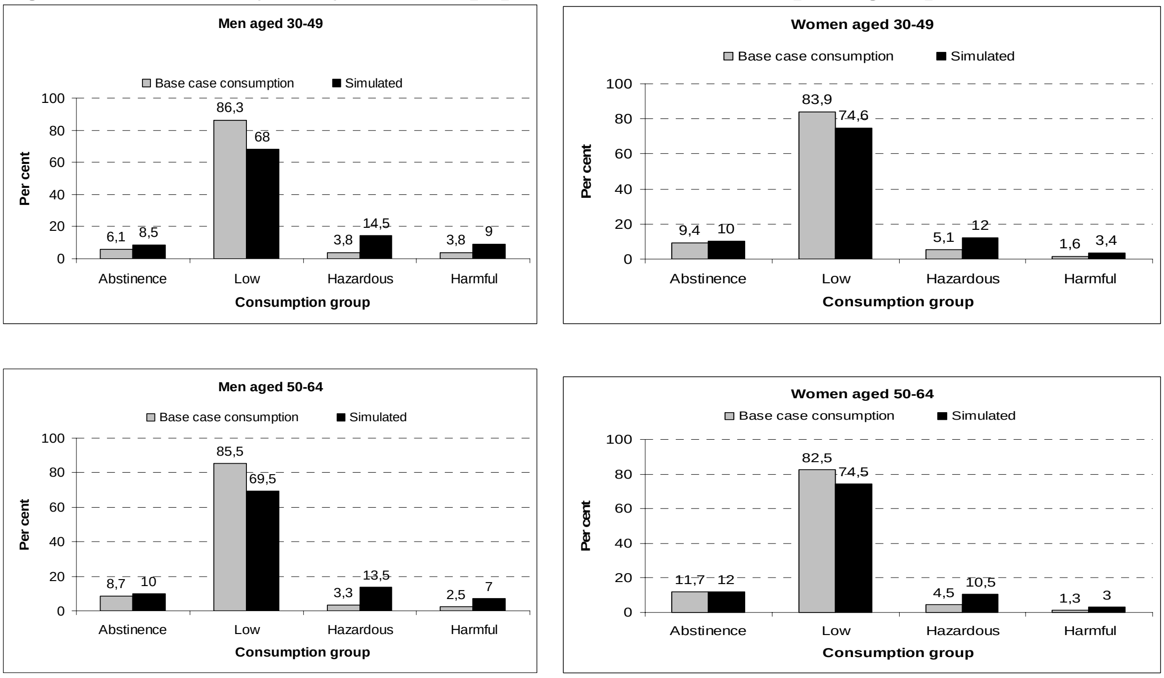
For the year 2002, we have compared the number of alcohol-related cases of cirrhosis deaths in the baseline estimation (survey based consumption) with the number of cases attributed to K70 (alcoholic cirrhosis). If the baseline estimation gives a smaller number of alcohol-related cirrhosis cases than given in the cause-of-death-registry, this is most likely due to biased information on the size of consumption groups in the population. If on the other hand, the baseline estimation gives a larger number of alcohol-related cirrhosis deaths, this indicates that the coding of alcoholic cirrhosis (K70) is underreported as a cause of death in Sweden. If we find that the fraction of alcoholic cirrhosis (number of K70 deaths as a percentage of all cirrhosis deaths) is higher than we find in the baseline estimations, we will change the size of consumption groups until we obtain the same number of alcohol-related cirrhosis as is given in the national registry. Next, we apply the simulated size of consumption group in a sensitivity analysis for early retired and long-term sickness absences. This follows partly a suggestion on how to deal with an opposite situation, where the baseline estimation gives a higher alcohol-related fraction for cirrhosis than the registration of specific cause of death (English et al., 1995).

The number of cirrhosis cases attributed to alcohol for men in the base case (using RRs and survey data on consumption) clearly differs from using the alcoholic cirrhosis disease code (alcoholic cirrhosis [K70], broken line in figure) as a validity test across the age groups (Figure 6.1). These differences are smaller for women. We tend to underestimate the number of alcohol-related cirrhosis deaths among those aged less than 80 and somewhat overestimate the number of cases among men aged 80+. We can also observe that cirrhosis deaths peak in the age group 50-64, whereas harmful alcohol consumption peaks in the age group 18-29. We should be aware of the fact that we still probably greatly underestimate the "true" number of alcohol-related cirrhosis deaths according to data from a number of neighbouring countries with similar drinking patterns as Sweden (Norway and Finland) even when using the higher results from the sensitivity analysis. When using the AAFs obtained from time series analysis (and changes in population drinking over time) on Swedish data (see above) nearly all cirrhosis deaths in Swedish men are found to be alcohol-related. There is reason to believe that the aggregate findings are somewhat exaggerated, although these are close to results for the registered cause of death in Finland.

With these findings we use the possibility to simulate the most probable size of consumption groups assuming that RRs are correct and that the Swedish national registry gives a good valuation of the fraction of alcohol for all cirrhosis deaths in Sweden. Findings in Figure 6.1 show that self-reported data on alcohol consumption leads to an underestimation of hazardous and harmful drinking in the population and an overestimate of the prevalence of low consumption. The consequence is an underestimated gross cost and overestimated cost reductions. The simulated size of consumtion groups is compared with base case in Figure 6.2. The simulated size of consumption groups are not unrealistic, given that there was a high non-response rate in the survey, and that population alcohol consumption is considerably higher than the levels being self-reported in the survey. Note that we use simulated consumption only for age groups 30-49 and 50-64 which is relevant for taking this sensitivity analysis further in terms of early retirement and long-term sickness absence

When using the approximated consumption in the base case (grey bars in Figure 6.2), net alcohol-related costs for early retired and long-term sickness absence were 2,423 and 3,167 million SEK respectively. Using the simulated size of consumption groups (black bars) for all chronic diseases with a causal relation with alcohol, we estimated net costs of 2,563 milion SEK for early retirement and 3,466 for long-term sickness absence. This is a higher cost of 440 million SEK compared to the base case. In sum, using various assumptions on size of consumption groups (still having to rely on the rate of abstinence from survey data) did not affect the costs of early retirement and long-term sickness

Figure 6.2. Sensitivity analysis on the population size of consumption groups.*



Based on the number of deaths of alcoholic cirrhosis (K70) for men and women in three age groups. The number of 'underestimated' cirrhosis deaths attributed to alcohol in the base case was 6 (30-49 yrs), 41 (50-64 yrs) and 16 cases (65-79 yrs) for men and 2 (30-49 yrs), 11 (50-64 yrs) and 12 cases (65-79 yrs) for women. The simulated consumption gives the same number of alcohol-related cirrhosis deaths as suggested by alcoholic cirrhosis (K70) in the Cause-of-Death-Registry.

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absence to any greater extent. One reason is that most of the productivity cost for early retirement is due to cases where alcohol is a necessary condition or injuries for which we do not use any estimates on the size of consumption groups. However, we did obtain higher alcohol-related costs in this sensitivity analysis regarding productivity costs for early retired and long-term sickness absence, suggesting that we probably somewhat underestimate the total costs of alcohol based on self-reported consumption (as also most likely also the costs in health care and mortality).

6.1.3 Disease and injury risks

The result of the analyses is found under C in Figure 6.3.

Swedish data on injuries

One sensitivity analysis uses data from a study on the alcohol-related mortality in Sweden for the years 1992-1996 for natural and unnatural deaths (Sjögren et al., 2000a) and in greater detail for unnatural deaths (Sjögren et al., 2000b; 2000c). For natural deaths, i.e. deaths from chronic diseases, the first of these studies used relative risks taken from English et al. (1995) and some updated estimates, in particular on ischemic heart disease, taken from Mäkelä (1997). The relative risks were weighted with Swedish alcohol consumption level data to arrive at disease-specific alcohol-attributable fractions which were applied to Swedish mortality data. Thus this earlier Swedish study used the same methodology on disease risks as the present study, although for an earlier period when alcohol consumption in Sweden was lower than it was in 2002; this is one reason we are not using the study's disease risks and AAFs in the base case. The injury risks are, however, used in a sensitivity analysis.

Table 6.6. AAFs for accidents and injuries, adapted from Sjögren et al. 2000b.

Type of injury	0-14 years	15-17 years	18-29 years	30-49 years	50-64 years	65-79 years	80+ years
Men							
Unintentional	0	0.190	0.340	0.484	0.486	0.129	0.065
Intentional	0	0.335	0.426	0.492	0.450	0.220	0.110
Undetermined	0	0.414	0.539	0.731	0.770	0.526	0.263
Women							
Unintentional	0	0.056	0.103	0.269	0.271	0.026	0.013
Intentional	0	0.174	0.307	0.365	0.338	0.156	0.078
Undetermined	0	0.235	0.414	0.609	0.674	0.366	0.183

The number of alcohol-caused unnatural deaths, i.e. deaths from injuries, was obtained either from death certificates from autopsies, or by examining the deceased person's hospitalizations for alcohol-related diagnoses for a period of three years prior to the injury death. In the sensitivity analysis, we used AAFs as reported in Sjögren et al. (2000b) for unintentional, intentional and undetermined categories (Table 6.6). They did not display their AAFs in the same age groups as the present study. Therefore we adjusted using the proportion of deaths in the age groups analysed by Sjögren et al. (2000b) (0-19, 20-29, 30-39, 40-49, 50-59, 60+) as weights. The AAF in those aged 80+ was halved as compared with the AAF for 60+, because another study by Sjögren et al. (2000a) reported clearly lower AAFs in those aged 70+. This latter study showed AAFs by various sex and age groups only for all accidental deaths and we judged it more appropriate to include AAFs for the three types of accidental deaths displayed in Table 6.6. We will discuss later some advantages and disadvantages of using AAFs for various injury categories and since we can calculate an alternative total number of injuries attributable to alcohol and accompanying costs, we will also be able to compare the data from the Finnish context (Mäkelä, 1998) with Sweden. The more detailed combination of injury categories by various age and sex groups was the main reason we chose Mäkelä (1998) as the base case. For medical care, the large difference in AAFs is reflected in the large difference in cases and costs attributable to alcohol. The sensitivity analysis results in more than twice the number of alcohol-related cases as well as costs, see Table 6.7. For division of the results in Table 6.7 by gender and type of care, see Appendix 5 Tables A5.7-12.

For the productivity costs, we found a somewhat greater number of alcohol-related cases, and consequently higher costs (1 286 million higher), when we used AAFs from Sjögren et al (2000b) as compared with Mäkelä (1998), although for unintentional injury deaths (such as water traffic & drowning,

Table 6.7. Sensitivity analysis, alcohol-related injury risk in medical care.

	Base case		Sensitivity analysis	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Unintentional	108.4	679.7	231.2	1 548.0
Intentional	10.2	69.0	11.3	116.7
Undetermined	12.0	29.5	39.8	97.2
Total	**130.6**	**778.2**	**282.4**	**1 761.9**

Table 6.8. Sensitivity analyses on injury risks due to mortality, early retirement and long-term sickness absence.

	Base case		Sensitivity analysis	
	Cases	Cost (millions)	Cases	Cost (millions)
Mortality				
Unintentional	576	2 120.8	516	2 016.1
Intentional	333	1 490.0	467	1 769.4
Undetermined	133	606.1	196	771.6
All injuries	1 042	4 216.8	1 179	4 557.1
Net total due to alcohol	*-849*	*3 068.9*	*-713*	*3 647.6*
Early retired				
Unintentional	211	626.0	314	867
Intentional	1	2.0	1	2.5
All injuries	212	628.0	315	869.5
Net total due to alcohol	*702*	*2 422.6*	*805*	*2 664.0*
*Long-term sickness absence**		*3 166.9*		*3 632.9*
Total		**8 658.4**		**9 944.5**

* The AAF in base case was 0.0085 for women and 0.0345 for men. In the sensitivity analysis AAF was 0.010 for women and 0.0392 for men.

and fires) we found the opposite (Table 6.8). There was a similar pattern for men and women (not shown in a table), but we also observed that the difference between the two studies' AAFs was smaller for early retirement and long-term sickness absence than for mortality, probably because we assume a lower AAFs for non-fatal injuries.

Aggregate data

Another sensitivity analysis for the total of all diseases and injuries, as well as for some separate diagnoses, is based on relationships estimated by aggregate-level time series analyses. Though this approach has limitations, there are also some methodological advantages. Firstly, aggregate level analyses data do not carry the problem of selection effects that may easily bias estimates derived from individual-level studies (Norström, 1989). Secondly, for some outcomes, and particularly for external causes, individual-level data do not measure the whole contribution of alcohol, since the adverse effects of drinking occur to others besides the drinker, e.g. in the case of violence and homicide (Room & Rossow, 2001).

We used results for Sweden produced within the European Comparative Alcohol Study (ECAS) where aggregate level time series analyses were conducted for 14 European countries on the basis of data for 1950-1995 (Norström, 2002). Using the Box-Jenkins technique for time series analyses (ARIMA-modelling), the effect on various forms of mortality from a one-litre change in per capita alcohol consumption was estimated. The proportion of mortality that can be attributed to alcohol consumption (i.e. the attributable fraction) can then be calculated on the basis of the parameter estimates derived from these ARIMA models, as demonstrated by Norström (1989). Thus, in the case of a semi-log model (the model specification most often used in ECAS), the fraction of mortality that can be attributed to alcohol (AAF) was calculated as: $AAF = 1 - \exp(-\beta X)$, where β is the effect parameter estimated in the models, and X here denotes alcohol consumption.

The sensitivity analyses on aggregate findings were performed for mortality from all-causes and all diseases (Norström, 2001), as well as for mortality from liver cirrhosis (Ramstedt, 2001a), suicide (Ramstedt, 2001b), homicide (Rossow, 2001) and ischemic heart disease (Hemström, 2001). We

Table 6.9. Aggregate analysis of diseases, medical care costs.

Disease/injury	Aggregate analysis results			Base case	
	Attributable fraction[a]	No. alcohol-attributable cases	Alcohol-attributable cost (millions)	No. alcohol-attributable cases	Alcohol-attributable cost (millions)
Women					
Liver cirrhosis	0.900	5 290	38.7	2 166	15.8
Ischemic heart disease	0	0	0	-20 227	-195.7
Suicide	0.187	1 766	25.2	610	8.6
Homicides	0.266	1 316	7.0	2 282	9.2
Total		*8 373*	*70.9*	*-16 169*	*-162.1*
Men					
Liver cirrhosis	0.956	5 654	64.2	2 559	28.7
Ischemic heart disease	0	0	0	-41 827	-394.6
Suicide	0.223	1 229	17.2	864	12.2
Homicides	0.278	2 613	20.5	6 412	39.1
Total		*9 496*	*101.9*	*-31 994*	*-314.7*

a per 100,000 inhabitants 15 years and above

excluded accidents since the AAFs became unreasonably high and also higher for women than men (women: 0.90, men 0.70). Further, the existence of a link is only assumed if the coefficient is statistically significant at the 10% level, otherwise a zero relation is assumed. As the time series analyses were based on recorded alcohol consumption, we applied recorded consumption for 2002 in the calculations of AAFs which was 6.9 liters 2002 (SoRAD, 2005). The estimates of all-cause mortality and mortality from diseases will be used for comparison with the base case results on the productivity costs from mortality, while the other specific estimates will be used in alternative calculations of the costs also of alcohol-related morbidity. This last calculation assumes that the morbidity AAFs are identical to the mortality AAFs. The aggregate analysis results are compared with medical care costs in Table 6.9, with early retirement and long-term sickness absence in Table 6.10 and mortality in Table 6.11 for four different diagnoses. The disease-specific total number of cases is the same as reported above. The valuation of the medical care and the productivity losses from early retirement and mortality is the base case average costs per case as reported in section 5.1 and 5.5.

The most obvious difference between the base case and sensitivity analysis based on aggregate results is found for ischemic heart disease, where the aggregate analysis posits a zero relation between alcohol consumption and the disease (see Table 6.9 aggregate analysis of diseases), due to the statistically insignificant result reported in Hemström (2001). There is also a higher cost from all other diagnoses (homicides for men being the exception) in the aggregate analysis because the AAFs are higher compared to the base case. For early retired and long-term sickness absence (Table 6.10) the difference between the two assumptions was 1,630 million higher using assumptions based on aggregate findings (7,220 million as compared with 5,589 million SEK). However, this difference was even greater for mortality (8,678 as compared with 3,069 million, see Table 6.11), and there was no net benefit of alcohol (in terms of cases) if we calculate costs based on aggregate findings.

Table 6.10. Aggregate analysis of early retirement and long-term sickness absence (costs in million SEK).

Disease/ injury	Aggregate analysis			Base case	
	Alcohol attributable fraction	No. alcohol-attributable cases	Total alcohol-attributable cost	No. alcohol-attributable cases	Total alcohol-attributable cost
Early retirement					
Women					
Liver cirrhosis	0.900	6	14.4	3	7.2
Ischemic heart disease	0	0	0	-64	-105.7
Suicide	0.187	0	0.5	0	0.2
Homicide	0.266	0	0	0	0
Total		*240*	*609.9*	*172*	*496.5*
Men					
Liver cirrhosis	0.956	7	21.1	3	10.3
Ischemic heart disease	0	0	0	-181	-368.4
Suicide	0.223	1	2.2	1	1.8
Homicide	0.278	0	0	0	0
Total		*713*	*2 303.9*	*530*	*1 926.0*
*Long-term sickness absence**					
Women			1 093.7		786.8
Men			3 212.2		2 380.1
Total			*4 305.9*		*3 166.9*
Total costs			**7 219.7**		**5 589.4**

The AAF in the sensitivity analysis was 0.0118 for women and 0.0464 for men.

Table 6.11. Aggregate analysis of mortality (costs in million SEK).

Cause of death	Aggregate analysis results			Base case	
	Alcohol attributable fraction	No. alcohol-attributable cases	Total alcohol-attributable cost	No. alcohol-attributable cases	Total alcohol-attributable cost
Women					
Liver cirrhosis	0.900	177	471.6	64	191.1
Ischemic heart disease	0	0	0	-1 086	-1 428.7
Suicide	0.420	132	481.8	32	139.0
Homicide	0.598	20	86.6	12	54.2
Total women		*138*	*1 431.3*	*-1 171*	*-653.8*
Men					
Liver cirrhosis	0.956	366	978.6	155	444.4
Ischaemic heart disease	0	0	0	-1 647	-2 498.9
Suicide	0.502	431	1 643.6	249	1 109.1
Homicide	0.625	39	174.9	39	183.7
Total men		*2 356*	*7 247.2*	*322*	*3 722.7*
Total		**2 494**	**8 678.5**	**-849**	**3 068.9**

Table 6.12. Aggregate analysis of all-cause mortality

	Aggregate analysis		Base case analysis
	Attributable fraction	No. alcohol-attributable cases	No. alcohol-attributable cases
Women	0.031	1 527	-1 171
Men	0.117	5 360	322

In Table 6.12 the aggregate level study results are compared with the base case result on the number of alcohol-related deaths from all-causes. We did not calculate a cost here. There is a much greater burden of alcohol in mortality if we use results for aggregate findings, although the AAF from aggregate data is probably exaggerated. The number of male cases (when not considering any benefit) in the sensitivity analysis was found to be 5,360, thus more than twice the number of male alcohol-related cases estimated for the base case (2,077). An explanation of the large difference is that the baseline analysis includes a large protective effect, mainly from IHD.

6.1.4 Health care costs: co-morbidity

The result of the analysis is found under D in Figure 6.3.

A sensitivity analysis was conducted using the method of Single et al. (1998), where co-morbidity is calculated by taking the difference in average length of stay for all diagnoses without an alcohol-related secondary diagnosis from the average length of stay for all diagnoses with an alcohol-related secondary diagnosis. This difference will be multiplied by the average cost per care day, calculated from the cost data from Region Skåne. In all other issues, the method will be the same as for the baseline calculation. In this sensitivity analysis we find a significant difference from the base case (see Table 6.13). The number of excess care days more than doubled in the sensitivity analysis, while the net costs almost quadrupled, indicating that the choice of method has large implications for the results in co-morbidity calculations. Since the baseline calculation is conducted on a diagnosis level (ICD-10 three digits), while the sensitivity analysis is conducted on an aggregate level, we conclude that the baseline is a more probable result.

6.1.5 Health care costs, valuation

The result of the analysis is found under E in Figure 6.3.

One analysis is conducted regarding the valuation of inpatient care episodes where a unit cost per inpatient care episode was used instead of the cost per diagnosis used in the base case estimation. The unit cost was calculated in the same manner as the unit costs for outpatient and primary care episodes and was weighted for type of care (somatic and psychiatric). The unit cost amounts to 40,728 SEK per care episode and for 42,032 care episodes in inpatient care, the total cost sums to 1,712 million SEK. This is more than double the cost as estimated in base case (774 million).

Table 6.13. Sensitivity analysis on co-morbidity

	Net cost (millions)	**Excess care days (thousands)**
Sensitivity analysis	213.7	44.2
Base case	58.0	21.9

6.1.6 Productivity costs, data

The result of the analyses is found under F in Figure 6.3.

Co-mortality
An additional calculation of co-mortality is presented where the PYLL for individuals with an alcohol-related contributory cause of death is compared to individuals without an alcohol-related contributory cause of death, stratified by underlying cause of death. The estimation of co-mortality is an estimation of the excess PYLL until life expectancy that non-alcohol-related deaths with an alcohol-related contributory cause experience compared to non-alcohol-related deaths without an alcohol-related secondary cause. As for co-morbidity, diagnoses with a causal link to alcohol are excluded to avoid double counting. This difference is then summed and valued as an additional productivity cost. The calculation is made only for chronic diseases without a known causal relation to alcohol, and the concept of co-mortality includes contributory causes of death fully attributable to alcohol (see Table 3.8).

The costs for co-mortality are not differentiated by sex, and we use the mean cost for a PYLL obtained for chronic diseases when using a 3% discount rate. This mean cost was 148,862 SEK for men and 143,188 for women. A sex-weighted mean cost was estimated from using the frequency of male and female PYLLs for chronic diseases with a relation to alcohol (0.634 and 0.366). Thus a mean cost of 146,786 SEK per PYLL was used for calculating the costs for co-mortality. We found 2,624 PYLLs for such cases (Table 6.14). Half of the PYLLs were in deaths having a respiratory disease as the underlying cause of death. A considerable proportion of co-mortality PYLLs for alcohol was also found when gastro-intestinal (21%), circulatory (15%) and infectious diseases (7%) were given as an underlying cause of death. The total cost was estimated at 385.2 millions. Compared with the total net productivity costs for mortality (3 069 millions), co-mortality amount to an additional 12.5% of the costs for mortality. For individuals dying before the age of 65 (retirement age), having a fully alcohol-related contributing cause showed a net sum of -500 working-age PYLL. That is, for those dying before retirement age, having an alcohol diagnosis in addition to their primary diagnosis actually reduced the length of life lost.

Early retirement productivity costs; only including fully alcohol-related diseases
An alternative way to estimate the number of alcohol-related cases in medical care, and as costs due to production losses from early retirement and mortality, is to use those cases where diseases fully attributable to alcohol are mentioned either as a first (underlying cause) or secondary diagnosis (contributory cause). Then, the cost is more confined to long-term chronic alcohol abuse (from current or past abuse) rather than alcohol consumption (from current drinking only). For injuries, only alcohol poisoning will be included as acute short-term abuse, unless there is information on BAC-levels in injured people. In this report, we estimated for early retired the costs for two fully alcohol-attributable disease codes as first or secondary diagnosis. This was possible only for alcohol psychoses, alcohol abuse, alcohol dependence syndrome (F10) and alcoholic liver cirrhosis (K70). With this alternative we do

Table 6.14. Costs and PYLLs for co-mortality by main chronic disease*.

Underlying cause of death	PYLLs	Costs (millions)
Infectious diseases	175	25.7
Circulatory diseases	384	56.4
Respiratory diseases	1 298	190.6
Gastro-intestinal diseases	560	82.2
Other chronic diseases	206	30.3
Total	**2 624**	**385.2**

* The contributory cause has AAF = 1. The mean cost for a PYLL for chronic diseases was used (146 786 SEK). The mean cost was weighted by the frequency of cases for men (0.634153) and women (0.365847).

not need population- and disease-specific relative risks for alcohol consumption groups and we do not need consumption data from surveys on representative samples for all sex- and age groups analysed.

The two methods gave similar costs for both men and women, although with a slightly higher alcohol-related cost for men in the sensitivity analysis (73.6 million higher, as compared with base case), but a higher cost for women in base case compared with the sensitivity analysis (91.7 million higher), see table 6.15. It is interesting though, that for early retirement, costs from long-term heavy alcohol use (abuse) are close to the net costs of alcohol (consumption) as estimated in the base case. Others, however, have found that the use of disease codes fully attributed to alcohol is underreported as a cause of early retirement (Upmark, 1999).

Long-term and short-term sickness absence – older Swedish data

An alternative data source on long- and short-term sickness absences is a longitudinal study in Stockholm that reported the average number of sick-days per year during a follow-up period of 1986 to 1991 (Upmark et al., 1999). There have been a number of changes in the Swedish social security system since that time, so the applicability of the data might be questioned. We use the excess number of sick-days for the moderate consumers and the high consumers in comparison with the low consumers. The abstainers have a higher number of sick-days than the low and the moderate consumers, but we assume this is due to other factors than alcohol consumption (such as abstainers might abstain because of disease and/or medication, which would also imply higher levels of sickness absence – see Shaper et al., 1988).

Table 6.15. Sensitivity analyses on estimating alcohol-related productivity costs due to early retirement.

	Alcohol-related cases		Cost due to alcohol (million SEK)	
	First/secondary 100% AAF (alcohol abuse)	Base case (alcohol consumption)	First/secondary 100% AAF (alcohol abuse)	Base case (alcohol consumption)
Men				
18-29	2	4	10.3	19.0
30-49	210	222	1 007.9	1 009.7
50-64	337	303	972.4	897.4
Total	*549*	*530*	*1 990.6*	*1 926.0*
Women				
18-29	2	4	8.5	14.9
30-49	44	83	168.4	295.5
50-64	96	85	227.9	186.2
Total	*142*	*173*	*404.8*	*496.5*
Total				
18-29	4	8	18.7	33.9
30-49	254	305	1 176.4	1 305.1
50-64	433	389	1 200.3	1 083.5
Total	**691**	**702**	**2 395.4**	**2 422.6**

* From alcohol-specific diseases [ICD-10 code F10 (alcoholic psychoses, alcohol abuse, alcohol dependence syndrome) or K70 (alcoholic cirrhosis) as first or secondary diagnosis] compared to base case.

Table 6.16. Sensitivity analysis on productivity costs for short-term and long-term sickness absence

	Number of sick-days	Excess number of sick-days*	Productivity costs per person	Number of persons**	Productivity costs, (in millions)
Women					
Abstinence	28.5	na	na	266 871	0
Low consumption	21.6	0	0	925 874	0
Hazardous cons	20.2	-1.4	-1 739	141 877	-246.7
Harmful cons	35.5	13.9	17 264	43 989	759.4
Total					*512.7*
Men					
Abstinence	23.1	na	na	194 959	0
Low consumption	12.3	0	0	1 273 675	0
Hazardous cons	16.8	4.5	6 674	115 500	770.8
Harmful cons	20.8	8.5	12 606	109 315	1 378.0
Total					*2 148.8*
Sum					**2 661.5**

* in comparison with low consumption
** in the ages 18-64 years
na: not applicable
Source: Adapted from Upmark et al. (1999)

The analysis results in productivity costs of about 2,660 million SEK per year, to be compared with the base case estimate of around 4,342 million, when the short-term and long-term absence costs are summed. As women consuming at a hazardous level had the lowest number of sick-days, which offsets some of the costs for the women with harmful consumption, the costs for women are considerable lower than the costs for men, see Table 6.16.

Long-term sickness absence – only available 2002 data

The only available register data on sickness absence was included in a report on the 25 most common diagnoses underlying long-term work absence (≥15 days) from the Swedish Social Insurance Agency (RFV, 2004). Alcohol dependence etc. (F10-F19) was the 16th most common diagnosis for men, at 1.5% of the payments of sickness benefit. For women, the diagnosis was not included among the 25 most common, so it is not possible to perform any calculations on the costs for women. The report was based on a random sample of 23,600 cases of long-term sickness absence that started the first two weeks in February in the years 1999, 2000, and 2001, and the two last weeks in January in 2002. We assume that the sample is representative for all cases during the year of 2002. The total sum of long-term sickness benefits paid to men was also obtained from the Agency (RFV, 2006a). To arrive at the productivity costs some further assumptions have to be made, as the sickness benefits paid do not correspond to the productivity lost. The reason is that the recipients only receive part of the wages lost, and also because the wages among the sick may be lower than the average wage. The Agency report also states the average sickness benefits paid per day per case for the diagnoses, which is used to arrive at the total number of days, and eventually months, with long-term sickness absence, which is then valued with the base case valuation of productivity costs.

The total sum of sickness benefits paid (for absences +15 days) during 2002 for males were 17,203 million SEK, so the 1.5% of the benefits that were paid for alcohol diagnoses amount to 258 million SEK. The average daily benefits paid per case for the alcohol diagnoses was 445 SEK per day, so the number of days for sickness-absence can be estimated at around 580,000, which is eqivalent to 19,300

Table 6.17. Sensitivity analysis on productivity costs for short-term and long-term sickness absence, aggregate analysis.

	Women	Men	Total
Number of days			
Short-term	2 913 006	4 016 380	6 929 387
Long-term	22 279 360	24 250 770	46 530 130
Total number of days	*25 192 366*	*28 267 150*	*53 459 517*
Productivity cost (million SEK)			
Short-term	3 618	5 956	9 574
Long-term	27 671	35 964	63 635
Total	**31 289**	**41 920**	**73 209**

months during the year. Using the average productivity costs per month of 32,600 SEK (average over the age groups 18-64 years), the productivity costs are estimated at 631 million SEK. The data give a considerable lower long-term sickness absence cost than the base case of 3,200 million. No data on female long-term sickness absence were available.

Long-term and short-term absences: aggregated data
The last sensitivity analysis on sickness absence aims at using time-series data to estimate the role of alcohol in registered sickness absence for the time period 1935-1990. According to Boman et al. (2005), a one litre increase in per capita alcohol consumption was associated with 13% higher sickness rates (including both long-term and short-term) for men and a 5.6% increase among women (not statistically significant). Thus, the fraction of sickness absence that can be attributed to alcohol (AAF) was calculated as: $AAF = 1 - \exp(-\beta X)$, where β is the effect parameter estimated in the model (0.13 for males), and X denotes alcohol consumption per capita in 2002 (6.9 litres, based on self-reported data). The estimated alcohol-attributable fractions are applied to the number of short-term sick-days (RFV, 2006b) and long-term sick-days (RFV, 2006c). The analysis gave the result that 59% of the sickness absence was due to alcohol for men and 32% for females. Applying these alcohol-attributable fractions to the numbers of sick-days resulted in more than 50 millions working days lost, which would amount to productivity costs of 73,200 million SEK, to be compared with the base case estimate of 4,300 million SEK, see Table 6.17. The estimated alcohol-attributable fractions are however implausibly high.

6.1.7 Productivity costs, valuation

The result of the analyses is found under G in Figure 6.3.

Only market productivity costs
The first sensitivity analysis on the valuation of the productivity costs excludes the value of non-market production, and thus includes only productivity losses from paid market production performed before the age of 65.

Hybrid approach
Another analysis on the value of productivity costs because of premature mortality and early retirement follows the method in a recent cost-of-alcohol study from Canada (Rehm et al., 2006). The value of the lost productivity is estimated by a modified human capital method complemented with the friction cost method (Koopmanschap et al., 1995), called the Hybrid approach. The productivity costs during the friction period are assumed to amount to the median wage, 19,700 SEK per month in year 2002 (Statistics Sweden, 2003a), with added wage taxes (40% in Sweden). The friction period is as

Table 6.18. Productivity costs valuation for sensitivity analyses, per month, in SEK 2002

	Non-market				Total*			
	Minimum, leisure-time based		High, market-based		Minimum, leisure-time based		High, market-based	
Age group	Women	Men	Women	Men	Women	Men	Women	Men
0-14	0	0	0	0	0	0	0	0
15-17	0	0	0	0	0	0	0	0
18-29	3 474	2 627	24 577	17 031	27 974	29 367	49 077	43 771
30-49	5 272	4 277	31 838	21 162	33 972	39 312	60 538	56 197
50-64	5 090	4 832	30 640	23 187	33 883	40 952	59 434	59 307
65-80	5 865	4 692	38 021	30 417	5 865	4 692	38 021	30 417
80+	5 064	4 947	32 825	32 064	5 064	4 947	32 825	32 064

* incl. market production

sumed to last for 3 months. The value of the productivity costs during the friction period is thus around 80,000 SEK per individual. However, the loss of leisure time for the previously unemployed individual is also included in the productivity costs, valued by the replacement method using Canadian data. We instead use the base case valuation of non-market production used in this study, age- and gender-specific, until the age of 65 years. The future losses are discounted at 3%. No changes in future productivity or adjustments of labour force participation are included, in contrast to the Canadian study (Rehm et al., 2006).

Friction costs
In another set of analyses we included only the friction cost estimation from the Hybrid method, for 3, 6 and 12 months.

Valuation of non-market productivity costs
As there are no clear recommendations on the valuation of non-market work, we use two alternative values (see Table 6.18). One is based on the replacement cost principle, as was the base case valuation, but instead of wage levels for cleaners, the valuation is taken from the price per hour for private home cleaning performed by private companies (250 SEK per hour), called the high market-based valuation. The other valuation of non-market production can be called the opportunity cost principle, by which the time spent on non-market production is valued as forgone leisure time, called the minimum leisure-time based valuation. This principle is the most commonly used in Swedish studies, with a standard valuation of 35% of the wage rate (Claesson et al., 2000), wage taxes excluded.

Table 6.19. Costs in added life years, per year, in SEK.

Age group	Costs per year
0-14	130 540
15-17	130 540
18-29	-20 698
30-49	-112 188
50-64	-60 005
65-80	147 685
80+	244 200

Source: Adapted from Swedish Pharmaceutical Board, www.lfn.se/upload/FÖR_040506_tabell_ekman.pdf . Accessed October 2005.

Table 6.20. Sensitivity analysis on valuation of productivity costs for mortality. Net costs in million SEK and 3% discount rate

Valuation of costs	Women	Men	Total
Base case	-653.8	3 722.5	3 068.9
Market production only	379.3	2 576.3	2 955.6
High, market-based valuation of non-market	-1 675.4	4 851.0	3 175.6
Low, leisure-time valuation of non-market	67.6	3 009.7	3 077.3
Costs in added life-years	-1 592.7	-404.6	-1 997.4
Hybrid approach	45.7	183.2	228.8
Friction method (3 months period)	16.2	78.3	94.5
Friction method (6 months period)	32.3	156.6	189.0
Friction method (12 months period)	64.7	313.3	377.9

Costs in added life-years
In Swedish health economics, there is yet another method to value lost life-years, the costs in added life-years (Johannesson & Meltzer, 1998; Swedish Pharmaceuticals Board, 2003). The method, also called the net production, calculates the difference between market production and market consumption for different ages, leading to increased costs for the survival of people younger than 19 years and older than 64 years (see Table 6.19). To fit this study's age groups, some assumptions and recalculations had to be made.

The five different valuations of production loss are reported in Table 6.20. For women the cost was highest (379 millions) if we only calculated costs from market production, and for men the cost was highest when we used a high market-based valuation of non-market production (4,851 millions). The net cost for women when using market production only is because most cost reductions for women are for non-market production in those aged 65 years and above. Note that the analysis with costs in added life years results in large cost reductions because of alcohol-related mortality, and that various assumptions on frictions costs (also in the hybrid approach) give much lower production costs from mortality.

6.1.8 Social services, data

The result from the analyses is found under H in Figure 6.3.

In order to perform a sensitivity analysis for the estimation of alcohol-related costs in the social service we use two other assumptions of the alcohol-related fraction among the clients in treatment from the IKB-study. The first starts out from only "pure" alcohol cases in treatment, i.e. excluding cases where alcohol and drug abuse are combined, giving 49%. The second estimation counts all cases as alcohol-related where alcohol and drug abuse are mixed, which yields an estimate of 81%.

For treatment of adults, costs range between 2.0 and 3.2 billion SEK, whereas for the area of child and youth welfare, the range is between 1.3 and 2.2 billion. In total, the sensitivity analysis indicates that alcohol-related costs within social services could be between 3.3 and 5.4 billion SEK in 2002.

6.1.9 Employers' costs, data

The result of the analysis is found under I in Figure 6.3.

The only costs for employers included in the base case estimate is the cost for Employer Assistance Programs, included under Health care costs as non-state funded costs. The costs for employers because of alcohol consumption among the employees might however be considerable. A frequently cited data in Sweden is that alcohol costs employers 3% of the total wage sum, including wage taxes (Alna, 2006). One sensitivity analysis is thus performed based on that data, reflecting the uncertainty on the validity of the data. The 3% of wages is based on the assumption that individuals with a risky consumption, around 15% of the population, have a lower productivity and sickness absence of 5% of the wage, while individuals with a high risk consumption, about 9.5% of the population, have a reduced productivity and increased sickness absence of 25% (Alna, 2006). The assumptions seem partly based on the so-called "Stanford Model" (Hermansson & Rönnberg, 2003). The total sum of wages and wage taxes in Sweden amounted to 1,274 billion SEK in 2002 (Statistics Sweden 2002c; 2002d; 2002e; 2003b). The analysis results in around 38,223 million SEK in costs for employers because of reduced productivity-on-the-job and sickness absence. To avoid double-counting the cost for sickness absence, as the employers are responsible for paying the benefits, the 1,175 million productivity costs estimated for short-term sickness absence are deducted, even though the full value of the productivity costs are not paid by the employers, as the benefits are lower than the wages.

6.1.10 Valuation of intangible cost – quality-of-life losses

The result of the analysis is found under J in Figure 6.3

A monetary valuation of the QALYs lost because of alcohol consumption is performed. The value used per QALY is 340,000 SEK, based on results from a Swedish pilot study on methods to measure the population valuation of a QALY (Hjalte et al., 2005). The costs amount to around 35 billion if the mortality QALYs are excluded, and to 41 billion if they are included (see Table 6.21).

6.1.11 Discount rates

The result of the analyses is found under K in Figure 6.3.

While the base case analyses used a discount rate of 3%, sensitivity analyses were performed with alternative discount rates of 6% and 0%. The total productivity costs resulting from potential years of life lost (PYLL) is much higher if we assume no discount rate as compared with a 3- or a 6- % discount rate. The difference is greater for mortality than for early retirement (Table 6.22). This is because the number of lost years per case is higher for alcohol-related deaths than for early retirements. It is of some interest to mention that there is a net cost for women (958 million SEK) when we use no discount rate. The cases 'prevented' by alcohol are among the oldest, whereas a large part of the alcohol-related cases occur relatively early in life giving a large number of lost years per case.

Table 6.21. Attaching monetary values to the estimated QALYs lost, in billions SEK.

	QALYs lost	Monetary value
Mortality	24 603	8.4
Consumers	68 804	23.4
Crime	1 216	0.4
Somebody close having a DP	16 301	5.5
Sharing a household with somebody having a DP	10 867	3.7
Total	**121 790**	**41.4**

Table 6.22. Sensitivity analyses on discount rates, alcohol-related productivity costs due to mortality and early retirement (million SEK).

Productivity Costs	Discount rate (%)		
	0	3*	6
Mortality			
Men	12 817 .4	3 722.7	1 084.7
Women	958.0	-653.8	-918.1
Total	*13 775.4*	*3 068.9*	*166.6*
Early retirement			
Men	3 151.2	1 926.0	1 238.4
Women	864.9	496.5	302.1
Total	*4 016.1*	*2 422.6*	*1 540.5*
Total	**17 791.5**	**5 491.6**	**1 707.1**

* Base case

6.1.12 Deadweight losses

The result of the analyses is found under L in Figure 6.3.

To account for the so-called deadweight losses that are assumed to arise because of inefficiencies introduced by tax-financing, we adjust all costs for health care, for crime, for social services and for policy and prevention with three different rates: 30%, 53% and 130%. The rate of 30% is used in the traffic sector to account for the deadweight loss of tax-financing (SIKA, 2002). The second rate is also used within the traffic sector and includes the deadweight loss as well as an adjustment for the VAT tax, and is thus the rate that is used for most of the costs in the traffic sector (SIKA, 2002). The higher rate, 130%, has previously been used in analyses on the financing of the pharmaceutical sector in Sweden (Gerdtham & Jönsson, 1993). When all tax-financed costs, totaling around 9.8 billion SEK are adjusted with the three rates, the total costs increase by 3.0, 5.2 and 12.8 billions SEK respectively.

6.1.13 Most conservative

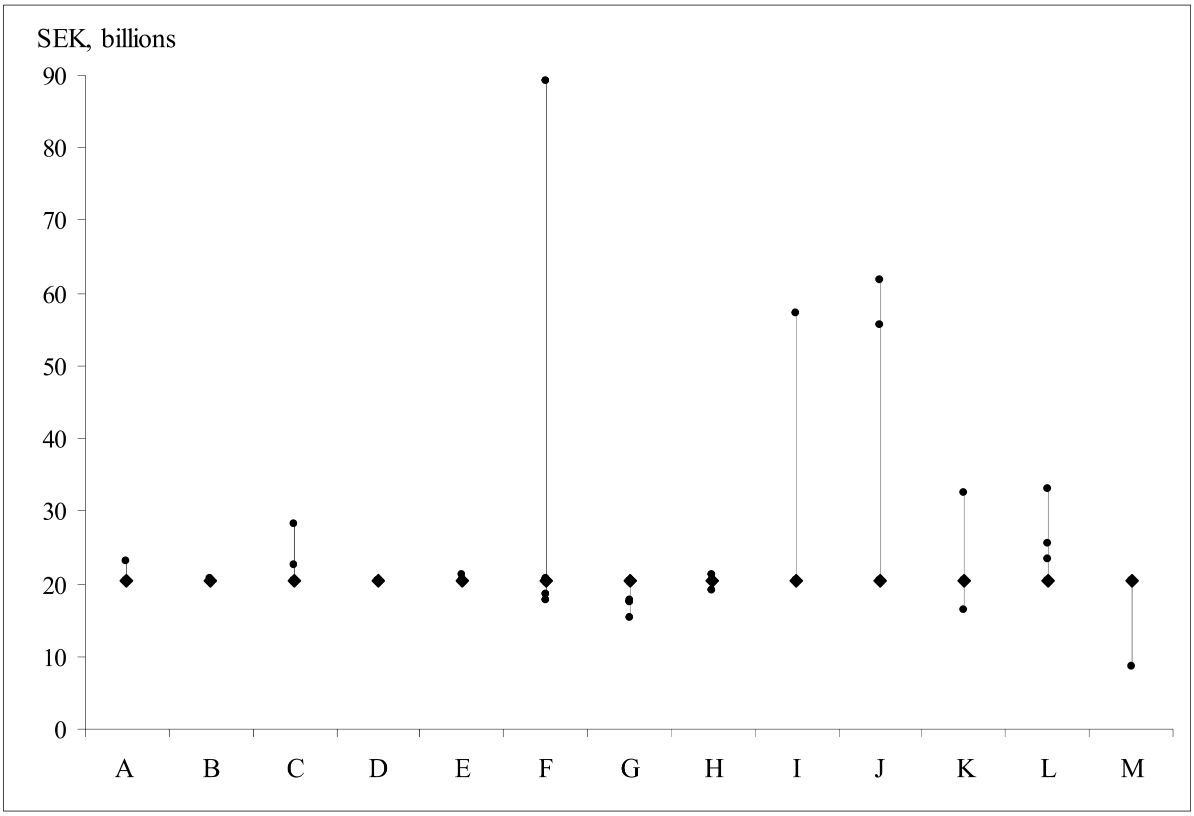
The result of the analysis is found under M in figure 6.3.

The final analysis combines all plausible results that achieve a lower cost than the base case estimates, and must therefore be seen as the most conservative estimate possible. The analysis more than halves the overall result, as the costs are decreased by 11.6 billion SEK. The reduced cost is almost entirely due to two assumptions; a discount rate of 6% (K), which reduces the costs by nearly 4 billion and the inclusion of costs in added life-years (G), which decreases the costs by 5 billion. These two assumptions are methodological, i.e. they do not refer to alcohol-specific issues but only to the health economic methods employed: which future costs to include and how to value them. The other two assumptions, which decrease the overall result by a total of nearly 3 billion, are the exclusion of combined cases of alcohol and drug abuse for social service costs (H), and the use of older Swedish data on alcohol-related sickness absence (F). Although we term this most conservative result plausible, it is deemed too conservative and in our view the best estimate is still the base case estimate.

6.2 Summary of sensitivity analyses

Figure 6.3 shows a summary of the sensitivity analyses, highlighting the span in total costs due to the different assumptions. The base result, to which the alternatives are compared, is the 20.3 billion SEK which includes the mortality productivity costs and the cost reductions because of alcohol consumption. The largest difference in total costs is found for the productivity costs data (F), which used aggregate data on sickness absence, with an implausible result which increased the total costs to 90 billion SEK. The valuation of QALYs in monetary terms (J) increased the costs by 41 billion if mortality is included and by 35 billion if it is excluded, while the estimate on the employers' costs (I) increased the total costs to over 50 billion. The analysis which only includes costs for ages 15-64 years (A) increases the total costs by nearly 3 billion SEK, even though the health care costs decreased by around 0.3 billion. The eight different valuations of the productivity costs (G) mainly changed the result downwards, but not to a large extent. The only other analysis that reduced the costs was the discount rates (K) where the higher rate of 6% decreased the costs by around 4 billion SEK. Finally, the most conservative estimate (M) that only included the analyses with decreased costs more than halved the total costs, mainly due to the methodological choices of discount rate (6%) and the inclusion of costs in added life-years.

Figure 6.3. Summary of sensitivity analyses, in billions SEK.



A. Age groups 0-64 years; B. Size of consumption groups; C. Disease and injury risks; Aggregate data; D. Health care costs, data; E. Health care costs, valuation, F. Productivity costs, data; G. Productivity costs, valuation; H. Social services, data; I. Employers' costs, data; J. QALYs, valuation; K. Discount rates; L. Deadweight loss; M. Most conservative

7. DISCUSSION

7.1. The overall result

Our base-case result is that the social costs of alcohol in Sweden in 2002 were 20.3 billion SEK, representing about 2 800 SEK for each resident of Sweden aged 15 and over, and about 1% of the GDP. The size of the cost burden is in itself an ample justification for policy attention to alcohol, and for substantial efforts to search for appropriate measures to reduce the harms from drinking in Swedish society.

In preparing this estimate, we have largely followed current international guidelines and practices for cost-of-alcohol studies. In general, but not in all respects as noted below, these guidelines point towards relatively conservative decisions about what is counted and how it is counted. Costs which are uncounted would raise the figure, as would a decision to focus only on gross costs, without subtracting for protective effects. Counting in intangible costs, i.e. the losses in quality-of-life of drinkers and those around them, would raise the total further. The sensitivity analyses (see below) suggest, however, that making more generous and inclusive assumptions would not be likely to produce a figure as high as the only previous estimate of the costs of alcohol in Sweden (Johnson, 1983). The earlier study was carried out with more limited means and materials than ours, and before the present substantial international consensus on cost-of-illness methods was reached. It deserves respect as a pioneer effort, but in our view has now been superseded.

Whether our base-case result or some other result from the sensitivity analyses is chosen as the favoured estimate, it remains clear that the social cost of alcohol in Sweden in 2002 was very substantial. Almost half of the costs we were able to identify were paid by one or other level of government, with the municipal level accounting for the greatest governmental share. At least for health care costs, where the clearest comparison is possible (Table 5.9), the cost is quite heavily concentrated in the heaviest drinking group. The much larger numbers who drink less mean that low consumers account for a smaller share of the cost and also a cost reduction suggesting that there is not a preventive paradox, at least in terms of chronic diseases.

7.2. Ranges of variation in the estimates

There is an element of arbitrariness in choosing any single figure to put forward as the cost of alcohol in Sweden. Behind any figure lies a myriad of decisions which, decided differently, would result in smaller or larger changes in the figure. We have therefore undertaken a substantial number of sensitivity analyses, in which different decisions about how to calculate are tried out. On the one hand, these allow the reader to choose another figure, based on decisions s/he considers to be more defensible. On the other hand, the sensitivity analyses give a sense of how much variation in results different decisions can make.

As Figure 6.3 shows, three sensitivity analyses stand out as giving total results which are several times those in the base case. One (F in the figure) is from an aggregate-level analysis assigning a very high rate of sickness absences as being due to alcohol, 59% for males and 32% for females. This estimate is much higher than from individual-level studies (both in our base case and in a sensitivity analysis using older data). As noted in chapter 6, we considered it to be implausibly high. The other (I in the figure) results from an undocumented estimate on the costs for employers probably derived from U.S. material, but frequently cited in Sweden. The third analysis (J) included a monetary valuation of the QALY losses. The fourth highest point in Figure 6.3 (at the top of L) results from assigning a deadweight loss of 130% for inefficiencies presumed to be introduced by tax financing. Assuming such a high rate for deadweight loss from taxes might be seen as having more to do with ideology than reality.

Setting these estimates aside as highly improbable, the sensitivity analyses included in Figure 6.3 result in estimates within a range of 50% (up or down as compared with base case). The total cost figure rises substantially (K in the figure) if a zero discount on future productivity losses from early death or retirement is applied. On the other hand, the figure falls (G in the figure) if the "costs in added life years", which includes cost reductions from reduced consumption during lost life-years, are added. Apart from using different estimates in the sensitivity analyses, the cost estimate is also substantially affected by what is included and excluded. Excluding the productivity costs from premature mortality, as has been urged in the economics literature, would lower the estimate from 20.3 to 17.3 billion SEK. On the other hand, using a gross measure of costs, without reduction for presumed beneficial health effects, would raise the estimate from 20.3 to 29.4 billion SEK. Both of these options are highly defensible choices in measuring the costs of alcohol in Sweden. Adding cost estimates for "intangible costs", that is, attaching a monetary value to impairment of the quality-of-life in various ways because of someone's drinking (Table 6.21), would greatly increase the cost estimate, from 20.3 billion for the base case to over 60 billion SEK. Expressed in gross terms, without reduction for beneficial health effects, the figure would reach 70.8 billion. However, in our view such a figure should not be regarded as a valid and reliable estimate for policy purposes. We are only at the beginning of developing valid ways for measuring alcohol's impact on the quality-of-life and the bases for converting QALYs into costs in kronor are controversial.

Lastly, there is the question of what are the potential effects on the cost estimate of the lacunae we found in the available Swedish data. One obvious missing piece is the loss of productivity due to drinking among those in the current workforce. Rough and empirically poorly grounded estimates are often made of quite high costs for these losses (e.g., Alna, 2006, included in a sensitivity analysis). However, our preliminary analyses of Swedish population samples suggest that these costs may not in fact be very high. And since there are also longitudinal studies supporting the idea that moderate drinkers have lower overall absence rates than abstainers and heavy drinkers (Zarkin et al, 1998; Upmark et al, 1999), this area is difficult. In previous studies, costs for alcohol-related sickness absence have not used the same orthodoxy as for mortality and health care costs. On the one hand, Swedish work life is still generally governed by the greatest long-term effect of the temperance era, which was to largely remove alcohol from the workplace, except for such special occasions as workforce Christmas lunches. On the other hand, in 2002 the relatively generous sick-leave and early retirement provisions, paid for largely by the state, provided an honourable way for employers to shed troubled employees – and we can see from the estimates we have made that these included heavy drinkers. (These provisions are now being tightened.)

Other missing pieces are parts of the crime estimates: most costs in anticipation of crime, in terms of locks and other security costs, and the costs from the alcohol-related fraction of types of crime not included in our analysis. Comparisons with cost-of-alcohol studies elsewhere (see Table 7.1) show that it is possible to develop defensible figures which are much higher than in our analysis. However, if we followed the general principles which we have used in our analysis, one might guess that filling in the missing data would not add more than 5 billion SEK to our estimate.

Almost certainly, the largest missing piece in the base case estimate is the costs of harms to others from drinking. Some of these harms are included and costed in the estimates for crime and for injuries, but most of them are not; in particular the potentially negative role of drinking in family life for the children, the long-term psychic harms for victims of alcohol-related crime, and the worry generated in the general population for fear of such crimes. The intangible cost estimates noted above put us on notice that a full measurement of these harms, along with defensible methods of assigning costs to them, might well triple the cost estimate of our base case.

7.3. Comparison with previous Costs of Alcohol studies

The base result in the present study of around 245 USD PPP (2003) per capita is in the lower range of previous cost-of-alcohol studies, as detailed in Table 7.1, where the total costs range between USD PPP 350-400 per capita (for Scotland, Australia and Canada) and $760 (for the US). The reasons for differing results for different nations are multiple: from different alcohol consumption patterns and societal norms and values, to differing institutional systems affecting treatment practices and relative prices for services. The methodology in the cost-of-alcohol studies also differs, in particular on which cost items are included and how they are valued (Andlin-Sobocki, 2004), as well as the manner of estimating the alcohol-related fractions of costs. One reason for the comparatively low results from this study is the inclusion of cost reductions due to the presumed beneficial health effects of moderate alcohol consumption. These cost reductions however only affect the health care costs and the productivity costs.

The health care costs in this study amount to 26 USD PPP per capita, which is higher than the Australian estimate of 10 USD PPP but lower than the most recent Canadian estimate of 90 USD PPP, which both include cost reductions. If the cost reductions are excluded, this study's estimate is 40 USD PPP, which is in accordance with the studies from Scotland and Norway (even though they include some cost items not included by us and exclude others). Our estimate is considerably lower than the US estimate of 97 USD PPP. However, in part the difference reflects that social responses to drinking problems which are counted under health care costs elsewhere appear under "social intervention" in the Swedish study; the Swedish Social service cost (53 USD PPP per capita) is thus higher than elsewhere. Adding the Health care and Societal intervention columns together, the Swedish total for health and welfare responses is still lower than the North American results, but higher than the other European results.

Comparison of the productivity costs is hampered by the multiple methods of estimating them. If we include the mortality productivity costs and disregard the cost reductions because of beneficial health effects to enable comparisons, the costs per capita from our study would amount to 221 USD PPP, which still is low compared to the Norwegian and US studies but in accordance with the results from the UK. Not included in our estimates are reduced productivity while at work (included in the Canadian, the Norwegian and the US studies) and costs due to increased unemployment (included in the Norwegian and UK studies). The valuation of the mortality productivity costs also differs between studies, where the most recent Canadian study used a hybrid method (which is a modified human capital/friction costs method), leading to lower costs, and the Scottish study used the willingness-to pay approach, which led to higher costs. As did we, most studies also include household non-market production in the valuation of the losses. However, our discount rate of 3% would increase our results comparative to the other studies' higher rate, most commonly 6% (which in a sensitivity analysis decreased the costs with nearly 4 billion).

The crime costs per capita in previous studies range between 32 (US study) and 359 USD PPP (UK study), with the Norwegian study reaching 132 USD PPP. Our estimate amounts to 34 USD PPP (42 if productivity costs for prison inmates is included) and is thus again found in the lower range. Apart from institutional differences between nations which translate into cost differentials, the differences

Table 7.1. Cost-of-alcohol studies. Costs per capita, PPP US$ 2003.

Study	Healthcare	Productiv-ity loss	Criminal Justice System	Societal inter-Vention	Intangible costs	Other	Total
Sweden (Johnson, 1983)	393	948	49	181		340	1 911
Scotland (Scottish Executive, 2001)	31	203	87	28			349
United States (NIDA, 2002)	97	550	32	4		78	760
Australia (Collins & Lapsley, 2002)	10	80	50		91	110	343
England &Wales (UK Strategy Unit, 2003)	44 - 45	164 - 202	359		11		578 - 626
Norway (Gjelsvik, 2004)	22 - 39	288 - 312	132	9			451 - 492
Canada (Rehm et al., 2006)	90	195	84	3		25	397
The present study							
Base result	26	126	34	59	X		244
(excl. cost reductions)	38	221	34	59	X		352

X. Estimated to 121,708 OALYs corresponding to 41.4 billion SEK (498 PPP US$ per capita). Not included in the base case.

between our study and the others can mainly be found in the attributable fractions, where we have applied low alcohol-related fractions and included only registered crime. There are also differences in cost items included, where some studies have included more types of costs for loss or damage of property (the US, UK, and Australian studies) or a large number of costs in anticipation of crime (the UK and Norwegian studies), while only some studies included administrative costs for insurance companies, as we did. In our study, the different cost items arising from drinking driving are included in health care costs, in productivity costs and in crime costs, while several other studies included these costs under “other costs”.

The societal intervention category contains very different cost items in the studies and our study would include both the social services costs, of 53 USD PPP, and the research, policy and prevention costs of 6 USD PPP, thus totalling 59 USD PPP. The Scottish study is the only study that particularly mentions social work for families and children and community care, amounting to 28 USD PPP, while the Canadian study includes some health promotion and prevention work in the category. Several studies instead include administrative costs for welfare programs in the category, leading to costs of 4 USD PPP in the US study. As mentioned above, the health care system is credited in other studies with many of the social services costs as well as the research, policy and prevention costs counted separately in our study. Finally, in the category “other costs” some studies include traffic accidents and costs for fires, which we included under the respective type of cost, but also some costs for employers, such as drugtesting and Employer Assistance programs (in the Canadian study). Their total costs for the category amounts to around 25 USD PPP, compared to our estimate of 1 USD PPP for EAP (included in the health care costs).

Special considerations are needed to compare the present study with the only previous Swedish study (Johnson, 1983; with updated versions 2000, 2004 – see Table 2.1), which quoted total costs of 156 billions SEK in the year 2004, and 1,911 USD PPP per capita from the study in 1983. The study was performed before the era of standardized cost-of-alcohol studies and its methods are different in several ways, leading to very high costs. For example, the costs of purchasing alcohol are included in the "other costs" category, amounting to 340 USD PPP per capita; a cost item that today is deemed not being a cost to society. For the health care cost estimates, Johnson (1983) assumes that 6% of the total costs are due to alcohol, based on studies performed at the time, leading to costs of 393 USD PPP, ten times as high as our estimate. The productivity costs are also very high, amounting to about 950 USD PPP, due to the high proportions of early retirement designated as alcohol-related (23% of all male and 5% of all female), as well as 15% of the sickness absence.

In conclusion, our cost-of-alcohol estimates are relatively low in comparison with previous studies. One of the reasons is the cost reductions included for the presumed health benefits. These reductions are also made in other recent studies, but the distribution of causes of death in the Swedish population results in larger than the usual reductions. Even so, it seems that all our estimates fall in the lower range of previously reported results. Part of the explanation is lack of accurate Swedish data, which forced us to exclude some fairly large cost items found in other studies (Baumberg, fortcoming): it is, however, questionable if this is all of the explanation. A factor to be taken into account is that this study has throughout tried to make conservative estimations. Connected to this is the improvement in certain estimates resulting from the relatively extensive data material in some areas in Sweden. For example a sensitivity analysis for inpatient costs shows that the improved costing used in this study gives much lower results than if methods previously used had been employed (see chapter 6). Against common expectations, better data may actually result in lower estimates, something that is also evident for certain cost categories in Appendix 3.

One possible explanation of the relative low Swedish figures, of course, is in terms of Swedish alcohol policies, in some aspects at least in combination with popular sentiment and behaviour. In the drinking driving area, for instance, it is clear that Swedish rates are low in a comparative perspective, due both to stringent legislation and to a high degree of compliance with the ideal of alcohol-free driving, just as Swedish driving fatalities per kilometre driven were the lowest among OECD countries in 2002 (OECD, 2002). Though control of alcohol marketing and availability is weaker than in the past, Swedish alcohol controls remain stronger than in most countries (Karlsson & Österberg, 2001), and there is some evidence that such alcohol controls have a particularly strong effect on marginalized heavy drinkers (Room et al., 2002), the very drinkers who contribute disproportionately much to social costs. Furthermore, costs of alcohol in 2002 may have been held down by the history of alcohol consumption in previous years. In 2002, estimated total alcohol consumption had risen 27% since 1995 (Leifman & Gustafsson, 2003:103), and some of the increased chronic disease that the 2002 consumption level would imply would not be apparent in the morbidity and mortality until later years. An aspect which might be expected to raise the costs in Sweden is the pattern of drinking. Rehm et al. (2004) rank Sweden in the second highest hazardous consumption score (3 on a scale from 1-4, mostly reflecting the proportion of drinking occasions with intoxication). All studies in Table 7.1 except Norway are on countries with a lower hazardous consumption score (2), and might thus be expected to experience a lower societal cost of alcohol, all else equal.

Another factor which might have been expected to drive up the social costs of alcohol in Sweden is the high societal investment in welfare services. Sweden's provision of care specifically for alcohol problems is relatively dense by international standards, although quantitative comparisons are hard to come by (Takala et al., 1992). The system includes civil commitment procedures for compulsory treatment. But these are used for only about 500 alcohol cases per year and there is little diversion to treatment from the criminal justice system, as is found in many English-speaking countries. Furthermore, the alcohol treatment system seems to be quite narrowly directed: a study of the Stockholm county health and welfare system found that those who used alcohol treatment services were quite marginalized, the alcohol cases in any one year amounted to about ¼% of the population (Storbjörk & Room, 2006). Once it is taken into account that Sweden provides services through welfare which elsewhere are often provided through health services, the Swedish general investment in welfare may not impact on social costs of alcohol as much as expected. As we noted in the first chapter, despite the increased standardization of methods in cost-of-alcohol studies, it remains difficult to make meaningful cross-society comparisons. One possible explanation of the relatively low figures for our study of Sweden is that they represent a success of Swedish alcohol policy. But such an explanation remains only a possibility, one among various competing explanations.

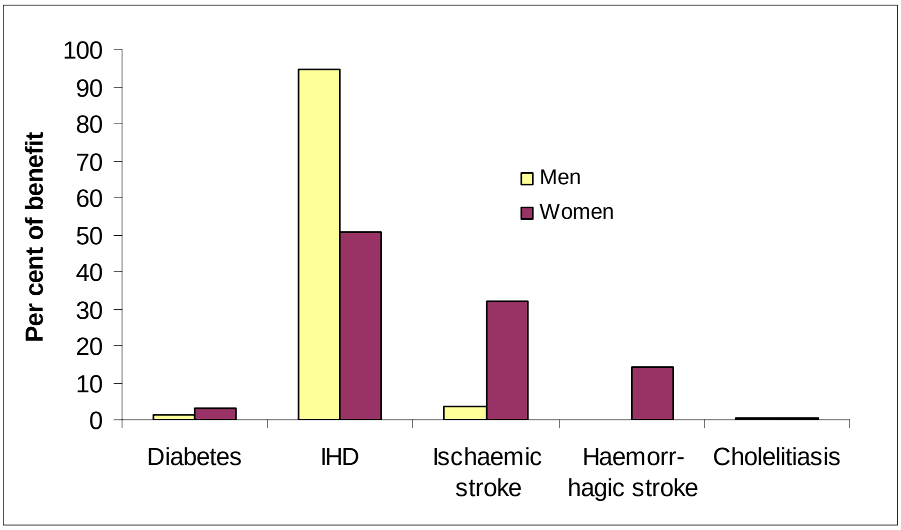
7.4. Discussion of assumptions and sources of error

The methodology used for the base case estimation of costs assumes that alcohol consumption in the year studied is responsible for all the costs, whereas the outcome is most often due to individual consumption from past years. It is likely that we will overestimate the number of alcohol-related cases among low to moderate drinkers, as well as the protective effects, because we observed a great discrepancy between surveys regarding the size of the non-drinking group in the population (see section 3.2.). In one study a considerable share (25%) of cirrhosis deaths occurred in abstainers by self-report (Gordon & Doyle, 1987). This was a prospective cohort study, thus suggesting that of all liver cirrhosis cases in the future, a considerable share might occur among 'non-drinkers' who change their behaviour to heavy drinking in the follow-up period, or were misclassified as abstainers at baseline. Misclassification of consumption is a difficult area, but any misclassification will affect estimates in our base case. There tends to be individual life-course mobility towards abstaining and lower drinking levels with increasing age among both women and men aged over 29, at least as found in data from the monitoring survey (Table 3.5). These data also suggest that there is a large group of low consumers and abstainers in Sweden, concentrated in the older population, and particularly among elderly women. The size of the group of low consumers, along with its distribution in the population, becomes very important for the estimates of the protective effects of alcohol, based on the prevailing epidemiological findings.

The beneficial effect of alcohol

It should be clear that the total 'benefit' of alcohol is mainly to be found among men and women aged 65+. However, there are considerable sex differences in the chronic diseases that contribute to the beneficial effect in terms of PYLLs (Figure 7.1) and also in the age groups that contributes to this. Nearly all the benefit among men is for IHD, whereas among women only about half of the benefit is for IHD. Among women ischaemic (32%) and haemorrhagic stroke (14%) as well as diabetes (3%) clearly contribute to the total benefit.

Figure 7.1: Sex-specific distribution of the alcohol-related 'benefit' for mortality.



The sex differences in the age groups that contributes to the benefit of alcohol consumption is also of interest and important for the estimation of PYLLs. For men, the benefit is significant already in the age group 30-49 (6% of the benefit) and the age group 50-64 contributes nearly one-third (30%), that is more than for the age group 80+ (22%). Among women, the contribution from various age groups increases by age, and 42 % of the benefit among women was found in those aged 80+. In the estimation formula, the same RRs are used for all age groups. This probably introduces a bias if the conditions analysed have a different mortality rate for the same alcohol-consumption level in various age groups. Mortality rates for all diseases with a net benefit increase steeply by age. A relative risk is sensitive to absolute mortality rates. For instance, relative differences in mortality between men and women are small among the old and tend to peak in the age group 20-30 (Hart, 1989). The same must be true also for other risk factors than male gender, such as alcohol consumption.

The age distribution of the benefit ascribed to moderate drinking by the current epidemiological orthodoxy raise methodological doubts about the true magnitude of the benefit. On balance, this orthodoxy also gives a very large number of alcohol-related cases caused by alcohol in terms of for instance cardiac arrhythmias in the age group 80+ (309 [81%] out of 380 alcohol-related cases in the entire population). Given the light and irregular drinking patterns of most of the elderly, the heavy concentration among them of the attributed benefit (and sometimes also harm) seems to lack biological plausibility (see also a discussion by Sjögren et al., 2000c). An issue that needs further analysis is the reliability of consumption data (from surveys) as well as the AAFs for the oldest in the population. It could be that we obtain unreliable findings both as regards the proportion of cases ‘caused’ by alcohol among those aged 80+ (such as for cardiac arrythmias and hypertensive disease) as well as the number of cases ‘prevented’ by alcohol. It is most likely that such diseases are less related to alcohol among the old than among younger adults. In Sweden, with data of rather good quality (obtained from registries rather than surveys), there is a clear decline of AAF with increasing age for the old (Sjögren, 2000b). In Finland, there is close to no relation with alcohol for certain injuries among elderly women, such as homicide and other accidents (Mäkelä, 1998).

Age groups

We assumed that children under the age of 15 years do not drink alcohol. Some costs caused by children were however included, such as the costs reported for the age group for conditions wholly attributable to alcohol and victims in accidents. Furthermore, no attempts were made to subtract the costs for the criminal activities that might have been committed by children. The assumption might have led to an underestimate, particularly in view of the estimated US$ 20 billion costs for underage drinking recently reported for the USA (Miller et al, 2006b). That study however defines underage drinking as alcohol consumption before the age of 21 years, which is higher than our youngest alcohol consumption group of 15 to 17 years.

Disease risks

The association between alcohol consumption and disease is pivotal for the results of cost-of-illness studies on alcohol. The alcohol-attributable fractions of disease affect the health care costs and the productivity costs, through the calculation of attributable morbidity, early retirement and mortality, normally with the large impact in cost-of-illness studies. To investigate the sensitivity of the disease risks chosen, we use alcohol disease risks calculated with four different methods. Corrao and coworkers (2000) discuss that it is not optimal to “borrow” disease risk functions from epidemiological studies obtained from populations which may differ in their drinking culture, and that there may be competing risk factors across populations that are difficult to hold constant at the individual level. For example could passive smoking and air pollution be possible factors that could make alcohol risk functions for alcohol-related cancers different across populations. Because there are few individual-level epidemiological studies of the alcohol-related risk functions for Sweden and since it is not possible to pool these into a sound meta-analysis, we must rely on risk functions estimated from other populations as regards chronic diseases (section 3.3.1), although this is not optimal.

The base case calculations of chronic disease risks are therefore similar to those used in a study on the costs of alcohol in Canada (Rehm et al., 2006), to enhance comparability. Most of the risks are also identical to those used in the WHO study of Burden of Disease (Rehm et al., 2004). These relative risks are derived from meta-analyses of international studies, mostly performed with a prospective design but with cross-sectional measurements of alcohol intake. Most studies report mortality risk functions in relation to alcohol intake. Another method is used for the base case injury alcohol-attributable fractions: a Finnish register study of death certificates, investigating the primary and contributory death causes for all deaths during a six-year period (Mäkelä, 1998). The sensitivity analyses on injury risks are also based on register studies, but the underlying study includes, apart from data from autopsies, also medical history records to attribute injury deaths to alcohol and was performed in Sweden (Sjögren et al., 2000a; 2000b; 2000c). Unfortunately we could not obtain the alcohol attributable fraction in Swedish data for all types of injuries differentiated for age and sex.

The fourth method used in this study is an aggregate level time-series analyses (Norström et al., 2001), used for a second set of sensitivity analyses, when data allows. These analyses offer a more direct measurement of changes in disease rates when alcohol consumption in a population changes (at least when such analyses remove secular trends by using differenced data and at least partly control for confounders). However, 45 observations is not an optimal number for ARIMA time series, that and other characteristics of the method make the estimates derived from the analyses quite conservative, particularly with respect to the statistical significance of results. In the case of IHD, however, where no significant effect is found in the time series, this factor operates against conservatism. It is thus to be expected that the base case and the sensitivity analyses differ considerably, when aggregate level data are used.

AAFs for mortality and morbidity

In this study it is assumed that the attributable fractions for mortality and morbidity are the same for chronic diagnoses. Arguments can be made that in general the AAF for mortality will be higher than for morbidity, since alcohol consumption can decrease the general health and thereby reduce the chance of survival for the individual. Sjögren et al. (2000) for example, stated that alcoholics, compared to the general population, have a higher mortality. WHO (2000), however, shows lower AAFs for mortality than for morbidity concerning (chronic) effects of long-term alcohol use, indicating that the risk of disease is higher than the risk of death. Since the evidence regarding possible differences in AAF for mortality and morbidity for chronic diseases is at best inconclusive, it is assumed in this study that the same AAF applies for both areas. Intoxicated individuals can be assumed to suffer from more severe accidents, since their ability to mitigate the situation is restricted, which is in line with Sjögren et al. (2000) and also showed in Cherpitel (1996; 1994). Further support for this statement can be found in WHO (2000) (Single et al., 1999), where the AAF for mortality is generally higher than for morbidity for accidents, i.e. short-term effects of alcohol. The AAF for injuries obtained from Mäkelä is for mortality, so adjustments need to be made for morbidity. These adjustments follow the same method as used in the Rehm et al. (2004 and 2006), i.e. traffic accidents are multiplied by 2/3 and all other accidents by 4/9.

Data material on inpatient care

The data on cost per disease for inpatient care (both chronic disease and injuries) originates from Stockholm County and the Skåne Region. These two administrative areas for health care have the largest and the third largest number of inhabitants as well as the largest and the second largest population density in Sweden. It is doubtful if these areas are truly representative for the whole of Sweden. The two areas are to some extent characterised as urban and Stockholm is the capital of Sweden, which might lead to a higher concentration of specialised medical care. The Skåne Region is close to Denmark, a country with a lower price for alcohol, with excellent possibilities of cross-border shopping. It has been shown that the distance to Denmark affects the sales in the stores of the Swedish government retail monopoly of alcohol and that the demand for foreign alcohol is higher closer to the border (Asplund et al., 2005). Another study also showed that the cost for alcohol-related inpatient care decreases as the distance to Denmark increases (Jarl et al., 2006). There are thus reasons to believe that alcohol-related problems are expected to be higher in areas close to low-cost countries. For these various reasons, the sample containing both Skåne County and Stockholm County almost certainly results in higher average costs than for the rest of Sweden, thus overestimating the inpatient cost. However, as one third of the Swedish population is included in the sample (Statistics Sweden, 2005a), the unrepresentativeness bias could be expected to be of smaller magnitude.

Data material on outpatient- and primary care
The data materials used for estimating the alcohol-related costs to outpatient- and primary care are taken from the Västra Götalandsregion, which is a health care administrative area in western Sweden. This region has had a unique project running for several years for coding outpatient- and primary care cases according to ICD-10 code, with improving coverage rate for each year. The Västra Götalandsregion is situated in the western part of Sweden, with Gothenburg as the largest urban area (Sweden's second largest city), but it also contains some average-sized towns as well as a large number of rural municipalities. More than 1.5 million inhabitants live in the region, which in some aspects can be considered as a kind of statistical miniature Sweden (Sveriges nationalatlas, 2005). Since the region covers around 17% of the total population and can be considered a representative area of Sweden, we assume that the outpatient care and primary care conditions in the Västra Götalandsregion can be extrapolated to the whole country.

Gross healthcare cost
As discussed in section 4.1.3, there are two possible methods for differentiating net cost into gross cost and cost reduction. The difference in results using the two different methods is marginal. The method used for the reported results (setting protective RRs to one when estimating gross costs and vice versa) results in marginally higher estimates for both cost and benefit (around 0.5%) than the method of division among consumption groups. As there is no obvious preference for either of the two methods and given that the difference in result is small, we conclude that the possible bias is most likely marginal.

Co-morbidity
The inclusion of the excess average number of care days captures the excess treatment given to patients with an alcohol-related secondary diagnosis. It does not, however, capture the effect of increased intensity of treatment that does not lead to an increased length of stay or the discomfort for the health care personnel from treating intoxicated patients. This cost is, in this study, estimated in two different manners (see 4.1.5 and chapter 6 *Co-morbidity*). The difference in results between the two methods is considered to be a result of a difference in the distribution of patients with alcohol-related secondary diagnoses, compared to patients without. The reason for this can be a sort of self-selection to certain diseases. An example of this is lung cancer, a condition that is common among individuals with an alcohol problem without there being a known causal link from alcohol (Rehm et al., 2004). It is therefore expected that the base case estimation in this study (which also is the lower of the two), more accurately reflects the actual conditions and is therefore preferred.

Mortality
The Swedish cause of death register (dödsorsaksregistret) contains all deaths of individuals registered in Sweden during the time of death. For later years, all deaths are included and at most 0.5% of the deaths lack information on cause (SOS, 2005). This means that the data material used for calculating the number of alcohol-related deaths and potential years of lost life can be expected to be appropriate.

Co-mortality
Co-mortality captures the excess PYLL of individuals who die of a non-alcohol-specific chronic disease but with a simultaneous contributing alcohol-specific cause of death compared to individuals without a simultaneous contributing alcohol-specific cause. It is interesting to note that for the year 2002 there is a total net loss of PYLL, although for individuals dying before the retirement age alcohol-specific conditions tend to have protective effects. As noted above, co-mortality (and co-

morbidity) is only calculated for mortality causes that do not have a causal link to alcohol consumption, to avoid double-counting.

Social services
The validity of the estimation of alcohol-related costs to the social service is influenced by two basic sources of error; those relating to the assumptions made in the present calculation and those related to plausible costs we have not been able to estimate. As to the first, it is obvious that the assumed fraction of alcohol problems in social service assumes that the situation during one single day of the year (April 1) is a valid estimate of the situation during the whole year. Although we have no reason to assume any substantial seasonal variation in this respect, the lack of yearly data is one source uncertainty for the estimate. Moreover, in the estimation of costs in the area "child and youth welfare" we define all cases involving parental alcohol abuse problems as alcohol-related, which may be an overestimate. On the other hand, we do not add the proportion of cases where alcohol problems only occur among the youth.

As to potentially missing alcohol-related costs to the social services, it should be remembered that we based our calculation only for the areas most obviously afflicted with alcohol-related costs, "treatment of adults" and "child and youth welfare". It is not unlikely that also other areas bear costs attributable to alcohol problems. For instance, in the most costly area of the social services, elderly care and care of disabled, clients with an alcohol problem may require more work and costs than would have been the case without the drinking problem. However, there is at present no data allowing for estimating the role of alcohol in these sectors. The same problem with missing data applies to the administrative costs to the social service for handling social allowances to alcohol abusers. In Norway, where relevant information was collected in a special study, this appeared to cost roughly 460 million Norwegian crowns in 2001 (Gjelsvik, 2004). Finally, it should be mentioned that we did not include expenditures for all treatment given to alcohol abusers by the National Board of Institutional Care, SiS, a governmental authority taking care of those with the most severe problems with substance abuse and psychosocial problems. Although a major part of the costs are included in the social service statistics, some of the work is paid by the state and is not included in the present estimate. To get an idea of the amount we did some rough assumptions based on data presented in the SiS annual report of 2002 and data on the clients in the SiS institutions according to the IKB-study (National Board of Health and Welfare, 2003). The outcome suggested that this cost may be in the range of 100-200 million SEK for 2002. Thus, considering all these limitations in the present estimate of alcohol-related costs in the social services, it seems that it should be viewed as minimum estimate.

Crime
Alcohol often plays a significant role in the commitment of several types of crime but the *causal* effect of alcohol is often more difficult to confirm. We have identified three rather different methods of establishing AAFs in relation to criminality. First there is a "maximum" approach, used in particular by the Norwegian study (Gjelsvik, 2004) and to some extent also in the UK Cabinet Office Report (2003). These bases the AAF on the proportion reported or measured to be under the influence of alcohol in crime situations. A more conservative approach is used in the Canadian studies by Brochu et al. (2001). They use information on the extent to which the offender states in an interview that alcohol was of importance to the commission of the crime. Finally, a "minimum" approach, as used in the current study in relation to violent crimes, bases the AAFs upon the results of time series analyses. This method is the best suited when trying to bring the AAF closer to a causal relationship between alcohol consumption and the commitment of violent acts. AAF for other types of crimes is based on studies of what is known on the relationship between alcohol and crime and thus probably show less of a causal relationship.

As is clear from the discussion regarding theft, these estimates are based on highly uncertain foundations in comparison with those for drinking driving and for violent offences. The AAF calculation for theft is therefore associated with a great deal of uncertainty. This in turn raises the question of whether it is reasonable to include theft offences in the analysis at all. The number of people who die or are injured as a result of drinking driving is also an underestimate. The dark figure in this area is large and the available statistics poor. We have chosen only to include the actual and verified cases of alcohol involvement and have thus not done any estimate of the dark figure. The hidden statistics in this area concerns both the actual number of injuries in traffic accidents and the proportion of alcohol-related cases. This implies that one should be aware of the fact that the costs would probably increase considerably if better data were available. The Swedish Governmental Report concerning alcolocks (SOU 2005:72) arrived at a much larger proportion of alcohol-related cases in relation to drinking driving. These estimates are probably closer to the truth, but they have included the unrecorded cases which we have chosen not to do.

Also, basically only registered crimes are included; the hidden criminality is left aside. The only exception is that some hidden criminality is captured by the health care estimates: those seeking medical treatment for injuries resulting from assault and rape have not necessarily reported the crime to the police. The reason for only including registered crimes is that these are the crimes that the social response system deals with and the analysis has focused on the most tangible costs associated with alcohol-related crimes. The "dark figure" of crimes is substantial, however, especially regarding domestic violence and sexual offences (SOU 2001:14 & Statistics Sweden, 2004a), and it would increase the costs considerably if such unreported crimes were to be included. Emotional costs as monetary values are also sometimes included in cost of crime studies. By including emotional costs the sum for alcohol-related crimes rises substantially. This report has instead calculated QALYs for some victims of crime, with a monetary valuation in a sensitivity analysis. No other sensitivity analyses have been made regarding crime.

There was also some lack of data regarding crime, mainly from the security industry. This has made it difficult to calculate the costs in anticipation of crime. On the other hand, it is also extremely difficult to estimate the proportion of preventive work directly focused on crime prevention and hence alcohol-related crime prevention. Other missing data is, for example, for vandalism. The only cost included is for vandalism in schools and this is probably mostly by juveniles. It has not been possible to get information on vandalism in other environments. The estimate of alcohol-related costs resulting from crimes is a thus a minimum estimate and also low in international comparisons. On the other hand, one of the fundamental assumptions employed in the analysis is that the effects of pre-existing unemployment are not taken into consideration when calculating the extent of the loss of production, which leads to an overestimation of the costs in certain cases where victims and perpetrators would in practice have found it very difficult to obtain employment.

Research, policy and prevention costs

The magnitude of research, policy and prevention costs is not necessarily directly connected to the actual level of consumption in the society or the costs as a result thereof. Rather could these costs be considered to be determined by the perceived societal problem. The costs might be regarded as investments to prevent these societal problems in the future. The inclusion of these costs is obvious in the present study where the counterfactual scenario is set to a society without alcohol consumption. It is rather uncontroversial to assume that no expenditures would occur for research, policy and prevention in the counterfactual scenario set in this study. However, if another counterfactual scenario is used, an extensive discussion of how much of these costs would be eradicated would be required. As mentioned in the background section, these costs are rather complex to calculate. In the present study, the total costs in this area are very likely underestimated. The study does not cover all areas in the field, mostly because data was hard to find or did not exist. The following areas was identified but not included; the county council, local co-ordinators in the municipalities and other local actors in the field (for example: NGOs), The Swedish Association of Local Authorities, the Federation of county councils and Alna. In contrast to the previous Swedish study by Johnson (1983), estimates of support by municipalities to youth activities are not included.

Productivity costs

The productivity costs are valued by the human capital method, in contrast to some other cost-of-alcohol studies, which have used the demographic method (Collins & Lapsley, 2002) or the hybrid method (Rehm et al., 2006). We have used the human capital method to enhance comparability with the larger part of cost-of-alcohol studies as well as with cost-effectiveness analyses performed in Sweden (Swedish Pharmaceuticals Board, 2003). It should be noted, though, that one of the fundamental assumptions employed in the analysis is that the effects of pre-existing unemployment are not taken into consideration when calculating the extent of the loss of production, which leads to an overestimation of the costs in certain cases.

We have calculated the productivity costs in several different ways, reflecting the discussions in the literature. The base case calculates the productivity costs because of morbidity, as recommended in Sweden (Swedish Pharmaceuticals Board, 2003), only including the market production valued at average wage levels. In previous cost-of-alcohol studies, mortality productivity costs are also included in the base case estimates, which is why we also include them, to enhance comparability. They are however reported separately, to enhance comparability also with future studies, as the calculation of mortality productivity is recommended against by many health economists (Gold et al., 1996; Swedish Pharmaceuticals Board, 2003; Sculpher, 2001). Note that the mortality productivity costs cannot be added to the QALY losses without the proviso that it might entail a double-counting. The reason is that respondents' valuation of quality-of-life might, implicitly, include a valuation of the productive capacity being lost because of ill-health (Gold et al., 1996).

Apart from the mortality productivity costs, we include also the productivity costs from early retirement, from long-term sickness absence and from shorter-term sickness absence. The sickness absence costs are quite uncertain, however, as detailed data on sickness absence is surprisingly scarce in Sweden. The long-term sickness absence is based on the early retirement estimates, assuming the same proportion of alcohol-related cases among the long-term sick as was estimated for the early retired. This is of course not true, but is the only possible way to estimate the alcohol-related long-term sickness absence, to our knowledge. The short-term sickness absence was estimated in another way, by analysing the relation between self-reported days of sickness absence and alcohol habits, with data taken from a large representative population survey (Statistics Sweden, 2006). Self-reported data on sickness absence and alcohol consumption are not considered very reliable, but the total lack of data on short-term sickness absence in Sweden makes the estimate the only possible.

In a sensitivity analysis, we could however include data from an older study (Upmark et al., 1999) on the alcohol-related short-term and long-term sickness absence. However, the large changes in the Swedish social security system since that study was performed raise doubts about the applicability of the data to the year of 2002. The other sensitivity analysis using aggregate data gave an implausibly high estimate on the fraction of sick-days lost because of alcohol, 59% for males and 32% for females, which would increase the productivity costs to over 70,000 million SEK. This estimate must be considered to lie above the plausible upper limit of the productivity costs.

In all, our base estimates of the sickness absence imply that 11,000 years of production was lost because of alcohol during the year 2002; i.e. the goods and services of 11,000 full-time employed people were not produced due to alcohol-related sickness absence. Yet, that is probably an underestimate of the true losses of production. Apart from sickness absence, alcohol consumption might affect productivity in several ways, through its effects on the workforce size, such as mortality, early retirement, and increased unemployment. Alcohol consumption might also affect the productivity of the workforce, in the shorter run as less productivity on the job including effects on co-workers, and in the longer run as reduced educational attainment or interference with career paths both for the drinker him/herself as well as for their family, such as spouses and children. There are studies suggesting that alcohol consumption (as one of several personal characteristics) in late teenage predicts later socioeconomic position as well as later alcoholism (Hemmingsson et al., 1998), and that alcohol-related illness is related to downward occupational mobility or mobility to positions outside the labour market (Romelsjö et al., 2004). The possibilities to measure all these effects accurately are meager, both in theory and in practice (Baumberg, forthcoming). Some previous cost-of-alcohol studies have included some of these effects, such as increased unemployment in the UK (UK Strategy Unit, 2003) and the Norwegian (Gjelsvik, 2004) studies, and the losses of potential productivity by examining wage or income differentials in the USA (US NIDA, 1992) and Canada (Rehm et al., 2006). The Norwegian study (Gjelsvik, 2004) also included the assumed 25% loss of productivity for 5% of the workforce (the so-called Stanford model). None of these effects on productivity from alcohol consumption are included in our base case estimates. Moreover, we observed in our analysis of short-term sickness absence that abstainers were overrepresented in the group that were outside the labour market as compared with moderate alcohol drinkers, so whether our estimate is an under- or overestimate is a complex issue. It depends on whether COI-studies of alcohol should use the same model for all health-related outcomes (this means modelling consumption and estimating cost reductions also for sickness absence), or whether these should use other methods for certain health outcomes.

Productivity costs are only costs for the employers to the extent that they pay wages above the value of productivity. However, the social security system for short-term sickness absences in Sweden then poses a particular problem. During sickness absence spells shorter than 15 days, all employees are paid almost the full amount of their normal wages by their employers, compensated by a reduction in the employee tax rates following an agreement between the employers and the government at the beginning of the 1990s. So in this case, the employers save money if the sickness absences decline (from the pre-agreement levels), but lose money if the absences increase. Whether the short-term sickness absence payment in Sweden is a transfer or a social cost, paid for by the employer, is thus not clear. If it is a transfer, the costs should be valued as productivity costs; if it is a social cost, the burden falls on the employers.

One could argue that the costs are (nearly) the same, regardless of who pays for them, but who is the payer has implications for the incentives for preventing or decreasing alcohol-related problems in working life. The base case estimates treated the short-term sickness absence as productivity costs, and thus as costs for the society overall, while the Employer Assistance Programs estimated at around 53 million were included in health care costs. According to this study`s estimates, the employers thus have no costs at all because of alcohol consumption, which is certainly not true. There is a frequently cited estimate of the costs for employers in Sweden is -- 3% of wage costs (Alna, 2006), resulting in employers costs of over 38,000 million -- which is included in a sensitivity analysis. If our estimates of short-term sickness absence of 1.2 billion is correct, the employers` costs for other types of productivity losses would then amount to around 37,000 million SEK. It is clear that the base case estimates have underestimated both the losses in productivity and the costs for employers because of alcohol consumption, but it has not been possible to acquire current and scientifically based estimates. Given the current Swedish policy discussions on sickness absence combined with the incentives and presumed potential for employers to cut costs by alcohol preventive measures, there is a surprising lack of current and reliable data.

An interesting area is to analyse in more detail whether early alcohol-related problems could be related to low educational achievement, moving into low paid jobs and high unemployment experience. On the register-linked early retirement data used for estimating production loss for early retirement, we did find that those who had a fully alcohol attributed cause for the early retirement more often were classified as having a fully reduced working capacity. Moreover, these individuals had much lower previous income from work in the entire 5-year period prior to the decision. There are also other Swedish data that suggests that when individuals do have an alcohol-related problem there is a tendency to move down in occupational status and income, and to be found in groups outside the labour market (Romelsjö et al., 2004). In future research it is probably fruitful to set up such appropriate life-course studies in order to fully capture productivity losses from risk use of alcohol.

Intangible costs

As mentioned, social harms from alcohol, and in particular the harm from other's drinking, is less explored and the methods less developed in comparison to methods for measuring physical harm. Intangible costs, such as suffering, worries and distress, are experiences difficult to quantify and even more difficult to attach a monetary value to. A number of COI studies conclude that these kinds of problems are of significance when estimating the overall social costs of alcohol (UK Prime Minister's Strategy Unit, 2004:31), but, most typically, no quantification and monetary evaluations are calculated.

In this study we have thus tried to include the intangible costs because of alcohol consumption, by use of the QALY concept. The intangible costs are thus not measured in monetary terms directly, but by way of a concept that is commonly used in other fields of health economics. The QALYs were developed as a measure of health within the cost-effectiveness methodology, to be able to measure the desired output of medical interventions, often a combination of longer life span and increased quality-of-life. Because of their origins in medicine, the quality-of-life measures are often referred to as health-related quality-of-life. We have however tried to use the QALY concept to capture alcohol-related intangible costs, which in some cases are more related to social problems than ill-health. Social problems can however be expected to affect quality-of-life and might, at least in theory, be expressed as decreases in the worth of a life-year, in a manner equivalent to the QALY concept.

As the approach very seldom has been used in cost-of-illness studies, nor in descriptions of social problems, there is a lack of data and methodology on which to base the calculations. In fact, we have different data for all the specific calculations of QALYs lost. The ability of the different data sets used to capture the social harm component of alcohol consumption differs. The study initiated within the project, *The Quality-of-life loss for relatives and friends* (Hradilova Selin, forthcoming), was however designed to seek to measure social problems and not only ill-health. Another important aspect is whether the estimates are preference-based. According to health economic recommendations (Drummond et al., 1997) the different QoL items should be weighted according to their relative importance for the individuals' overall QoL. In other words, the different items in a QoL instrument should be valued differently according to the perceived "seriousness" of the item. Unfortunately, only some of the QoL estimates used in this study are preference-based.

The QoL loss for the consumers themselves is based on a survey performed in the US, where respondents were given descriptions on the life situation of alcohol consumers with different levels of alcohol consumption and asked to value the life situations using different standard health economic methods (Kraemer et al., 2005). These estimates thus include aspects other than ill-health, such as values and feelings, and they use recommended methods to obtain preference-based estimates. The survey was however performed on a small and probably unrepresentative sample of US citizens, and the appropriateness for a Swedish setting might thus be questioned. The QoL descriptions also include some positive effects of alcohol consumption as well as what might be considered private costs, such as remorse, so that the valuations are not fully complying with the boundaries set for the present study.

In order to estimate the QoL loss among relatives and friends of heavy drinkers, the study has conducted its own data collection (see 4.6.3). A shortcoming in our analyses is that all the QoL items are weighted the same. However, no other weighting data has been available for the present analyses, probably due to the fact that the WHOQOL-BREF appears to be not yet fully developed. The figures probably represent an underestimation in some ways. There is likely to be underreporting of drinking problems among relatives and friends and the reported level of quality-of-life is probably somewhat biased by socially desirable responses. People in general tend to report good health or at least fairly good health even when at death's door, so that there is considerable excess mortality in longitudinal studies among those reporting "good" health when they are compared to those reporting something like "excellent" health (Idler & Benyamini, 1987). The answers also represent a balancing judgement, implicitly setting the better against the worse in the respondent's current experience with respect to the item, so some element of "benefits" as well as "costs" may enter into the answers.

It must also be noted that the results are based on a bivariate analysis, i.e. not controlling for other conditions and circumstances that might affect the association between quality of life and relationship to a problem drinker. This, of course, complicates causal interpretations. Our data concerns the association of lower QoL with amount of drinking or various relations to someone with drinking problems, not whether the QoL value would increase if the drinking was removed. While controlling for other factors gets somewhat closer to a causal analysis, it remains an over-interpretation of cross-sectional data to interpret it causally. A conservative rule-of-thumb to get closer to the probable causal effect would be to halve the differences and the costs that we found. Also, in the analyses of quality-of-life of relatives and friends of heavy drinkers, the assumption is made that this association is stable over time, i.e. it has not changed between 2002 (the year of our cost estimations) and 2005 (the year of the QoL-data collection). To what extent this is correct is unknown but there are no plausible reasons to believe otherwise.

As a sensitivity analysis, reflecting the uncertainty surrounding the estimates and the appropriateness of the calculation, we have valued the QALYs lost in monetary terms, by pricing each QALY at 340,000 SEK (about 36,000 EUR). The reason behind the calculation is to be able to summarize the costs using only one metric, i.e. money. The method is gaining credence within the cost-effectiveness field (Eichler et al., 2004) and has been used in calculations on the costs of crime (Dubourg et al., 2005) and underage drinking (Miller et al., 2006b). The valuation of a QALY was taken from a Swedish pilot study that tested different methods of obtaining population valuations (Hjalte et al., 2005) and the valuation is thus not yet settled. Informal discussions among Swedish health economists suggest the value used by the Swedish Pharmaceuticals Board (LFN), that decides on reimbursements for pharmaceuticals, is in the range of 500-600,000 SEK (about 55-65,000 EUR). The valuation per QALY lost used in this study might thus be underestimated. In conclusion, since this is the first attempt to evaluate the situation of relatives and friends to heavy drinkers in the Swedish general population in terms of quality-of-life and also the first time an effort is made to include intangible costs of this kind in a cost-of-illness study, the analyses should be seen as a pilot within this area and valued as such.

7.5. Conclusion: looking beyond the single figure

The present study was undertaken with the primary aim of making a new estimate of the social costs of alcohol in Sweden. This technical report gives the details of our work on this aim. It arrives at a "base-case" estimate of the costs, but we also offer sensitivity and other analyses which exemplify how arbitrary it is to settle on a single figure. If we seek to answer the question limiting ourselves to tangible costs, we can state the study's conclusions as follows: Following the general recommendations on procedures for cost-of-alcohol studies, we found the social costs of alcohol in Sweden in 2002 to be 20.3 billion SEK on a net basis, or 29.4 billion SEK on a gross basis. Sensitivity analyses with alternative defensible assumptions yielded figures within a range of about 50% above or below these figures. The study did not capture many aspects of harm to others besides the drinker, and in particular did not attempt to include cost estimates for intangible costs, often to others. Measurement and calculation of such costs might as much as triple the cost estimate.

A secondary aim of the study was to serve as a trial and proving ground for a second phase of the study: the extension of cost-of-alcohol estimates on a comparable basis elsewhere in the WHO European Region. As a start on this potential line of work, alternative estimates are made in Appendix 3 below, using less detailed data, such as might be available in countries without the richness of data resources that exists in Sweden. A further result of undertaking the study has been to identify lacunae and deficiencies in the data which was needed for making our study. These are discussed in Appendix

4. In some ways, this has often been the most important output from cost-of-alcohol studies. Undertaking such studies forces analysts to look for data, and particularly epidemiological data, and the recurrent experience internationally has been to find with some surprise that there are important gaps. Since the kind of data needed for these studies is highly relevant to policy monitoring and cost-effectiveness studies, cost-of-alcohol studies have often served as a stimulus to new data collection efforts. In our view, it is important that early consideration be given to this in Sweden, as an outcome of this study. A particular priority is to develop better measurement of the effects of drinking on others.

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APPENDICES

Appendix 1. Cost items due to alcohol consumption

The cost items marked in bold are included in this study.

1. Health care costs
   - 1.1. Inpatient care
     - 1.1.1. **Alcohol-related chronic diseases**
     - 1.1.2. **Injuries**
     - 1.1.3. **Violence**
     - 1.1.4. **Fires**
     - 1.1.5. **Co-morbidity**
   - 1.2. Outpatient care and day-cases
     - 1.2.1. **Alcohol-related chronic diseases**
     - 1.2.2. **Injuries**
     - 1.2.3. **Violence**
     - 1.2.4. **Fires**
     - 1.2.5. **Co-morbidity**
   - 1.3. Primary health care
     - 1.3.1. **Alcohol-related chronic diseases**
     - 1.3.2. **Injuries**
     - 1.3.3. **Violence**
     - 1.3.4. **Fires**
     - 1.3.5. **Co-morbidity**
   - 1.4. Non-state paid treatment
     - 1.4.1. **Employer Assistance Programs**
     - 1.4.2. Out of pocket expenditures
       - 1.4.2.1. Fees
       - 1.4.2.2. Private care
   - 1.5. Pharmaceuticals
     - 1.5.1. Prescribed drugs
       - 1.5.1.1. **Direct alcohol-related pharmaceuticals (100% AAF)**
       - 1.5.1.2. Indirect alcohol-related pharmaceuticals
     - 1.5.2. Non-prescribed drugs
   - 1.6. Ambulance service
     - 1.6.1. Car service
       - 1.6.1.1. Alcohol-related diseases
       - 1.6.1.2. Injuries
       - 1.6.1.3. Violence
       - 1.6.1.4. Fires
     - 1.6.2. Boat service
       - 1.6.2.1. Alcohol-related diseases
       - 1.6.2.2. Injuries
       - 1.6.2.3. Violence

- 1.6.2.4. Fires
- 1.6.3. Aviation service
  - 1.6.3.1. Alcohol-related diseases
  - 1.6.3.2. Injuries
  - 1.6.3.3. Violence
  - 1.6.3.4. Fires
- 1.7. Other medical personnel
  - 1.7.1. Dental care
  - 1.7.2. School health care
- 1.8. Preventive work within health care system
  - 1.8.1. Midwifes
  - 1.8.2. Health promotion

2. Social services

- 2.1. **Treatment of adults with substance abuse**
- 2.2. **Child and youth welfare**
- 2.3. Care for elderly and disabled
  - 2.3.1.1. Nursing homes
  - 2.3.1.2. Community care services
- 2.4. Orphanage
- 2.5. Administrative costs for allowances and insurances
- 2.6. Rescue and fire services
  - 2.6.1. Fires
  - 2.6.2. Traffic accidents
  - 2.6.3. Other accidents

3. Crime

- 3.1. Cost in anticipation of crime
  - 3.1.1. **Security devices**
  - 3.1.2. Precautionary behaviour
  - 3.1.3. **Administrative costs for insurance**
  - 3.1.4. Security services
- 3.2. Costs as a consequence of crime
  - 3.2.1. **Property stolen and damaged**
  - 3.2.2. **Vandalism**
  - 3.2.3. **Arson**
  - 3.2.4. Victim services
- 3.3. Costs in response to crime
  - 3.3.1. Police
    - 3.3.1.1. **Investigations**
    - 3.3.1.2. **LOB** (Law on temporary custody of drunken people)
  - 3.3.2. Courts
    - 3.3.2.1. **Legal expenses**
    - 3.3.2.2. Time spent in courts by the accused, the victim and witnesses (productivity)
    - 3.3.2.3. QoL effects of court experience
  - 3.3.3. Incarceration
    - 3.3.3.1. **Cost of incarceration**
    - 3.3.3.2. **Loss of productivity**
    - 3.3.3.3. Juvenile correction centres
  - 3.3.4. Drinking driving
    - 3.3.4.1. **Drinking driving prevention including random breath-testing**
- 3.4. Regulation costs
  - 3.4.1. Customs

3.4.1.1. Prevention of smuggling
3.4.1.2. Administration of legal import
3.4.2. Skatteverket (control of sales)
3.5. Elsewhere included costs for victims of crime, including drinking-driving
3.5.1. **Health care costs**
3.5.2. **Productivity costs**
3.5.3. **Intangible costs**

4. Research, policy, prevention etc
4.1. Professional competence/education
4.1.1. Shool teachers
4.1.2. Public health workers
4.1.3. Social workers
4.1.4. Medical personnel
4.1.5. Law enforcement personnel
4.2. Research and prevention
4.2.1. Public
4.2.1.1. State-level
4.2.1.1.1. **Government**
4.2.1.1.2. **State agencies**
4.2.1.1.3. Police
4.2.1.2. Regional level
4.2.1.2.1. Health care system
4.2.1.2.2. **County councils**
4.2.1.3. Local level
4.2.1.3.1. **School activities**
4.2.1.3.2. NGOs
4.2.2. Private prevention
4.2.2.1. **NGOs**

5. Productivity costs
5.1. Premature death
5.1.1. Market production
5.1.1.1. **Alcohol-related chronic diseases**
5.1.1.2. **Injuries**
5.1.1.3. **Violence**
5.1.1.4. **Fires**
5.1.2. Non-market production
5.1.2.1. **Alcohol-related chronic diseases**
5.1.2.2. **Injuries**
5.1.2.3. **Violence**
5.1.2.4. **Fires**
5.2. Early retirement
5.2.1. Market production
5.2.1.1. **Alcohol-related chronic diseases**
5.2.1.2. **Injuries**
5.2.1.3. **Violence**
5.2.1.4. **Fires**
5.3. Absenteeism from work
5.3.1. Market production
5.3.1.1. **Short-term sick leave**
5.3.1.2. **Long-term sick leave**
5.4. Increased unemployment
5.5. Decreased workforce size

- 5.6. Career impairment
  - 5.6.1. Reduced career path
  - 5.6.2. Criminal careers

6. Other
- 6.1. Litter
  - 6.1.1. Clean-up costs
  - 6.1.2. Property damage
  - 6.1.3. Morbidity (health hazard)
- 6.2. Reduced real-estate value
- 6.3. Travel delays

7. Intangible costs
- 7.1. Borne by the consumer
  - 7.1.1. **Mortality**
    - 7.1.1.1. **Alcohol-related chronic diseases**
    - 7.1.1.2. **Injuries**
    - 7.1.1.3. **Violence**
    - 7.1.1.4. **Fires**
  - 7.1.2. **Effects of consumption**
- 7.2. Borne by others
  - 7.2.1. **Mortality**
    - 7.2.1.1. **Injuries**
    - 7.2.1.2. **Violence**
    - 7.2.1.3. **Fires**
  - 7.2.2. Morbidity
    - 7.2.2.1. Injuries
    - 7.2.2.2. **Violence**
    - 7.2.2.3. Fires
  - 7.2.3. Family and friends of consumer
    - 7.2.3.1. **Adults**
    - 7.2.3.2. Children
  - 7.2.4. General population
    - 7.2.4.1. Fear and insecurity
    - 7.2.4.2. **Victims of crime**

8. Transfers
- 8.1. Taxes
- 8.2. Allowances
  - 8.2.1. Dependence allowance
  - 8.2.2. Widow/widower pension
- 8.3. Insurances
  - 8.3.1. Public insurance
  - 8.3.2. Private insurance

Appendix 2. WHOQOL BREF

		Very poor	Poor	Neither poor nor good	Good	Very good
1	How do you rate your quality of life?	1	2	3	4	5

		Very dis-satisfied	Dissatis-fied	Neither satisfied nor dissat-isfied	Satisfied	Very satis-fied
2	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

		Not at all	A little	A moder-ate amount	Very much	An ex-treme amount/ Extremely
3	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4	How much do you need any medical treat-ment to function in your daily life ?	1	2	3	4	5
5	How much do you enjoy life?	1	2	3	4	5
6	To what extent do you feel you life to be meaningful?	1	2	3	4	5
7	How well are you able to concentrate?	1	2	3	4	5
8	How safe do you feel in your daily life?	1	2	3	4	5
9	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moder-ately	Mostly	Com-pletely
10	Do you have enough energy for everyday life?	1	2	3	4	5
11	Are you able to accept your bodily appear-ance?	1	2	3	4	5
12	Have you enough money to meet you needs?	1	2	3	4	5
13	How available is the information that you need in your day-to-day life?	1	2	3	4	5
14	To what extent do you have the opportunity for leisure activities ?	1	2	3	4	5

		Very poor	Poor	Neither poor or good	Good	Very good
15	How well are you able to get around?	1	2	3	4	5

The following questions ask you to say how good or satisfied you have felt about various aspects of your life over the last two weeks.

		Very dis-satisfied	Dissatis-fied	Neither satisfied nor dissat-isfied	Satisfied	Very satis-fied
16	How satisfied are you with your sleep?	1	2	3	4	5
17	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18	How satisfied are you with your capacity for work?	1	2	3	4	5
19	How satisfied are you with yourself?	1	2	3	4	5
20	How satisfied are you with your per-sonal relationships?	1	2	3	4	5
21	How satisfied are you with your sex life?	1	2	3	4	5
22	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23	How satisfied are you with the condi-tions of your living place?	1	2	3	4	5
24	How satisfied are you with your access to health services?	1	2	3	4	5
25	How satisfied are you with your trans-port?	1	2	3	4	5

The following question refers to how often you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
26	How often do you have negative feelings such as blue mood, despair, anxiety, depression ?	1	2	3	4	5

27. Is there someone in your family or among your friends whose drinking has troubled you or caused problems for you in the last 12 months?

Yes, one person
Yes, more than one person
No – *to the end of the interview*

28. Who is this person (if ‘more than one person’, think of the one who affected you the most)? Is it your:

Partner
Son
Daughter
Mother
Father
Brother
Sister
Somebody else among your relatives
A close friend
Some other acquaintance
Don’t know
No response

29. (*If 1-8 on question 28*): Does the person live in the same household as you?

Yes – *skip next question*
No

30. How often are in contact with that person – i.e. how often do you meet, talk, e-mail, etc? Think of the past 12 months.

Daily or more often
3-6 times a week
1-2 times a week
1-3 times a month
Less often
Never
Don't know
No response

31. How often would you say that the person drinks a lot during one occasion, i.e. alcohol equivalent to one bottle of wine (75 cl) or 5-6 shots (á 25 cl) or 4 cans strong beer or 6 cans 'folk beer'? Try to report an average during the past 12 months:

Daily or more often
3-6 times a week
1-2 times a week
1-3 times a month
Less often
Never
Don't know
No response

32. How often does it happen that you are around when or after the person is or has been drinking? Is it…

Daily or more often
3-6 times a week
1-2 times a week
1-3 times a month
Less often
Never
Don't know
No response

33. One can get affected in a number of ways of somebody else's drinking. In which of the following ways have you felt affected during the past 12 months in connection to the persons drinking? (*More than 1 alternative possible*):

That s/he is violent when drinking
Things s/he says when drinking
Other things s/he does when drinking
That s/he does not fulfil her/his family-, work- or other responsibilities
That you cannot rely on her/him if there is some everyday crisis

(*If the person is IP's partner*):

Time s/he spends away from the family
Money s/he spends on things and associated activities
How her/his drinking affects your intimate relationship

None of these
Don't know
No response

34. (*If more than 1 alternative in question 32*): Which of these problems has affected you the most during the past 12 months?

Appendix 3. Result with less detailed data

Three different models for estimation of social cost of alcohol are presented in this section. The models differ in the assumption of data available, where the most extended model coincide with the best estimation for Sweden as presented in the current report, while the medium and small models assume more data limitations. The purpose of this section is to investigate how much the estimations of social cost of alcohol would differ between models. The long term aim is to supply countries with less data with information as to the direction and magnitude of the bias of social cost of alcohol estimate resulting from data limitations. Considering this long term aim, we have refrained from using the results from the current study in any manner (e.g. the proportion of alcohol-related cost for a certain category) as this probably would lead to better estimates than what can be assumed for other countries. The medium and small model will be calculated for the case of Sweden, given the assumptions of data limitations made within the models. All costs estimated are net cost, i.e. cost reductions are adjusted for. This is relevant for health care and productivity costs. When estimating the medium and small model, we will use the same assumptions as in the current study with exception of the limitations specified below. This means that assumptions used in the current study that are not affected by the model limitations, e.g. assumptions on the value of one year of production in the large model, also holds for the medium and small model. The information that is assumed to exist for the medium and small model is listed below, using the same cost categories as have been used in the current report.

Medium model

This model takes an intermediate position between the other two models, assuming in some areas there is detailed information, whereas in other areas no or very limited information is available.

Alcohol consumption

- → Country-specific alcohol consumption estimates, age- and gender specific

Health care

- → RR for chronic diseases (Table 3.8)
- → WHO-regional AAFs for injuries (Rehm et al. 2004) + country-specific AAF for traffic accidents
- → Inpatient main diagnosis and diagnosis-specific length of stay
- → Average inpatient per diem cost
- → Number of outpatient and primary care cases (no diagnoses)
- → Average cost per outpatient case and per primary care case

Social services

- → Overall cost of alcohol treatment (for many countries this would be included in the health care category, making this category irrelevant)

Crime

- → AAF (non-country specific, see Table 4.1)
- → Crime statistics (divided by type of crime), proportion of prison sentences for each type of crime
- → Overall cost of judicial system and the police as well as proportion of costs between crimes of violence and theft.
- → Per diem cost of imprisonment + average time in prison per crime type

Research, policy and prevention

- → No information

Productivity cost

- → Full mortality codes
- → Age- and gender-specific average wages

QALYs

- → No information

Small model

This model assumes the lowest possible data availability for the WHO-Euro region. Most of the information is derived from aggregated data supplied by WHO.

Alcohol consumption

→ Age- and gender-specific consumption estimates from WHO sub-region (Rehm et al. 2004) adjusted for per capita consumption and rate of abstainers

Health care

→ RR for chronic diseases (Table 3.8)
→ WHO-regional AAFs for injuries (Rehm et al. 2004)
→ Inpatient main diagnosis
→ Average cost per inpatient case (cost per admission, i.e. not diagnosis-specific)
→ Number of care episodes in outpatient and primary care
→ Average cost per outpatient and per primary care case

Social services

→ Overall cost of alcohol treatment (for many countries this would be included in the health care category, making this category irrelevant)

Crime

→ AAF (non country-specific, see Table 4.1)
→ Crime statistics (divided upon type of crime), proportion of prison sentences for each type of crime
→ Overall cost of judicial system and the police
→ Per diem cost of imprisonment + average time in prison per crime type

Research, policy and prevention

→ No information

Productivity cost

→ Mortality data (3 digit ICD-10)
→ Average wages (not differentiated for age or gender)

QALYs

→ No information

Medium model estimation

This model uses the same prevalence figures for alcohol consumption as the large model, see Table A3.1.

Table A3.1. (Table 3.5 reproduced): Assumed and estimated proportions of the population in drinking volume groups, by age and gender. Year 2002 (Abstainers weighted down by Monitoring data from Fall 2004).

	15-17 years	18-29 years	30-49 years	50-64 years	65-79 years	80+
Women						
Abstinence	0.2840	0.0852	0.0943	0.1172	0.3187	0.4434
Low consumption	0.6451	0.8246	0.8392	0.8253	0.6659	0.5477
Hazardous cons.	0.0527	0.0671	0.0509	0.0450	0.0119	0.0067
Harmful cons.	0.0182	0.0231	0.0156	0.0125	0.0035	0.0022
Men						
Abstinence	0.2355	0.0663	0.0612	0.0869	0.2005	0.2951
Low consumption	0.7241	0.8127	0.8627	0.8549	0.7706	0.6786
Hazardous cons.	0.0133	0.0589	0.0384	0.0334	0.0141	0.0129
Harmful cons.	0.0271	0.0621	0.0377	0.0248	0.0148	0.0134

Health care

Inpatient care

In the medium model, we have the same information of the increased risk of certain chronic diseases resulting from alcohol consumption as in the large model, see Table 3.8. This will therefore lead to the same number of cases for each chronic disease as in the large model. What is different though is the costing of each case. In the large model we had cost information on a disease-specific basis which we assume is not available in the medium model. Instead we assume information on the per diem cost of inpatient care, regardless of disease, and length of stay in inpatient care on a disease-specific basis. The per diem cost is neither weighted for type of care or disease nor age or gender differentiated. The length of stay, however, is age and gender differentiated.

Table A3.2. AAF for injuries (mortality)

	Men						**Women**					
	0-15	15-29	30-44	45-59	60-69	70+	0-15	15-29	30-44	45-59	60-69	70+
Motor vehicle accidents	See Table 3.9						See Table 3.9					
Drowning	0.00	0.35	0.40	0.40	0.33	0.33	0.00	0.33	0.39	0.39	0.32	0.32
Falls	0.00	0.30	0.30	0.30	0.24	0.17	0.00	0.20	0.20	0.20	0.13	0.06
Fires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisoning	0.00	0.38	0.22	0.22	0.22	0.12	0.00	0.31	0.21	0.21	0.21	0.10
Other injuries	0.23	0.38	0.38	0.32	0.32	0.31	0.07	0.31	0.31	0.26	0.26	0.26
Suicide and self-inflicted injuries	0.00	0.21	0.21	0.16	0.16	0.07	0.00	0.14	0.14	0.12	0.12	0.07
Homicide	0.19	0.36	0.36	0.36	0.36	0.36	0.19	0.36	0.36	0.36	0.36	0.36
Undetermined injuries	0.00	0.27	0.27	0.27	0.27	0.14	0.00	0.27	0.27	0.27	0.27	0.14

Source: Rehm et al. 2004

The alcohol-attributable fractions for accidents are, for the medium model, based on the AAF for the WHO regions as presented in Rehm et al. (2004). The exception is motor vehicle accidents that use the same AAFs as the large model. The accident categories differ somewhat to the categories in the large model as well as the age-groups. Comparison should therefore only be made on the total sum of all injuries and all age-groups. The injury AAFs for morbidity are adjusted in the same manner as in the large model, i.e. by multiplying traffic accidents by two thirds and all other types of accidents by four ninths (Rehm et al., 2004, 2006).

The total alcohol-related cost to inpatient care sums to 1.0 billion over 194,200 care days, see Table A3.3.

Table A3.3. Alcohol-related inpatient cost, million SEK.

		No. care days	Cost
Chronic	Men	107 426	561.1
	Women	-18 481	-96.5
Injury	Men	63 333	330.8
	Women	41 959	219.1
Total		**194 237**	**1 014.5**

Outpatient and primary care

For outpatient and primary care it is assumed that the only available information is the number of cases, without information on diagnoses. We will therefore assume the same alcohol-related proportion for the outpatient and primary care episodes as the inpatient care days, as reported above. In the costing of care episodes, the main difference from the large model is that no weighting of different types of care episodes are done. In the large model, adjustment are made regarding, for example, more resources spent on a home visit compared to a telephone contact, as well as between different professions in the health care, e.g. doctors and nurses. This is not done in the medium and small model. Using the proportion of alcohol-related inpatient care days of the total (194,200 alcohol-related inpatient care days out of a total of 10,424,112) gives an alcohol attributable fraction of 0.0186 which leads to 899,053 and 422,701 alcohol-related care episodes in primary care and outpatient care. This gives an alcohol-related cost of 447 million for primary care and 649 million for outpatient care, see Table A3.4.

Table A3.4. Alcohol-related cost in primary and outpatient care.

	Primary care	Outpatient care
Number of cases[1]	48 336 164	22 725 865
Total cost[1]	24 049 028 436	34 875 893 935
Cost per case	497.54	1 534.63
Alcohol-related cost	**447 314 656**	**648 689 772**

[1] Landstingsförbundet (2003)

Social service

Using the calculations in the large model we conclude that alcohol treatment in the social service sector in Sweden amount to 4.364 billion.

Crime

In the medium model, the AAFs from the UK Cabinet Office Report (2003) have been used to obtain alcohol-related cases for different types of crimes. AAF for arson was however not available in the

Table A3.5. Alcohol-related costs for the justice system, million SEK.

Recorded crimes	Total cases	AAF From Cabinet office report	Alcohol related cases (prison)	Police investi-gation	Proce-dure	Courts	Prison costs	Productivity costs
Homicides	100	0.37	32				140	96
Woundings & assaults	55 000	0.37	652				264	181
Violence against the police	3 928	0.37	226				40	28
Rape	2 184	0.13	12				24	16
All violent crimes above				576	144	144		
Burglaries & Thefts	686 000	0.17	443	238	59.5	59.5	164	113
Drinking driving	14 900	1.0	2 287	n.a.	n.a.	n.a.	187	128
Public drunkenness	44 000	1.0	-	66	-	-	-	-
Total costs				*880*	*203.5*	*203.5*	*819*	*562*
Sum								**2 668**

British study so this crime type is excluded. The total number of cases for each crime are taken from the Swedish data. The costs have been recalculated accordingly. Regarding public drunkenness, information on these costs is as in the large model drawn from Harries (1999), as in the large model. Only costs regarding responses to crime were possible to calculate in this model, thus excluding costs in anticipation and costs as consequence of crime.

Productivity cost

Only productivity cost resulting from mortality is calculated in the medium model giving a total cost of 1.9 billion. The mortality cost is calculated in the same manner as in the large model with exception of injuries (see health care section).

Table A3.6. Alcohol related productivity costs due to mortality (using a 3% discount rate).

	Men		**Women**		**Total**	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Chronic diseases	-571	104	-1 320	-1 252	-1 891	-1 148
Injuries	733	2 433	317	629	1 050	3 062
Total	**162**	**2 537**	**-1 003**	**-622**	**-841**	**1 915**

Total cost medium model

The net social cost of alcohol consumption estimated in the medium model sums to 11.1 billion SEK. The largest cost is from social service followed by crime and health care. Productivity cost is the smallest cost of those estimated.

Small model estimation

In this model we assume that there is no country-specific prevalence data of alcohol consumption. Instead we use prevalence data by WHO subregion for the year 2000, differentiated by consumption categories, age and sex (Rehm et al. 2004). The prevalence figures are adjusted for country-specific per capita consumption, also based on Rehm et al. (2004). The difference in per capita consumption from the regional average is directly applied on the regional prevalence, i.e. a lower (higher) consumption per capita than the average reduces (increases) each consumption group by an equal proportion except the lowest (highest) consumption group. The average per capita consumption for EUR-A (including unrecorded consumption) is 12.9 litres of pure alcohol (Rehm 2003). Sweden, with a per capita consumption of 11.07, is 14.19% below the regional average which reduces the prevalence of consumption by an equal amount. This method results in a very high fraction of abstainers, especially compared to official figures. We therefore make one more adjustment where we reduce the proportion of abstainers to 7% for men and 12% for women (according to figures from Rehm et al. 2004) and assume that the rest belongs in the low consumption group. The adjusted prevalence of consumption for Sweden is shown in Table A3.7.

Table A3.7. Comparison of prevalence of alcohol consumption.

	EUR-A						**Sweden, adjusted for per capita consumption and abstainers**					
	15-29	30-44	45-59	60-69	70-79	80+	15-29	30-44	45-59	60-69	70-79	80+
Men												
Abstinence	0.074	0.074	0.093	0.139	0.186	0.186	0.062	0.060	0.066	0.083	0.099	0.099
Low	0.748	0.721	0.701	0.723	0.717	0.717	0.772	0.749	0.742	0.789	0.810	0.81
Hazardous	0.087	0.102	0.096	0.069	0.042	0.042	0.088	0.102	0.098	0.069	0.044	0.044
Harmful	0.091	0.102	0.110	0.069	0.055	0.055	0.078	0.088	0.094	0.059	0.047	0.047
Women												
Abstinence	0.138	0.138	0.173	0.259	0.346	0.346	0.097	0.099	0.109	0.143	0.175	0.175
Low	0.698	0.726	0.662	0.635	0.571	0.571	0.757	0.780	0.744	0.763	0.751	0.751
Hazardous	0.123	0.103	0.124	0.085	0.065	0.065	0.111	0.093	0.112	0.076	0.058	0.058
Harmful	0.041	0.033	0.041	0.021	0.017	0.017	0.035	0.028	0.035	0.018	0.015	0.015

Health care

Inpatient care

In the small model, one assumption was that the only cost available for inpatient care was cost per admission, i.e. an average cost per care episode. This cost is not weighted for type of care, intensity or length of stay. There were a total of 44,901 alcohol-related cases in inpatient care during 2002. With an average cost per care episode of 36,821 SEK[20] the total cost of alcohol-related inpatient care sums to 1.7 billion.

Table A3.8. Alcohol-related cost in inpatient care, million SEK.

		No. cases	Cost
Chronic	Men	24 539	903.5
	Women	4 694	172.8
Injury	Men	9 907	364.8
	Women	5 761	212.1
Total		**44 901**	**1 653.3**

Outpatient and primary care

The costing of care episodes differs in the medium and small model from the large model. The method of calculating the cost of outpatient and primary care in the small model is the same as for the medium model, i.e. we assume the same alcohol-related proportion of alcohol-related cases for outpatient and primary care as for inpatient care. The result will however differ as the calculations of inpatient care are different in the small model compared to the medium model, due to additional assumed data limitations. There are a total of 1,444,517 inpatient cases and 44,901 are alcohol-related giving an alcohol attributable fraction of 0.0311. Applying this fraction to primary and outpatient care gives a cost of 0.7 billion for primary care and 1.1 billion for outpatient care.

Table A3.9. Alcohol-related cost in primary and outpatient care.

	Primary care	Outpatient care
Number of cases[1]	48 336 164	22 725 865
Total cost[1]	24 049 028 436	34 875 893 935
Cost per case	497.54	1 534.63
Alcohol-related cost	**747 929 343**	**1 084 637 200**

[1] Landstingsförbundet (2003)

Social service

Using the calculations in the current study we conclude that alcohol treatment in the social service sector in Sweden amounts to 4.364 billion. This calculation is assumed to be possible in all three models.

Crime

In the small model, like the medium model, AAFs from UK Cabinet Office Report (2003) has been used to obtain alcohol-related cases for each crime type. Arson was however not included in the British study and has thus been excluded in the small model (but is included in large model). The number of total cases is taken from the Swedish case (large model). Since the only

[20] Calculated from Landstingsförbundet (2003).

Table A3.10. Alcohol-related costs for the justice system, million SEK.

Recorded crimes	Total cases	AAF From Cabinet office report	Alcohol related cases (prison)	Police investi-gation	Proce-dure	Courts	Prison costs	Lost produc-tivity
Homicides	100	0.37	32	126	32	32	140	96
Woundings & assaults	55 000	0.37	652	237	59	59	264	181
Violence against the police	3 928	0.37	226	36	9	9	40	28
Rape	2 184	0.13	12	21	5	5	24	16
Burglaries & Thefts	686 000	0.17	443	148	37	37	164	113
Drinking driving	14 900	1.0	2 287	167	42	42	187	128
Public drunkenness	44 000	1.0	-	66			-	-
Total costs				801	184	184	819	562
Sum								**2 550**

information available is the total cost for police, courts and procedure the sum has been dived according to Harries (1999) who stated that 2/3 of the total amount of criminal justice expenditures go to the police and the remaining 1/3 to courts and procedures. The alcohol-related proportion of this total cost has been calculated by the number of alcohol-related cases (obtained from UK AAFs) divided by the total number of cases, resulting in an overall AAF of 24.5%. The alcohol-related cost has then been distributed between the crimes according to the proportions of prison months for each crime divided by the total number of prison months. One might argue that severe crimes cost more for the police and the justice system and this is also reflected in prison lengths. This implies less cost per case for theft for example but thefts are far more frequent than the more severe crime of homicide. It could be argued that this somehow corrects the distributed costs between the crimes even though this estimate is far from correct and also quite substantial. It is probably better to be satisfied with the total alcohol-related cost, instead of distributing them between the different crime types. Regarding public drunkenness it is assumed that information on these costs are the same as in the large model drawn from Harries (1999). As for the medium model, only costs resulting from responses to crime have been possible to estimate in the small model.

Productivity costs

In this model the coding of deaths according to the ICD-10 is assumed to be less detailed than in the other models. More specifically, it is assumed that only three digits are used in the coding. This will have a number of implications, compared to the large and medium model, since 20 disease categories require a fourth digit to capture the alcohol relation. For some cases this is rather easily solved, for example the three diagnoses *alcoholic psychoses* and *alcohol dependence* and *abuse* are merged into one large category. The diagnoses *sequelae of intentional self-harm, assault and events of undetermined intent* (Y87), in the large model divided between *suicide and self-inflicted injury*, *homicide* and *undetermined injury,* are in the small model instead included in the *other accidents* category. This will result in a slight underestimation of the alcohol-related cost. For five of the problematic diagnose categories, no deaths occurred (Q86, R78, O35, P04

Table A3.11. Applied proportion for mortality diagnoses requiring four digits.

Diagnosis	Alcohol-related proportion (%)
G31.2	16.14
G61.1	8.36
I25.1-9	95.78
I42.6	4.01
K29.2	2.64
K86.1	43.30
K86.0	33.16
E24.4	0.00
G72.1	0.00
Motor vehicle accidents (V00-89, V95-99)	57.98*

* Calculated based on external cause of inpatient care episode

and Z72). Remaining is nine diagnose categories defined fully or in part by a fourth ICD-10 digit. The alcohol proportion of these categories is established by using the same proportion as for inpatient care. That is, we investigated what proportion, for example, K86.0 has to the full K86 diagnosis for inpatient care and apply the same proportion to mortality, see Table A3.11. The age of death will be assumed to be the average age of death for that specific diagnosis. This means that it will not be possible to divide mortality between age-groups without further assumptions. The proportions in Table A3.11 are thus used to estimate the number of cases in each disease category. The alcohol-related number of cases is then calculated by applying the AAFs from Table 3.8 and Rehm et al. 2004, as discussed above.

When using the information available for the small model (different prevalence of alcohol consumption, relative risks of chronic diseases and AAF of injuries as well as average wages not differentiated for age and gender), the total cost of productivity lost from mortality sums to 3,126 million SEK (Table A3.12). In these estimations we only include market production and therefore was there no cost of lost life-years after 65 years of age. This estimation therefore can be compared with our findings when valuing only market production in the sensitivity analysis shown in Table 6.20 on page 105 (2 956 million). The slightly higher result using the small model stems from a higher cost of female injuries (due to small sex-differences in injury AAFs in the small model). The number of prevented cases from alcohol consumption (a large net reduction of cases) was however much higher in the analysis presented in Table A3.12 than in the large model.

Table A3.12. Alcohol related productivity costs (market production only) due to mortality (using a 3% discount rate).

	Men		**Women**		**Total**	
	Cases	Cost (millions)	Cases	Cost (millions)	Cases	Cost (millions)
Chronic diseases	-152	935	-1 642	349	-1 794	1 284
Injuries	701	1 469	312	373	1 013	1 842
Total	**549**	**2 404**	**-1 330**	**722**	**-781**	**3 126**

Total cost small model

The small model estimates a net social cost of alcohol consumption of 13.5 billion SEK. The largest cost component is health care followed by social service. The lowest estimated cost is for crime.

Discussion

Information on intangible costs was assumed not to be available for the medium or small model and since QALYs are not valued in monetary terms in the base case of the large model, they have been excluded from the model comparison below. The costs of the large model have, in Table A3.13, been divided upon *comparable* and *additional cost*. In the *comparable cost*, the same costs have been estimated in all models, although in different manners. Cost components that have only been estimated in the large model is presented in *additional cost*. It is striking that, given data limitations, both the small and the medium model estimations are rather close to the large model (see Table A3.13, total comparable costs). The largest difference between the models is that the large model includes more costs components and thus results in a higher total cost.

When focusing on the *comparable* costs, the medium model results in the lowest cost while the small model shows the highest cost. The difference for both the small and the medium model compared to the large model is around 10%. However, when comparing the total cost estimated by the models, the large model shows substantial higher costs due to more cost components estimated. Interesting to note is that there is a downward trend for health care cost when applying better data while the opposite is (marginally) true for crime cost. A possible conclusion from this excercise is that the largest difference between estimations result from different costs estimated and different methods used (see chapter 6) rather than the level of detail of the data employed. More studies in this area is required in order to be able to make a more definitive conclusion.

Table A3.13. Total alcohol-related costs per model (billions)

		Small	**Medium**	**Large**
Health care	Comparable	3.486	2.111	2.056
	Additional			0.133
Social service	Comparable	4.364	4.364	4.364
	Additional			0
Crime	Comparable	2.550	2.668	2.715
	Additional			0.749
Res., policy & prev	Comparable	0	0	0
	Additional			0.479
Productivity cost	Comparable	3.126	1.915	3.069
	Additional			6.765
Total	*Comparable*	*13.526*	*11.058*	*12.204*
	Additional			*8.126*
Total model		**13.526**	**11.058**	**20.330**

Appendix 4. Needs for Swedish data identified by the study

Disease and injury risks

There are few studies on alcohol-related disease risks performed on a Swedish population, so to the extent that some disease risks differ between countries, the representativeness of the disease risks might be questioned. In the present study the IHD health benefits might be doubted, as noted in the report`s Discussion. The applied injury risks seem more appropriate, with both a Finnish and a Swedish study performed. However, increased information regarding the risk of being harmed in an accident resulting from somebody else's drinking, especially for children, need to be produced. In addition, studies of chronic diseases and injuries yielding AAFs differentiated for mortality and morbidity in a Swedish setting are required. There is a particular need for studies providing a basis for deriving AAFs directly for morbidity.

Health care

The Swedish data available in the cause of death and inpatient registers are outstanding, leaving very little to ask for as all individuals are covered and the disease codes are complete. However, this is not true for outpatient and primary care. Both areas lack nationwide coverage of patient cases and disease codes. In addition, it has not been possible to differentiate between day hospital care[21] and health care visits for outpatient care, where the former is expected to have a much higher resource use than the latter, and therefore a higher cost. The addition of this kind of information would doubtless increase the precision of the cost estimate. Further, studies investigating the proportion of the ambulance service and dental care that could be attributable to alcohol would also make it possible to include these costs in a COI study. It would also be beneficial to have access to studies on alcohol's role in co-morbidity, especially for outpatient and primary care. The handling of alcohol in private treatment and in mental health treatment, and the costs incurred therein, also needs to be further explored and investigated. Finally, it would be of interest to develop information regarding the treatment of alcohol-related problems within the correctional services.

Costs because of reduced productivity

The paucity of the data on reduced productivity because of alcohol consumption was surprising. To obtain current data on the short-term sickness absence, we had to perform an analysis on a population survey, which resulted in doubtful results. As the employers in Sweden now have the responsibility to pay employees during sickness for a 15 working-days period, they certainly have an incentive to investigate the reasons for sickness absence, to be able to reduce their costs. They also have the necessary registers available. A study on a sample of enterprises of the extent of and alcohol's role in short-tem sickness absence would greatly increase the possibilities to give accurate estimates on the social cost of alcohol-related reductions in productivity. The long-term sickness absences (21 or more days) are the responsibility of the National Social Security Board. Given the current policy discussions in Sweden on the large amount of sick leave, more accurate and detailed registers on the causes of absence seem relevant. Alcohol not only increases sickness absences, but it can affect productivity in a number of other ways, from reduced educational attainment and career paths, to the effect on co-workers. Some of these effects could be investigated in the excellent Swedish registers on income and social class, covering the full population.

Social services and other costs for the municipalities

[21] Outpatient care that requires more extensive and resource intensive care than an ordinary visit.

A need for more studies was identified regarding foremost the AAF for cases in child and youth welfare and for adult cases outside alcohol/drug treatment. It is obvious that our estimation of costs in child and youth welfare could be improved with better data, considering that available studies showed very different results regarding the AAF. Further, a large cost for the municipalities, the costs for care for disabled and elderly, could not be included due to lack of data concerning the role of alcohol abuse in these sectors. The same problem with missing data applies to administrative costs to the social service for handling social allowances to alcohol abusers as no data was found regarding alcohol abuse among recipients of social allowances. Another deficiency is the lack of individual-specific data within the Social services which hindered us from describing the costs per individual. In fact, we did not even find any data on the total number of individuals that the Social services covered during a year. In general there is a need for studies which would give an accurate AAF for child welfare cases, and for adult social services other than alcohol/drug treatment. A special study is also needed on alcohol components in costs for other departments in municipalities.

Crime

The data concerning crime statistics is fairly good in Sweden. Data concerning expenditures for the police is however not so comprehensive. The only crimes where data on costs for the police was available and specified was for violent crimes and theft. Also, costs for courts and procedure were not available per crime category. More Swedish studies on AAF for more types of crimes is desirable, especially theft/burglary and vandalism. AAF on crimes should include drinking by both the perpetrator and (where appropriate) the victim. There is also a need to develop data on expenditures for crime prevention and for developing defensible AAFs for these expenditures. There was a general lack of data on costs that can be attributed to the category “anticipation of crime” specifically from the security industry. Another lack of data or studies concerns the intangible effects of crime. That is, how one best can study and calculate on the nature and size of the fear and worry that crimes create among the citizens in a society.

Quality-of-life effects

Recent cost-of-alcohol studies all call for some estimates on the so-called intangible costs because of alcohol. We have tried to incorporate these costs, using the QALY concept. However, we had to combine several studies, with sometimes doubtful representativeness for a Swedish population, and conduct a survey study on the QoL effects for some third party members to be able to fulfill the aim. Some important QoL effects are still not covered, such as fear and anxiety in the general population or effects on children. Further studies on the issue would shed some much-needed light on these important effects. There is an overall need for developing measures applicable in population studies and otherwise to measure and monitor social problems from drinking, putting more emphasis on harm caused to the third party – relationships within family, with friends, harm to children – but also nuisances caused by alcohol outside close relationships – fears of alcohol-related crime, harassments, disturbed sleep at nights, etc. Also, studies on quality-of-life among heavy drinkers in general population, i.e. based on non-clinical samples, are basically absent in present research. When designing such studies and developing relevant measures, attention should be paid to the possibility of costing these intangible costs.

Appendix 5. Detailed results on medical care costs and productivity costs

A5.1 Inpatient care

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Mouth and oropharynx cancers	0-14	62	0	0	12	0	0
	15-17	0	0	0	0	0	0
	18-29	15	6	342 656	8	3	155 173
	30-49	239	88	4 949 508	143	47	2 632 598
	50-64	778	267	14 949 267	333	106	5 917 652
	65-79	590	176	9 838 161	283	69	3 890 384
	80+	174	47	2 659 597	172	36	1 999 557
	All	1 858	584	32 739 189	951	261	14 595 365
Stomach cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	14	1	64 091
	30-49	106	8	503 426	90	6	392 536
	50-64	378	26	1 679 185	235	15	986 652
	65-79	735	42	2 757 818	372	18	1 149 136
	80+	339	17	1 131 629	277	11	698 333
	All	1 558	93	6 072 058	988	50	3 290 748
Oesophageal cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	13	6	373 824	0	0	0
	30-49	59	27	1 628 761	18	8	472 771
	50-64	377	169	10 034 803	127	55	3 264 996
	65-79	474	193	11 441 792	190	68	4 051 721
	80+	174	66	3 895 110	93	29	1 725 335
	All	1 097	461	27 374 290	428	160	9 514 823
Liver cancer	0-14	46	0	0	15	0	0
	15-17	1	0	14 541	1	0	15 047
	18-29	3	1	57 605	2	1	35 395
	30-49	31	11	546 677	24	8	402 201
	50-64	161	55	2 682 613	90	30	1 457 400
	65-79	379	111	5 424 133	224	56	2 735 334
	80+	123	33	1 612 555	116	24	1 190 870
	All	744	211	10 338 124	472	119	5 836 247

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden, cont´d

		Men			**Women**		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Laryngeal cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	17	8	377 191	14	7	298 913
	50-64	224	106	4 778 266	62	29	1 291 743
	65-79	281	119	5 363 914	66	25	1 113 162
	80+	110	43	1 953 017	16	5	234 030
	All	632	278	12 472 388	158	65	2 937 847
Breast cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	25	3	110 886
	30-49	5	0	0	2 075	267	8 741 373
	50-64	17	0	0	4 838	599	19 631 540
	65-79	20	0	0	3 323	303	9 912 290
	80+	8	0	0	1 331	99	3 257 067
	All	50	0	0	11 592	1 271	41 653 156
Other neoplasms	0-14	387	0	0	487	0	0
	15-17	79	7	272 932	144	12	486 471
	18-29	285	36	1 409 740	623	66	2 624 201
	30-49	1 030	114	4 514 699	4 608	457	18 136 315
	50-64	1 934	196	7 783 347	4 547	431	17 112 102
	65-79	2 712	228	9 034 717	3 627	246	9 742 670
	80+	1 463	110	4 355 366	2 070	114	4 526 335
	All	7 890	690	27 370 802	16 106	1 326	52 628 094
Diabetes mellitus	0-14	785	0	0	841	0	0
	15-17	246	-5	-154 572	282	-17	-508 772
	18-29	517	-27	-829 942	472	-36	-1 106 595
	30-49	1 578	-58	-1 753 934	958	-74	-2 247 262
	50-64	2 491	-76	-2 307 357	1 343	-101	-3 080 660
	65-79	2 693	-49	-1 478 701	2 140	-123	-3 735 042
	80+	1 277	-21	-628 429	1 890	-88	-2 666 080
	All	9 587	-236	-7 152 935	7 926	-440	-13 344 412
Alcoholic psychoses	0-14	130	130	2 047 544	162	162	2 551 555
	15-17	312	312	4 914 106	314	314	4 945 607
	18-29	510	510	8 032 673	373	373	5 874 877
	30-49	2 075	2 075	32 681 956	652	652	10 269 222
	50-64	2 249	2 249	35 422 515	452	452	7 119 154
	65-79	529	529	8 331 930	123	123	1 937 292
	80+	37	37	582 763	23	23	362 258
	All	5 842	5 842	92 013 486	2 099	2 099	33 059 964

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden, cont´d

		Men			**Women**		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Alcohol abuse	0-14	7	7	96 107	11	11	151 026
	15-17	32	32	439 347	30	30	411 888
	18-29	146	146	2 004 522	103	103	1 414 149
	30-49	1 199	1 199	16 461 790	423	423	5 807 621
	50-64	1 325	1 325	18 191 720	341	341	4 681 794
	65-79	345	345	4 736 712	74	74	1 015 990
	80+	30	30	411 888	8	8	109 837
	All	3 084	3 084	42 342 086	990	990	13 592 304
Alcohol dependence syndrome	0-14	1	1	19 693	0	0	0
	15-17	2	2	39 386	3	3	59 079
	18-29	173	173	3 406 873	62	62	1 220 960
	30-49	4 154	4 154	81 804 348	1 123	1 123	22 115 138
	50-64	5 235	5 235	103 092 384	1 092	1 092	21 504 658
	65-79	856	856	16 857 131	176	176	3 465 952
	80+	32	32	630 173	10	10	196 929
	All	10 453	10 453	205 849 988	2 466	2 466	48 562 716
Unipolar major depression	0-14	51	0	0	138	0	0
	15-17	72	5	299 175	202	5	298 794
	18-29	528	36	2 193 949	1 092	26	1 615 264
	30-49	1 367	93	5 680 167	2 091	50	3 092 965
	50-64	1 011	68	4 200 913	1 412	34	2 088 602
	65-79	773	52	3 211 974	1 624	39	2 402 188
	80+	365	25	1 516 650	831	20	1 229 198
	All	4 167	279	17 102 828	7 390	175	10 727 011
Degeneration of nervous system due to alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	2	2	93 094
	50-64	21	21	977 490	3	3	139 641
	65-79	11	11	512 019	2	2	93 094
	80+	1	1	46 547	0	0	0
	All	33	33	1 536 056	7	7	325 830
Epilepsy	0-14	689	0	0	525	0	0
	15-17	103	30	709 235	92	37	868 870
	18-29	400	193	4 562 019	360	165	3 904 264
	30-49	974	390	9 221 775	726	300	7 085 293
	50-64	966	346	8 184 300	767	300	7 086 100
	65-79	981	257	6 078 786	787	192	4 542 704
	80+	408	99	2 327 770	532	104	2 451 294
	All	4 521	1 315	31 083 884	3789	1 098	25 938 525

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden, cont´d

		Men			Women		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Alcoholic polyneuropathy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	4	4	164 835	2	2	82 418
	50-64	6	6	247 253	3	3	123 627
	65-79	10	10	412 089	2	2	82 418
	80+	0	0	0	0	0	0
	All	20	20	824 177	7	7	288 462
Hypertensive disease	0-14	4	0	0	11	0	0
	15-17	1	0	5 228	4	1	20 128
	18-29	27	10	184 999	19	6	113 586
	30-49	381	127	2 380 733	230	70	1 306 255
	50-64	895	279	5 222 255	638	187	3 499 287
	65-79	697	188	3 514 703	1 040	233	4 370 297
	80+	331	81	1 524 354	818	154	2 892 313
	All	2 336	685	12 832 272	2 760	651	12 201 866
Ischemic heart disease	0-14	30	0	0	21	0	0
	15-17	0	0	0	0	0	0
	18-29	31	-5	-216 094	4	-1	-30 333
	30-49	2 840	-530	-21 129 545	933	-177	-7 068 547
	50-64	15 109	-2 805	-111 812 437	5 255	-973	-38 777 183
	65-79	21 764	-3 523	-140 440 353	12 333	-1 712	-68 236 453
	80+	10 502	-1 469	-58 566 654	11 932	-1 322	-52 685 480
	All	50 276	-8 333	-332 165 083	30 478	-4 184	-166 797 996
Alcoholic cardiomyopathy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	12	12	295 083	0	0	0
	50-64	25	25	614 756	0	0	0
	65-79	6	6	147 541	3	3	73 771
	80+	0	0	0	0	0	0
	All	43	43	1 057 379	3	3	73 771
Cardiac arrhythmias	0-14	80	0	0	63	0	0
	15-17	31	9	183 534	21	6	123 748
	18-29	262	94	1 892 946	158	55	1 099 449
	30-49	1 723	599	12 020 275	850	287	5 754 771
	50-64	6 157	2 073	41 565 419	2 687	886	17 757 417
	65-79	8 200	2 460	49 323 975	7 592	2 004	40 176 049
	80+	3 195	877	17 587 816	5 692	1 281	25 675 985
	All	19 648	6 113	122 573 965	17 063	4 518	90 587 419

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden, cont´d

		Men			**Women**		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Ischemic stroke	0-14	17	0	0	22	0	0
	15-17	2	-0	-3 554	2	-1	-26 121
	18-29	20	-1	-28 269	31	-12	-561 221
	30-49	430	-18	-830 240	270	-108	-5 043 704
	50-64	2 818	-124	-5 818 627	1 411	-552	-25 840 276
	65-79	7 053	-306	-14 329 620	5 465	-1 600	-74 902 929
	80+	5 207	-197	-9 233 250	7 951	-1 818	-85 129 129
	All	15 547	-646	-30 243 560	15 152	-4 090	-191 503 380
Haemorrhagic stroke	0-14	35	0	0	22	0	0
	15-17	4	0	26 528	14	-2	-167 757
	18-29	40	5	368 009	47	-11	-757 422
	30-49	424	52	3 560 386	425	-107	-7 367 912
	50-64	1 156	132	9 095 843	934	-235	-16 145 401
	65-79	1 515	145	9 984 479	1 236	-252	-17 314 826
	80+	826	71	4 867 886	1 080	-176	-12 085 603
	All	4 000	406	27 903 131	3 758	-784	-53 838 921
Oesophageal varices	0-14	0	0	0	8	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	2	1	32 789
	30-49	51	24	786 049	19	8	276 320
	50-64	160	67	2 211 895	37	15	505 800
	65-79	72	22	735 132	64	15	493 824
	80+	18	5	170 253	16	3	94 772
	All	301	118	3 903 328	146	42	1 403 505
Alcohol gastritis	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	2	2	24 722	1	1	12 361
	30-49	21	21	259 580	0	0	0
	50-64	19	19	234 858	2	2	24 722
	65-79	3	3	37 083	0	0	0
	80+	0	0	0	3	3	37 083
	All	45	45	556 243	6	6	74 166
Cirrhosis of the liver	0-14	1	0	0	9	0	0
	15-17	0	0	0	2	1	34 025
	18-29	4	2	88 068	9	5	173 089
	30-49	235	120	4 403 424	163	76	2 793 213
	50-64	814	371	13 656 017	359	157	5 789 043
	65-79	468	162	5 955 317	312	80	2 931 614
	80+	67	22	792 837	48	10	350 599
	All	1 589	677	24 895 662	902	328	12 071 582

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden, cont´d

Disease		**Men**			**Women**		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Cholelithiasis	0-14	26	0	0	42	0	0
	15-17	10	-2	-49 432	71	-12	-334 228
	18-29	180	-44	-1 248 735	1 222	-271	-7 699 700
	30-49	1 451	-332	-9 450 656	3 601	-765	-21 733 571
	50-64	1 732	-372	-10 585 777	3 162	-644	-18 304 967
	65-79	2 009	-356	-10 126 314	2 315	-332	-9 436 460
	80+	1 059	-162	-4 616 671	1 472	-167	-4 743 685
	All	6 467	-1 269	-36 077 585	11 885	-2 190	-62 252 611
Acute and chronic pancreatitis	0-14	13	0	0	10	0	0
	15-17	10	2	79 399	6	1	46 112
	18-29	146	44	1 554 840	102	27	944 047
	30-49	776	211	7 488 371	393	97	3 441 964
	50-64	797	201	7 155 104	502	119	4 235 400
	65-79	607	131	4 655 573	497	89	3 150 985
	80+	266	52	1 851 398	342	51	1 806 870
	All	2 615	641	22 784 685	1 852	383	13 625 379
Chronic pancreatitis (alcohol induced)	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	8	8	254 678	0	0	0
	30-49	171	171	5 443 746	32	32	1 018 713
	50-64	185	185	5 889 432	38	38	1 209 721
	65-79	44	44	1 400 730	12	12	382 017
	80+	3	3	95 504	3	3	95 504
	All	411	411	13 084 090	85	85	2 705 955
Psoriasis	0-14	2	0	0	9	0	0
	15-17	1	0	9 027	10	3	85 755
	18-29	20	7	210 473	12	4	121 369
	30-49	93	34	965 194	77	27	769 267
	50-64	125	44	1 263 350	123	42	1 205 729
	65-79	75	24	689 666	106	30	863 285
	80+	27	8	227 638	38	9	266 431
	All	343	118	3 365 347	375	116	3 311 835

Table A5.1 Alcohol-related costs to inpatient care, chronic diseases, Sweden, cont´d

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Total cost*	*Total cases*	*Alcohol-related cases*	*Total cost*
Excess blood alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	1	1	7 100
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	1	1	7 100
Toxic effect of alcohol	0-14	1	1	10 994	0	0	0
	15-17	0	0	0	7	7	76 958
	18-29	4	4	43 976	2	2	21 988
	30-49	4	4	43 976	1	1	10 994
	50-64	4	4	43 976	0	0	0
	65-79	0	0	0	0	0	0
	80+	1	1	10 994	0	0	0
	All	14	14	153 917	10	10	109 941
Problems related to lifestyle alcohol use	0-14	0	0	0	0	0	0
	15-17	1	1	12 354	1	1	12 354
	18-29	2	2	24 709	0	0	0
	30-49	8	8	98 835	0	0	0
	50-64	9	9	111 189	3	3	37 063
	65-79	8	8	98 835	1	1	12 354
	80+	0	0	0	0	0	0
	All	28	28	345 922	5	5	61 772
*Other diagnoses related to pregnancy**	0-14	0	0	0	2	2	67 524
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	1	1	33 762
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	3	3	101 286

* Maternal care of suspected damage to the foetus from alcohol, Fetal alcohol syndrome and Foetus and newborn affected by maternal use of alcohol

Table A5.2 Alcohol-related cost to inpatient care, injuries, Sweden

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Motor vehicle accidents	0-14	500	32	1 503 965	303	10	460 354
	15-17	606	78	3 645 611	242	16	735 351
	18-29	2 087	551	25 814 715	803	48	2 234 841
	30-49	2 044	523	24 505 624	911	22	1 051 583
	50-64	902	189	8 856 072	562	11	525 147
	65-79	441	32	1 498 215	382	0	0
	80+	193	15	716 671	153	0	0
	All	6 773	1 419	66 540 871	3 356	107	5 007 275
Water traffic accidents and drowning	0-14	112	15	566 239	77	11	414 817
	15-17	4	1	40 446	4	1	43 098
	18-29	48	13	485 348	22	6	237 038
	30-49	78	25	917 984	53	14	535 905
	50-64	138	37	1 395 376	79	10	379 758
	65-79	237	32	1 178 560	160	2	79 565
	80+	156	21	775 761	211	3	104 927
	All	773	144	5 359 714	606	47	1 795 108
Falls	0-14	5 713	0	0	3 241	0	0
	15-17	866	223	8 733 026	409	85	3 342 259
	18-29	2 319	598	23 385 552	1 123	235	9 176 910
	30-49	4 613	1 271	49 727 202	2 651	436	17 054 160
	50-64	5 234	1 047	40 951 057	4 716	398	15 579 240
	65-79	7 256	258	10 092 672	12 339	55	2 145 353
	80+	8 652	308	12 034 426	24 546	109	4 267 756
	All	34 653	3 705	144 923 935	49 025	1 318	51 565 679
Fire, flames, heat and cold	0-14	77	14	603 165	37	6	282 676
	15-17	19	7	297 666	17	6	259 757
	18-29	91	33	1 425 663	31	11	473 674
	30-49	182	68	2 956 931	66	21	893 578
	50-64	142	49	2 114 801	75	18	797 838
	65-79	69	14	600 554	44	2	93 613
	80+	38	8	330 740	47	2	99 996
	All	618	193	8 329 520	317	66	2 901 132

Table A5.2 Alcohol-related cost to inpatient care, injuries, Sweden, cont´d.

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Accidental alcohol poisoning	0-14	10	10	118 853	7	7	83 197
	15-17	16	16	190 165	19	19	225 821
	18-29	25	25	297 133	17	17	202 051
	30-49	22	22	261 477	9	9	106 968
	50-64	7	7	83 197	2	2	23 771
	65-79	11	11	130 739	1	1	11 885
	80+	1	1	11 885	0	0	0
	All	92	92	1 093 450	55	55	653 693
Suicide and self- inflicted injuries	0-14	69	0	0	230	0	0
	15-17	130	25	537 819	506	38	827 606
	18-29	905	173	3 744 047	1 935	146	3 164 857
	30-49	1 400	249	5 387 810	2 262	151	3 264 435
	50-64	605	70	1 513 397	753	33	724 468
	65-79	215	10	206 853	272	2	52 339
	80+	100	4	96 211	150	1	28 863
	All	3 424	531	11 486 137	6 108	372	8 062 569
Homicide	0-14	64	15	446 881	50	7	205 042
	15-17	131	60	1 829 421	37	10	303 463
	18-29	828	376	11 563 055	145	39	1 189 245
	30-49	633	338	10 383 341	254	75	2 308 444
	50-64	221	83	2 547 401	78	21	657 022
	65-79	51	13	406 981	27	0	0
	80+	14	4	111 720	13	0	0
	All	1 942	888	27 288 800	604	152	4 663 216
Undetermined injury	0-14	58	0	0	52	0	0
	15-17	28	7	183 376	24	4	98 237
	18-29	107	27	700 759	94	15	384 763
	30-49	149	38	993 249	127	23	608 954
	50-64	118	23	593 400	64	7	194 603
	65-79	52	6	145 953	61	2	49 937
	80+	40	4	112 271	56	2	45 844
	All	552	104	2 729 009	478	53	1 382 339
Other accidents	0-14	3 864	0	0	2 713	0	0
	15-17	1 045	111	5 480 839	700	44	2 141 636
	18-29	3 578	382	18 765 975	2 183	136	6 678 844
	30-49	6 198	1 074	52 824 540	4 641	639	31 440 743
	50-64	6 002	694	34 102 709	4 708	293	14 404 031
	65-79	6 673	208	10 207 954	6 272	28	1 370 647
	80+	3 370	105	5 155 223	5 428	24	1 186 204
	All	30 730	2 573	126 537 241	26 645	1 164	57 222 105

A5.2 Outpatient care

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden

		Men			Women		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Mouth and oropharynx cancers	0-14	185	0	0	290	0	0
	15-17	26	8	17 631	13	4	8 254
	18-29	119	48	103 272	145	50	107 175
	30-49	1 252	463	988 238	1 318	433	924 745
	50-64	4 969	1 704	3 638 776	2 570	815	1 740 658
	65-79	4 139	1 232	2 630 057	2 386	585	1 249 851
	80+	1 186	324	691 008	1 911	397	846 734
	All	11 876	3 779	8 068 982	8 633	2 284	4 877 417
Stomach cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	66	5	9 839
	30-49	264	19	40 830	158	11	22 498
	50-64	923	63	133 667	369	24	50 533
	65-79	1 134	65	138 707	646	30	65 065
	80+	633	32	68 876	527	20	43 347
	All	2 952	179	382 080	1 766	90	191 282
Oesophageal cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	13	6	13 637	0	0	0
	30-49	145	67	144 012	66	29	62 280
	50-64	1 279	573	1 224 449	514	223	475 494
	65-79	1 410	574	1 224 901	527	189	404 527
	80+	316	119	254 790	105	33	70 385
	All	3 163	1 340	2 861 790	1 213	474	1 012 686
Liver cancer	0-14	26	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	13	5	11 053	0	0	0
	30-49	13	5	10 151	13	5	9 647
	50-64	290	99	211 007	132	44	93 213
	65-79	198	58	123 573	514	128	274 138
	80+	224	60	128 292	92	19	41 366
	All	764	227	484 076	751	196	418 364
Laryngeal cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	277	137	291 850	40	19	40 120
	50-64	2 096	995	2 124 453	474	220	469 802
	65-79	3 506	1 489	3 180 424	975	366	781 761
	80+	1 081	427	911 916	171	56	119 103
	All	6 959	3 048	6 508 643	1 661	661	1 410 786

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden, cont´d.

		Men			**Women**		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Breast cancer	0-14	13	0	0	13	0	0
	15-17	0	0	0	13	1	3 075
	18-29	13	0	0	264	36	76 204
	30-49	13	0	0	24 252	3 118	6 658 705
	50-64	158	0	0	47 252	5 853	12 496 489
	65-79	290	0	0	30 262	2 755	5 883 366
	80+	66	0	0	11 757	878	1 875 098
	All	554	0	0	113 813	12 642	26 992 936
Other neoplasms	0-14	16 120	0	0	19 046	0	0
	15-17	5 536	482	1 029 144	6 103	520	1 109 369
	18-29	16 766	2 090	4 462 536	36 694	3 895	8 317 228
	30-49	36 853	4 071	8 692 188	91 433	9 069	19 364 602
	50-64	36 879	3 740	7 986 526	64 096	6 079	12 980 248
	65-79	38 948	3 270	6 982 045	43 179	2 923	6 241 294
	80+	16 884	1 267	2 704 766	17 741	978	2 087 477
	All	167 985	14 920	31 857 206	278 292	23 464	50 100 217
Diabetes mellitus	0-14	24 832	0	0	21 682	0	0
	15-17	7 170	-148	-316 866	6 656	-396	-844 592
	18-29	14 749	-780	-1 665 210	12 574	-971	-2 073 371
	30-49	36 866	-1 350	-2 881 911	26 400	-2 040	-4 355 630
	50-64	54 989	-1 678	-3 582 343	28 878	-2 182	-4 658 992
	65-79	37 907	-686	-1 463 911	27 547	-1 584	-3 381 503
	80+	6 379	-103	-220 797	8 277	-385	-821 207
	All	182 892	-4 745	-10 131 038	132 015	-7 557	-16 135 296
Alcoholic psychoses	0-14	132	132	281 434	198	198	422 151
	15-17	277	277	591 011	303	303	647 298
	18-29	659	659	1 407 169	540	540	1 153 878
	30-49	4 850	4 850	10 356 761	2 214	2 214	4 728 086
	50-64	3 954	3 954	8 443 011	1 107	1 107	2 364 043
	65-79	857	857	1 829 319	224	224	478 437
	80+	40	40	84 430	26	26	56 287
	All	10 768	10 768	22 993 134	4 613	4 613	9 850 180
Alcohol abuse	0-14	0	0	0	0	0	0
	15-17	26	26	56 287	40	40	84 430
	18-29	646	646	1 379 025	224	224	478 437
	30-49	6 762	6 762	14 437 550	3 242	3 242	6 923 269
	50-64	2 926	2 926	6 247 828	883	883	1 885 606
	65-79	356	356	759 871	92	92	197 004
	80+	0	0	0	0	0	0
	All	10 716	10 716	22 880 561	4 481	4 481	9 568 746

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden, cont´d.

		Men			Women		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Alcohol dependence syndrome	0-14	0	0	0	0	0	0
	15-17	0	0	0	13	13	28 143
	18-29	1 199	1 199	2 561 047	844	844	1 801 176
	30-49	13 154	13 154	28 087 085	6 432	6 432	13 733 965
	50-64	10 386	10 386	22 176 977	4 429	4 429	9 456 173
	65-79	1 358	1 358	2 898 767	580	580	1 238 308
	80+	92	92	197 004	0	0	0
	All	26 190	26 190	55 920 879	12 297	12 297	26 257 766
Unipolar major depression	0-14	3 111	0	0	3 677	0	0
	15-17	6 248	423	903 115	16 041	387	825 437
	18-29	24 713	1 673	3 572 449	50 257	1 211	2 586 187
	30-49	52 234	3 536	7 550 729	104 732	2 524	5 389 416
	50-64	28 206	1 910	4 077 355	49 203	1 186	2 531 927
	65-79	8 936	605	1 291 798	17 767	428	914 288
	80+	2 333	158	337 239	6 511	157	335 058
	All	125 781	8 305	17 732 685	248 188	5 893	12 582 313
Degeneration of nervous system due to alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	40	40	84 430	40	40	84 430
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	40	40	84 430	40	40	84 430
Epilepsy	0-14	7 012	0	0	6 656	0	0
	15-17	1 634	476	1 016 954	1 437	574	1 226 085
	18-29	4 284	2 068	4 414 763	5 272	2 420	5 166 824
	30-49	6 393	2 561	5 469 205	6 959	2 874	6 137 366
	50-64	4 455	1 597	3 410 736	3 256	1 273	2 717 914
	65-79	2 056	539	1 151 329	1 700	415	886 863
	80+	488	118	251 425	422	82	175 615
	All	26 321	7 360	15 714 411	25 702	7 639	16 310 666
Alcoholic polyneuropathy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	13	13	28 143	0	0	0
	65-79	13	13	28 143	0	0	0
	80+	0	0	0	0	0	0
	All	26	26	56 287	0	0	0

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden, cont´d.

		Men			**Women**		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Hypertensive disease	0-14	119	0	0	66	0	0
	15-17	40	11	23 555	0	0	0
	18-29	303	111	236 703	422	135	287 338
	30-49	5 272	1 758	3 754 200	5 259	1 594	3 403 648
	50-64	18 571	5 783	12 348 599	13 629	3 989	8 518 265
	65-79	17 556	4 725	10 088 621	15 368	3 447	7 359 492
	80+	4 402	1 082	2 310 341	7 974	1 505	3 213 062
	All	46 263	13 470	28 762 020	42 718	10 669	22 781 804
Ischemic heart disease	0-14	40	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	53	-9	-19 687	105	-20	-42 832
	30-49	8 435	-1 574	-3 361 856	2 794	-531	-1 133 996
	50-64	43 166	-8 014	-17 111 693	15 869	-2 938	-6 272 740
	65-79	53 249	-8 620	-18 406 103	24 423	-3 390	-7 238 530
	80+	9 727	-1 361	-2 905 775	7 974	-883	-1 886 081
	All	114 670	-19 579	-41 805 113	51 166	-7 762	-16574181
Alcoholic cardiomyopathy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	40	40	84 430	0	0	0
	50-64	92	92	197 004	0	0	0
	65-79	13	13	28 143	0	0	0
	80+	0	0	0	0	0	0
	All	145	145	309 577	0	0	0
Cardiac arrhythmias	0-14	923	0	0	909	0	0
	15-17	237	70	149 578	237	70	148 879
	18-29	830	299	638 877	619	215	459 046
	30-49	4 653	1 619	3 456 559	3 150	1 064	2271157
	50-64	20 074	6 759	14 431 218	7 750	2 554	5454181
	65-79	34 269	10 280	21 951 169	20 970	5 534	11817383
	80+	8 343	2 291	4 890 856	10 465	2 354	5 027 161
	All	69 329	21 318	45 518 257	44 102	11 792	25177806
Ischemic stroke	0-14	145	0	0	53	0	0
	15-17	0	0	0	13	-4	-7 851
	18-29	40	-1	-2 549	92	-36	-76 179
	30-49	1 358	-56	-119 546	751	-300	-640 066
	50-64	3 756	-166	-353 743	2 241	-876	-1 871 470
	65-79	3 229	-140	-299 220	1 898	-556	-1 186 410
	80+	778	-29	-62 890	79	-187	-399 036
	All	9 305	-392	-837 949	5 127	-1 958	-4 181 012

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden, cont´d.

		Men			**Women**		
Disease		*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Haemorrhagic stroke	0-14	53	0	0	66	0	0
	15-17	26	3	5 433	105	-18	-39 268
	18-29	92	12	26 381	40	-9	-19 804
	30-49	422	52	110 073	633	-160	-340 876
	50-64	1 265	145	309 425	817	-206	-439 029
	65-79	316	30	64 792	185	-38	-80 339
	80+	79	7	14 485	79	-13	-27 504
	All	2 254	248	530 590	1 924	-443	-946 820
Oesophageal varices	0-14	13	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	13	7	15 605	79	39	83 779
	30-49	92	43	91 890	119	52	111 479
	50-64	435	182	388 552	158	65	139 717
	65-79	224	69	147 833	171	40	85 433
	80+	40	11	24 168	92	17	35 314
	All	817	313	668 048	619	213	455 722
Alcohol gastritis	0-14	0	0	0	26	26	56 287
	15-17	0	0	0	13	13	28 143
	18-29	0	0	0	0	0	0
	30-49	66	66	140 717	0	0	0
	50-64	26	26	56 287	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	92	92	197 004	40	40	84 430
Cirrhosis of the liver	0-14	13	0	0	40	0	0
	15-17	13	5	11 143	0	0	0
	18-29	53	32	67 357	40	21	44 128
	30-49	580	295	630 582	593	276	589 787
	50-64	1 819	829	1 770 701	1 898	832	1 775 993
	65-79	936	324	691 009	1 595	407	869 569
	80+	132	42	90 506	132	26	55 864
	All	3 546	1 527	3 261 299	4 297	1 562	3 335 343
Cholelithiasis	0-14	92	0	0	105	0	0
	15-17	0	0	0	145	-24	-51 270
	18-29	395	-97	-206 065	3 229	-716	-1 528 460
	30-49	2 952	-677	-1 444 534	9 068	-1 925	-4 111 324
	50-64	3 440	-740	-1 579 431	7 078	-1 442	-3 077 986
	65-79	3 084	-547	-1 167 811	3 651	-524	-1 117 952
	80+	883	-135	-289 197	1 476	-167	-357 364
	All	10 848	-2 195	-4 687 038	24 753	-4 798	-10 244 356
Acute and chronic pancreatitis	0-14	13	0	0	13	0	0
	15-17	0	0	0	0	0	0
	18-29	92	28	59 002	105	27	58 603
	30-49	633	172	366 611	290	71	152 502
	50-64	923	233	497 387	488	116	247 076
	65-79	448	97	206 396	237	42	90 324
	80+	119	23	49 579	132	20	41 816
	All	2 227	552	1 178 977	1 265	276	590 321

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden, cont´d.

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Chronic pancreastitis (alcohol induced)	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	66	66	140 717	66	66	140 717
	50-64	395	395	844 301	53	53	112 573
	65-79	66	66	140 717	13	13	28 143
	80+	0	0	0	13	13	28 143
	All	527	527	1 125 735	145	145	309 577
Psoriasis	0-14	1 028	0	0	844	0	0
	15-17	250	79	168 595	646	193	413 063
	18-29	3 625	1 332	2 844 853	5 378	1 900	4 056 458
	30-49	15 962	5 786	12 354 845	13 246	4 622	9 869 920
	50-64	15 790	5 574	11 902 325	15 685	5 370	11 467 080
	65-79	7 262	2 333	4 980 705	9 187	2 613	5 580 109
	80+	1 054	311	663 028	2 227	546	1 164 796
	All	44 972	15 415	32 914 352	47 212	15 245	32 551 426
Excess blood alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	0	0	0
Toxic effect of alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	26	26	56 287
	18-29	26	26	56 287	13	13	28 143
	30-49	26	26	56 287	40	40	84 430
	50-64	40	40	84 430	26	26	56 287
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	92	92	197 004	105	105	225 147
Problems related to lifestyle alcohol use	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	13	13	28 143	26	26	56 287
	30-49	0	0	0	0	0	0
	50-64	13	13	28 143	0	0	0
	65-79	0	0	0	13	13	28 143
	80+	0	0	0	0	0	0
	All	26	26	56 287	40	40	84 430

Table A5.3 Alcohol-related costs to outpatient care, chronic diseases, Sweden, cont´d.

Disease		**Men** *Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	**Women** *Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
*Other diagnoses related to pregnancy**	0-14	13	13	28 143	26	26	56 287
	15-17	0	0	0	13	13	28 143
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	13	13	28 143	40	40	84 430

* Fetal alcohol syndrome

Table A5.4 Alcohol-related cost to outpatient care, injury, Sweden

Disease		**Men** *Total cases*	*Alcohol-related cases*	*Alcohol-related cost*	**Women** *Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Motor vehicle Accidents	0-14	1 977	127	270 831	1 213	39	83 903
	15-17	2 649	340	725 826	989	64	136 798
	18-29	6 933	1 829	3 905 437	2 452	146	310 730
	30-49	7 170	1 833	3 914 919	3 532	87	185 694
	50-64	2 794	585	1 249 423	1 674	33	71 234
	65-79	619	45	95 846	712	0	0
	80+	185	15	31 205	119	0	0
	All	22 328	4774	10 193 486	10 689	369	788 359
Water traffic accidents and drowning	0-14	26	4	7 630	40	6	12 195
	15-17	13	4	7 630	0	0	0
	18-29	26	7	15 260	0	0	0
	30-49	13	4	8 881	0	0	0
	50-64	0	0	0	0	0	0
	65-79	13	2	3 752	0	0	0
	80+	0	0	0	0	0	0
	All	92	20	43 153	40	6	12 195
Falls	0-14	79 452	0	0	57 954	0	0
	15-17	14 406	3 714	7 929 426	7 381	1 542	3 292 149
	18-29	40 438	10 424	22 257 529	18 439	3 852	8 224 494
	30-49	63 266	17 433	37 224 299	44 998	7 400	15 800 064
	50-64	39 251	7 850	16 762 192	54 527	4 605	9 831 793
	65-79	20 390	725	1 548 011	54 303	241	515 336
	80+	11 414	406	866 566	37 393	166	354 857
	All	268 617	40 552	86 588 023	274 997	17 805	38 018 693

Table A5.4 Alcohol-related cost to outpatient care, injury, Sweden, cont´d.

Disease		**Men**			**Women**		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Fire, flames, heat and cold	0-14	224	40	86 119	250	44	93 874
	15-17	53	19	40 526	13	5	9 881
	18-29	474	171	364 738	40	14	29 644
	30-49	290	108	231 151	92	29	61 290
	50-64	290	99	211 888	198	48	103 192
	65-79	92	18	39 401	53	3	5 504
	80+	0	0	0	40	2	4 128
	All	1 423	456	973 823	685	144	307 513
Accidental alcohol poisoning	0-14	158	158	337 720	66	66	140 717
	15-17	26	26	56 287	53	53	112 573
	18-29	26	26	56 287	26	26	56 287
	30-49	0	0	0	13	13	28 143
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	211	211	450 294	158	158	337 720
Suicide and self-inflicted injuries	0-14	105	0	0	303	0	0
	15-17	250	48	102 192	896	68	144 594
	18-29	540	103	220 519	949	72	153 100
	30-49	672	120	255 167	1 252	83	178 241
	50-64	395	46	97 564	316	14	30 020
	65-79	224	10	21 264	145	1	2 752
	80+	26	1	2 502	26	0	500
	All	2 214	327	699 206	3 888	238	509 207
Homicide	0-14	1 938	611	1 304 059	2 557	473	1 010 748
	15-17	936	590	1 259 703	1 265	468	1 000 328
	18-29	3 756	2 368	5 056 556	1 371	508	1 083 688
	30-49	2 175	1 610	3 438 627	1 410	579	1 235 484
	50-64	593	309	659 000	198	75	160 526
	65-79	26	9	20 277	40	0	0
	80+	0	0	0	26	0	0
	All	9 424	5 497	11 738 221	6 867	2 103	4 490 773
Undetermined injury	0-14	7 948	0	0	5 878	0	0
	15-17	3 203	797	1 702 111	1 186	185	394 007
	18-29	9 754	2 428	5 183 384	3 559	554	1 182 022
	30-49	12 772	3 236	6 908 635	7 223	1 316	2 810 335
	50-64	6 682	1 277	2 726 905	7 091	819	1 749 642
	65-79	5 048	538	1 149 751	7 513	234	499 076
	80+	2 649	283	603 394	6 669	207	443 039
	All	48 056	8 558	18 274 179	39 120	3 315	7 078 120

Table A5.4 Alcohol-related cost to outpatient care, injury, Sweden, cont´d.

Disease		**Men**			**Women**		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Other accidents	0-14	51 773	0	0	34 796	0	0
	15-17	12 363	1 319	2 815 838	6 893	429	915 848
	18-29	44 075	4 701	10 038 553	19 151	1 192	2 544 411
	30-49	72 387	12 547	26 790 989	38 698	5 332	11 384 432
	50-64	38 447	4 443	9 486 443	25 544	1 589	3 393 715
	65-79	17 596	547	1 168 888	18 993	84	180 243
	80+	5 246	163	348 477	8 818	39	83 680
	All	241 887	23 721	50 649 188	152 893	8 665	18 502 328

A5.3 Primary care

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden, cont´d.

Disease		**Men**			**Women**		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Mouth and oropharynx cancers	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	22	8	11 341
	30-49	0	0	0	0	0	0
	50-64	110	38	56 174	88	28	41 561
	65-79	132	39	58 498	88	22	32 151
	80+	88	24	35 748	44	9	13 594
	All	331	101	150 420	243	66	98 648
Stomach cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	331	22	32 734
	50-64	375	25	37 786	0	0	0
	65-79	220	13	18 774	132	6	9 274
	80+	375	19	28 394	154	6	8 830
	All	970	57	84 954	617	34	50 838
Oesophageal cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	66	30	44 080	66	29	42 575
	65-79	154	63	93 275	66	24	35 315
	80+	198	75	111 216	22	7	10 241
	All	419	167	248 571	154	59	88 131

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*
Liver cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	22	8	11 816	0	0	0
	50-64	110	38	55 821	22	7	10 850
	65-79	88	26	38 357	22	6	8 182
	80+	88	24	35 137	198	42	61 907
	All	309	95	141 130	243	54	80 939
Laryngeal cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	88	42	62 210	0	0	0
	65-79	154	66	97 421	0	0	0
	80+	66	26	38 834	0	0	0
	All	309	134	198 466	0	0	0
Breast cancer	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	22	3	4 435
	30-49	0	0	0	1 720	221	328 563
	50-64	0	0	0	3 903	483	718 165
	65-79	66	0	0	4 674	426	632 327
	80+	22	0	0	3 859	288	428 202
	All	88	0	0	14 178	1 421	2 111 693
Other neoplasms	0-14	10 098	0	0	10 385	0	0
	15-17	4 189	365	541 917	6 372	543	806 019
	18-29	14 067	1 754	2 605 358	28 289	3 003	4 461 575
	30-49	21 366	2 360	3 506 451	52 763	5 234	7 775 560
	50-64	15 633	1 586	2 355 638	26 327	2 497	3 709 669
	65-79	11 399	957	1 421 896	16 537	1 119	1 663 199
	80+	5 645	423	629 177	7 563	417	619 188
	All	82 397	7 444	11 060 437	148 236	12 812	19 035209
Diabetes mellitus	0-14	728	0	0	860	0	0
	15-17	176	-4	-5 424	220	-13	-19 467
	18-29	2 117	-112	-166 289	1 698	-131	-194 792
	30-49	37 219	-1 363	-2 024 476	24 805	-1 917	-2 847 572
	50-64	131 280	-4 005	-5 950 916	80 898	-6 112	-9 081 330
	65-79	151 168	-2 734	-4 062 084	135 646	-7 798	-11 585 959
	80+	50 559	-820	-1 217 597	70 910	-3 295	-4 895 097
	All	373 247	-9 037	-13 426 785	315 037	-19 266	-28 624 217

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden, cont´d.

		Men			Women		
Disease		*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*
Alcoholic psychoses	0-14	0	0	0	22	22	32 759
	15-17	66	66	98 276	132	132	196 553
	18-29	1 191	1 191	1 768 976	176	176	262 071
	30-49	5 380	5 380	7 993 152	1 940	1 940	2 882 776
	50-64	6 350	6 350	9 434 540	1 235	1 235	1 834 494
	65-79	1 147	1 147	1 703 459	287	287	425 865
	80+	88	88	131 035	0	0	0
	All	14 222	14 222	21 129 438	3 792	3 792	5 634 517
Alcohol abuse	0-14	0	0	0	22	22	32 759
	15-17	0	0	0	22	22	32 759
	18-29	88	88	131 035	22	22	32 759
	30-49	838	838	1 244 835	132	132	196 553
	50-64	882	882	1 310 353	243	243	360 347
	65-79	265	265	393 106	176	176	262 071
	80+	0	0	0	0	0	0
	All	2 073	2 073	3 079 329	617	617	917 247
Alcohol dependence syndrome	0-14	0	0	0	22	22	32 759
	15-17	0	0	0	0	0	0
	18-29	441	441	655 176	66	66	98 276
	30-49	6 019	6 019	8 943 158	1 940	1 940	2 882 776
	50-64	7 541	7 541	11 203 516	1 698	1 698	2 522 429
	65-79	1 565	1 565	2 325 876	198	198	294 829
	80+	110	110	163 794	88	88	131 035
	All	15 677	15 677	23 291 520	4 013	4 013	5 962 105
Unipolar major depression	0-14	529	0	0	706	0	0
	15-17	1 014	69	102 018	3 241	78	116 055
	18-29	29 921	2 026	3 009 517	66 985	1 614	2 398 463
	30-49	91 812	6 216	9 234 803	202 918	4 890	7 265 654
	50-64	50 647	3 429	5 094 222	104 027	2 507	3 724 802
	65-79	20 395	1 381	2 051 439	45 906	1 106	1 643 713
	80+	10 429	706	1 049 006	25 445	613	911 069
	All	204 748	13 826	20 541 005	449 228	10 809	16 059 755
Degeneration of nervous system due to alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	22	22	32 759	0	0	0
	80+	0	0	0	0	0	0
	All	22	22	32 759	0	0	0

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden, cont´d.

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*
Epilepsy	0-14	2 315	0	0	2 977	0	0
	15-17	176	51	76 370	529	212	314 237
	18-29	926	447	664 088	926	425	631 488
	30-49	2 977	1 193	1 772 019	2 624	1 084	1 610 079
	50-64	3 021	1 083	1 609 178	2 381	931	1 383 295
	65-79	2 668	700	1 039 471	2 955	722	1 072 318
	80+	970	234	348 026	926	181	268 295
	All	13 053	3 708	5 509 151	13 318	3 554	5 279 711
Alcoholic polyneuropathy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	88	88	131 035	0	0	0
	50-64	110	110	163 794	88	88	131 035
	65-79	44	44	65 518	0	0	0
	80+	0	0	0	0	0	0
	All	243	243	360 347	88	88	131 035
Hypertensive disease	0-14	0	0	0	88	0	0
	15-17	88	25	36 558	66	18	26 393
	18-29	1 257	460	682 816	1 235	394	585 307
	30-49	43 657	14 559	21 630 908	52 344	15 866	23 572 441
	50-64	168 697	52 534	78 050 738	196 810	57 610	85 593 264
	65-79	187 219	50 385	74 858 051	279 318	62 643	93 069 939
	80+	63 104	15 510	23 043 654	159 657	30 128	44 762 500
	All	464 023	133 472	198 302 726	689 518	166 659	247 609 843
Ischemic heart disease	0-14	0	0	0	0	0	0
	15-17	22	-3	-4 867	0	0	0
	18-29	66	-12	-17 186	44	-8	-12 464
	30-49	3 087	-576	-856 011	1 169	-222	-329 992
	50-64	19 447	-3 610	-5 364 168	8 776	-1 625	-2 413 604
	65-79	38 321	-6 204	-9 216 847	25 577	-3 550	-5 274 546
	80+	25 092	-3 510	-5 215 549	25 952	-2 875	-4 271 039
	All	86 035	-13 916	-20 674 628	61 517	-8 280	-12 301 646
Alcoholic cardiomyopathy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	0	0	0

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden, cont´d.

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*
Cardiac arrhythmias	0-14	265	0	0	154	0	0
	15-17	66	20	29 018	110	32	48 137
	18-29	750	270	401 336	794	275	409 273
	30-49	2 977	1 036	1 538 704	3 991	1 348	2 002 073
	50-64	12 436	4 187	6 220 629	8 401	2 769	4 113 669
	65-79	32 346	9 704	14 416 722	28 554	7 536	11 196 261
	80+	25 356	6 961	10 342 632	36 160	8 135	12 086 437
	All	74 195	22 177	32 949 042	78 164	20 095	29 855 848
Ischemic stroke	0-14	22	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	573	-24	-35 126	419	-167	-248 345
	50-64	4 873	-215	-319 292	3 285	-1 285	-1 909 292
	65-79	7 849	-341	-506 089	6 681	-1 956	-2 905 810
	80+	4 233	-160	-238 223	6 284	-1 437	-2 135 095
	All	17 551	-740	-1 098 729	16 669	-4 845	-7 198 542
Haemorrhagic stroke	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	44	6	8 774	0	0	0
	30-49	88	11	16 016	176	-45	-66 130
	50-64	397	45	67 532	573	-144	-214 302
	65-79	309	30	43 994	287	-58	-86 835
	80+	198	17	25 290	243	-40	-58 693
	All	1 036	109	161 605	1 279	-287	-425 960
Oesophageal varices	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	22	9	13 705	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	22	9	13 705	0	0	0
Alcohol gastritis	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	22	22	32 759	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	22	22	32 759	0	0	0

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden, cont´d.

Disease		Men			Women		
		Total cases	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*
Cirrhosis of the liver	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	22	13	19 601	0	0	0
	30-49	132	67	100 090	44	21	30 512
	50-64	485	221	328 580	441	193	287 118
	65-79	132	46	67 972	243	62	92 016
	80+	22	7	10 535	0	0	0
	All	794	355	526 778	728	276	409 646
Cholelithiasis	0-14	0	0	0	22	0	0
	15-17	0	0	0	66	-11	-16 276
	18-29	309	-75	-111 934	1 720	-381	-566 415
	30-49	2 095	-480	-713 108	6 460	-1 372	-2 038 041
	50-64	1 742	-375	-556 467	3 814	-777	-1 154 225
	65-79	1 191	-211	-313 691	1 808	-259	-385 220
	80+	375	-57	-85 412	573	-65	-96 565
	All	5 711	-1 198	-1 780 613	14 464	-2 865	-4 256 742
Acute and chronic pancreatitis	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	22	7	9 811	22	6	8 527
	30-49	176	48	71 122	110	27	40 344
	50-64	243	61	90 979	66	16	23 319
	65-79	132	29	42 396	0	0	0
	80+	22	4	6 412	88	13	19 469
	All	595	149	220 721	287	62	91 658
Chronic pancreatitis (alcohol induced)	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	22	22	32 759	0	0	0
	50-64	176	176	262 071	44	44	65 518
	65-79	44	44	65 518	0	0	0
	80+	0	0	0	0	0	0
	All	243	243	360 347	44	44	65 518
Psoriasis	0-14	617	0	0	750	0	0
	15-17	309	97	144 601	331	99	147 185
	18-29	3 109	1 143	1 697 847	4 123	1 457	2 164 116
	30-49	12 392	4 492	6 673 929	10 628	3 709	5 509 938
	50-64	7 122	2 514	3 735 336	10 010	3 427	5 092 299
	65-79	3 550	1 140	1 694 015	3 682	1 047	1 556 247
	80+	684	201	299 058	1 698	416	617 740
	All	27 782	9 588	14 244 785	31 221	10 155	15 087 525

Tabel A5.5 Alcohol-related costs to primary care, chronic diseases, Sweden, cont´d.

		Men			Women		
Disease		*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*	*Total cases*	*Alcohol-related cases*
Excess blood alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	0	0	0
Toxic effect of alcohol	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	22	22	32 759	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	22	22	32 759	0	0	0
Problems related to lifestyle alcohol use	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	22	22	32 759	0	0	0
	50-64	44	44	65 518	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	66	66	98 276	0	0	0
Other diagnoses related to pregnancy	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	0	0	0

Table A5.6 Alcohol-related cost to primary care, injury, Sweden

		Men			Women		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Motor vehicle accidents	0-14	22	1	2 102	22	1	1 062
	15-17	66	8	12 610	22	1	2 123
	18-29	176	47	69 139	66	4	5 834
	30-49	88	23	33 507	44	1	1 613
	50-64	44	9	13 720	22	0	653
	65-79	0	0	0	22	0	0
	80+	0	0	0	0	0	0
	All	397	88	131 078	198	8	11 284
Water traffic accidents and drowning	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	0	0	0
Falls	0-14	353	0	0	573	0	0
	15-17	22	6	8 444	0	0	0
	18-29	154	40	59 111	66	14	20 529
	30-49	110	30	45 134	154	25	37 709
	50-64	132	26	39 311	66	6	8 299
	65-79	88	3	4 659	176	1	1 165
	80+	154	5	8 153	154	1	1 019
	All	1 014	111	164 813	1 191	46	68 721
Fire, flames, heat and cold	0-14	0	0	0	22	4	5 751
	15-17	0	0	0	0	0	0
	18-29	22	8	11 793	0	0	0
	30-49	0	0	0	22	7	10 192
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	22	8	11 793	44	11	15 943
Accidental alcohol poisoning	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	0	0	0

Table A5.6 Alcohol-related cost to primary care, injury, Sweden, cont´d.

		Men			Women		
		Total cases	*Alcohol-related cases*	*Alcohol-related cost*	*Total cases*	*Alcohol-related cases*	*Alcohol-related cost*
Suicide and self-inflicted injuries	0-14	0	0	0	22	0	0
	15-17	0	0	0	0	0	0
	18-29	22	4	6 261	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	0	0	0
	65-79	22	1	1 456	0	0	0
	80+	0	0	0	0	0	0
	All	44	5	7 717	22	0	0
Homicide	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	66	20	29 090
	30-49	44	26	38 786	22	7	10 745
	50-64	0	0	0	0	0	0
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	44	26	38 786	88	27	39 835
Undetermined injury	0-14	0	0	0	0	0	0
	15-17	0	0	0	0	0	0
	18-29	0	0	0	0	0	0
	30-49	0	0	0	0	0	0
	50-64	0	0	0	22	3	3 785
	65-79	0	0	0	0	0	0
	80+	0	0	0	0	0	0
	All	0	0	0	22	3	3 785
Other accidents	0-14	573	0	0	353	0	0
	15-17	154	16	24 460	66	4	6 115
	18-29	551	59	87 357	176	11	16 307
	30-49	661	115	170 346	507	70	103 809
	50-64	353	41	60 567	331	21	30 575
	65-79	243	8	11 211	110	0	728
	80+	44	1	2 038	44	0	291
	All	2 580	240	355 979	1 588	106	157 825

A5.4 Sensitivity analysis injury

Table A5.7 Alcohol-related unintentional injury cost, sensitivity analysis

	Men		**Women**		**Total, non gender diff**	
	Cases (thousands)	Cost (millions)	Cases (thou-sands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	18.4	823.4	6.4	284.8	24.8	1 108.2
Outpatient	151.7	323.9	53.3	113.7	205.0	437.7
Primary	1.1	1.6	0.4	0.5	1.4	2.1
Total	**171.2**	**1 148.9**	**60.0**	**399.1**	**231.2**	**1 548.0**

Table A5.8 Alcohol-related intentional injury cost, sensitivity analysis

	Men		**Women**		**Total, non gender diff**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	2.3	56.9	2.0	44.8	4.3	101.7
Outpatient	4.5	9.5	2.5	5.3	6.9	14.8
Primary	0.04	0.05	0.03	0.04	0.06	0.1
Total	**6.8**	**66.5**	**4.5**	**50.2**	**11.3**	**116.7**

Table **A5.9 Alcohol-related undetermined injury cost, sensitivity analysis**

	Men		**Women**		**Total, non gender diff**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thosands)	Cost (millions)
Inpatient	0.3	8.1	0.2	5.2	0.5	13.3
Outpatient	24.4	52.1	14.9	31.8	39.3	84.0
Primary	0.0	0.0	0.0	0.0	0.0	0.0
Total	**24.7**	**60.2**	**15.1**	**37.0**	**39.8**	**97.2**

Table A5.10 Alcohol-related unintentional injury cost, base case

	Men		**Women**		**Total, non gender diff**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	8.1	352.8	2.8	119.1	10.9	471.9
Outpatient	69.7	148.9	27.1	58.0	96.9	206.9
Primary	0.4	0.7	0.2	0.3	0.6	0.9
Total	**78.3**	**502.3**	**30.1**	**177.4**	**108.4**	**679.7**

Table A5.11 Alcohol-related intentional injury cost, base case

	Men		**Women**		**Total, non gender diff**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	1.4	38.8	0.5	12.7	1.9	51.5
Outpatient	5.8	12.4	2.3	5.0	8.2	17.4
Primary	0.0	0.0	0.0	0.0	0.1	0.1
Total	**7.3**	**51.3**	**2.9**	**17.8**	**10.2**	**69.0**

Table A5.12 Alcohol-related undetermined injury cost, base case

	Men		**Women**		**Total, non gender diff**	
	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)	Cases (thousands)	Cost (millions)
Inpatient	0.1	2.7	0.1	1.4	0.2	4.1
Outpatient	8.6	18.3	3.3	7.1	11.9	25.4
Primary	0.0	0.0	0.0	0.0	0.0	0.0
Total	**8.7**	**21.0**	**3.4**	**8.5**	**12.0**	**29.5**

A5.5 Drinking driving

Table A5.13 Drinking driving related injuries. Alcohol-related cost: inpatient, outpatient and primary care

		Men			Women		
	Age	Total cases	Alcohol-related cases	Total cost (millions)	Total cases	Alcohol-related cases	Total cost (millions)
Inpatient care	0-14	500	32.5	1 523 774	303	6.2	291 086
	15-17	606	78.8	3 693 628	242	9.9	464 970
	18-29	2 087	492.4	23 088 621	803	37.6	1 763 476
	30-49	2 044	447.9	21 000 987	911	18.9	886 286
	50-64	902	148.9	6 983 444	562	10.6	495 108
	65-79	441	14	658 338	382	0	0
	80+	193	8.1	380 053	153	0	0
	All	6 773	1 222.6	57 328 845	3 356	83.2	3 900 926
Out-patient care	0-14	1 977	128.5	274 398	1 213	24.8	53 053
	15-17	2 649	344.4	735 386	989	40.5	86 499
	18-29	6 933	1 635.9	3 493 013	2 452	114.8	245 192
	30-49	7 170	1 571.3	3 355 032	3 532	73.3	156 505
	50-64	2 794	461.4	985 231	1 674	31.4	67 159
	65-79	619	19.7	42 116	712	0	0
	80+	185	7.7	16 548	119	0	0
	All	22 328	4 169	8 901 724	10 689	284.9	608 408
Primary care	0-14	22	1.4	2 129	22	0.5	671
	15-17	66	8.6	12 776	22	0.9	1 342
	18-29	176	41.6	61 838	66	3.1	4 603
	30-49	88	19.3	28 715	44	0.9	1 359
	50-64	44	7.3	10 819	22	0.4	616
	65-79	0	0	0	22	0	0
	80+	0	0	0	0	0	0
	All	397	78.2	116 277	198	5.8	8 591

A5.6 Productivity cost

In tables below, the number of alcohol-related cases and potential years of life lost (PYLL) are rounded. Therefore the sum per disease category does not always correspond to summing age groups. When there are alcohol-related cases in the interval 0-0.5 this is indicated by ‘0+’. For early retired a column for ‘reduced work capacity’ is the sub group means granted (for each person this is 25, 50, 75 or 100%).

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate).

		Men				Women			
		Total cases	*Alco-hol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Mouth and oropharynx cancers	18-29	1	+0	24	1.9	0	0	0	0
	30-49	9	3	125	17.4	7	2	96	11.2
	50-64	56	19	432	67.1	16	5	129	18.2
	65-79	64	19	229	30.1	26	6	86	12.3
	80+	32	9	48	7. 9	38	8	45	7.6
	All	162	51	858	124.3	87	22	356	49.3
Oesophageal canser	18-29	1	+0	24	2.5	0	0	0	0
	30-49	10	5	156	23.4	4	2	69	8.5
	50-64	64	29	642	99.4	19	8	210	29.5
	65-79	116	47	554	73.4	46	17	231	32.8
	80+	51	19	105	17.4	37	12	70	11.6
	All	242	100	1 480	216.0	106	38	579	82.4
Stomach cancer	18-29	0	0	0	0	1	+0	4	0.3
	30-49	18	1	45	6.6	17	1	45	5.5
	50-64	91	6	140	21.9	50	3	83	11.7
	65-79	234	13	157	20.8	124	6	78	11.2
	80+	158	8	42	6.9	164	6	37	6.2
	All	501	29	384	56.3	356	17	247	35.0
Liver cancer	15-17	1	+0	19	1.2	0	0	0	0
	18-29	0	0	0	0	0	0	0	0
	30-49	9	3	107	16.2	8	3	106	13.1
	50-64	78	27	585	89.9	36	12	326	46.2
	65-79	185	54	604	81.6	104	26	345	49.8
	80+	96	26	143	23.5	95	20	122	20.2
	All	369	110	1 457	212.5	243	61	900	129.3
Laryngeal cancer	50-64	7	3	76	12.0	0	0	0	0
	65-79	21	9	99	13.4	4	2	22	3.1
	80+	12	5	25	4.2	2	1	4	0.7
	All	40	17	201	29.6	6	2	26	3.8

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alco-hol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Breast cancer	18-29	0	0	0	0	1	+0	7	0.6
	30-49	2	0	0	0	118	15	596	73.0
	50-64	4	0	0	0	381	47	1 274	180.2
	65-79	3	0	0	0	492	45	633	89.7
	80+	0	0	0	0	490	37	209	35.0
	All	9	0	0	0	1 482	144	2 719	378.5
Other neoplasms	0-14	2	0	0	0	1	0	0	0
	18-29	2	+0	14	1.2	0	0	0	0
	30-49	1	+0	5	0.6	3	+0	11	1.4
	50-64	22	2	48	7.3	19	2	46	6.5
	65-79	118	10	103	14.3	119	8	97	14.3
	80+	235	18	89	14.9	339	19	103	17.4
	All	380	30	259	38.2	481	29	258	39.7
Diabetes mellitus	15-17	0	0	0	0	1	-0	-4	-0.2
	18-29	2	-0	-6	-0.5	3	-0	-14	-1.1
	30-49	44	-2	-59	-8.3	23	-2	-73	-8.7
	50-64	136	-4	-92	-14.2	49	-4	-96	-13.5
	65-79	348	-6	-70	-9.5	262	-15	-195	-28.3
	80+	418	-7	-35	-5.8	628	-29	-156	-26.5
	All	948	-19	-261	-38.3	966	-50	-537	-78.2
Alcoholic psychoses	50-64	1	1	18	2.4	0	0	0	0
	65-79	12	12	129	17.6	0	0	0	0
	80+	9	9	49	8.1	1	1	4	0.6
	All	22	22	196	28.2	1	1	4	0.6
Alcohol abuse	30-49	2	2	71	10.3	2	2	71	9.3
	50-64	22	22	545	87.4	5	5	114	15.4
	65-79	22	22	283	36.1	2	2	37	4.7
	80+	4	4	21	3.5	1	1	8	1.3
	All	50	50	921	137.3	10	10	230	30.8
Alcohol dependence syndrome	30-49	48	48	1 685	245.5	5	5	180	23.4
	50-64	128	128	3 050	484.3	36	36	976	138.1
	65-79	45	45	575	73.6	9	9	144	19.6
	80+	6	6	34	5.6	1	1	5	0.8
	All	227	227	5 345	809.0	51	51	1 305	181.9

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alcohol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alcohol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Unipolar major depression	30-49	1	+0	2	0.3	0	0	0	0
	50-64	0	0	0	0	1	+0	1	0.1
	65-79	2	+0	1	0.1	4	+0	1	0.2
	80+	17	1	4	0.6	39	1	5	0.8
	All	20	1	7	1.0	44	1	6	1.1
Epilepsy	0-14	3	0	0	0	2	0	0	0
	15-17	0	0	0	0	2	1	53	3.2
	18-29	7	3	190	16.3	2	1	53	4.2
	30-49	13	5	205	27.4	6	2	106	12.1
	50-64	20	7	175	27.9	14	5	152	21.6
	65-79	15	4	44	5.9	13	3	44	6.2
	80+	9	2	11	1.9	11	2	12	2.0
	All	67	22	625	79.4	50	15	419	49.2
Hypertensive disease	30-49	4	1	56	7.1	1	+0	14	1.5
	50-64	22	7	153	23.6	9	3	71	10.0
	65-79	110	30	311	43.0	96	22	272	39.8
	80+	178	44	215	36.1	442	83	403	69.3
	All	314	82	735	109.7	548	108	760	120.6
Ischemic heart disease	0-14	0	0	0	0	1	0	0	0
	15-17	0	0	0	0	0	0	0	0
	18-29	1	-0	-9	-0.9	1	-0	-11	-0.9
	30-49	163	-31	-1 068	-156.6	34	-6	-248	-30.9
	50-64	1 225	-229	-5 047	-776.4	354	-66	-1 673	-235.5
	65-79	3 880	-631	-6 986	-946.8	1 927	-267	-3 420	-498.0
	80+	5 391	-757	-3 681	-618.2	6 740	-747	-3 900	-663.4
	All	10 600	-1 647	-16 790	-2 498.9	9 057	-1 086	-9 252	-1 428.7
Alcoholic cardiomyopathy	30-49	3	3	102	15.2	0	0	0	0
	50-64	15	15	350	55.2	4	4	109	15.4
	65-79	8	8	96	12.6	2	2	36	4.7
	80+	1	1	5	0.8	0	0	0	0
	All	27	27	553	83.8	6	6	145	20.1

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alcohol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alcohol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Cardiac arrhythmias	15-17	0	0	0	0	1	+0	19	1.2
	18-29	0	0	0	0	1	+0	22	1.5
	30-49	2	1	26	3.6	5	2	72	8.2
	50-64	10	3	76	11.8	10	3	82	11.5
	65-79	112	34	351	48.6	102	27	325	47.9
	80+	452	124	561	95.1	824	185	901	155.0
	All	576	162	1 013	159.2	943	218	1 421	225.3
Haemorrhagic stroke	18-29	1	+0	7	0.7	0	0	0	0
	30-49	36	4	157	22.6	38	-10	-361	-45.6
	50-64	185	21	482	75.2	135	-34	-893	-126.1
	65-79	347	33	382	51.1	335	-68	-922	-132.4
	80+	264	23	119	19.8	416	-68	-412	-68.4
	All	833	82	1 148	169.5	924	-180	-2 589	-372.4
Ischemic stroke	30-49	7	-0	-11	-1.5	7	-3	-121	-13.9
	50-64	94	-4	-91	-13.7	47	-19	-466	-65.3
	65-79	686	-30	-317	-43.8	564	-166	-2 052	-301.1
	80+	1 302	-50	-242	-40.7	2 647	-607	-3 177	-540.4
	All	2 089	-84	-660	-99.7	3 265	-794	-5 817	-920.7
Oesophageal varices	30-49	1	+0	20	2.5	0	0	0	0
	50-64	0	0	0	0	0	0	0	0
	65-79	2	1	6	0.9	1	+0	3	0.4
	80+	3	1	5	0.8	1	+0	1	0.2
	All	6	2	31	4.1	2	+0	4	0.6
Cirrhosis of the liver	0-14	0	0	0	0	1	0	0	0
	30-49	26	13	466	67.8	14	7	234	30.5
	50-64	176	80	1 842	288.4	67	29	775	109.5
	65-79	135	47	574	74.7	82	21	314	43.7
	80+	46	15	82	13.5	34	7	46	7.5
	All	383	155	2 964	444.4	198	64	1 369	191.1

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alcohol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alcohol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Cholelithiasis	30-49	1	-0	-8	-1.2	0	0	0	0
	50-64	2	-0	-10	-1.5	3	-1	-18	-2.5
	65-79	7	-1	-13	-1.8	6	-1	-10	-1.5
	80+	19	-3	-14	-2.3	34	-4	-22	-3.7
	All	29	-5	-45	-6.8	43	-5	-50	-7.7
Acute and chronic pancreatitis	18-29	1	+0	15	1.6	0	0	0	0
	30-49	8	2	80	11.3	3	1	30	3.6
	50-64	18	5	111	17.8	2	+0	12	1.8
	65-79	26	6	63	8.5	17	3	39	5.7
	80+	8	2	7	1.2	38	6	34	5.7
	All	61	14	276	40.3	60	10	116	16.7
Chronic pancreatitis (alcohol induced)	50-64	1	1	19	2.7	0	0	0	0
	65-79	1	1	15	1.8	0	0	0	0
	80+	0	0	0	0	0	0	0	0
	All	2	2	35	4.5	0	0	0	0
Psoriasis	80+	0	0	0	0	1	+0	1	0.2
	All	0	0	0	0	1	+0	1	0.2
Motor vehicle accidents	0-14	13	2	172	8.0	4	+0	21	0.8
	15-17	13	5	313	21.3	7	1	66	3.9
	18-29	101	36	2 000	174.7	30	4	243	17.5
	30-49	98	37	1 472	195.1	20	2	91	9.8
	50-64	62	14	339	54.0	21	1	26	3.6
	65-79	36	1	11	1.5	22	0	0	0
	80+	29	1	5	0.9	23	0	0	0
	All	352	96	4 311	455.4	127	8	447	35.6

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alco-hol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Water traffic accidents, drowning	0-14	6	2	135	5.0	4	1	97	3.6
	15-17	2	1	76	5.3	0	0	0	0
	18-29	7	4	227	21.3	2	1	77	5.8
	30-49	24	17	637	88.8	4	2	106	11.9
	50-64	50	31	722	114.6	6	2	49	6.9
	65-79	35	11	129	16.8	7	+0	3	0.4
	80+	10	3	16	2.6	7	+0	1	0.2
	All	134	67	1 942	254.3	30	7	333	28.9
Falls	18-29	3	2	90	8.8	2	1	55	4.2
	30-49	19	12	436	61.2	3	1	39	5.2
	50-64	55	25	584	92.4	15	3	73	10.2
	65-79	113	9	103	13.8	68	1	9	1.3
	80+	148	12	55	9.3	162	2	8	1.4
	All	338	59	1 269	185.6	250	7	184	22.3
Fires, flames, heat and cold	0-14	3	1	80	4.2	0	0	0	0
	15-17	1	1	50	3.6	1	1	53	3.0
	18-29	3	2	132	12.0	0	0	0	0
	30-49	22	18	692	96.3	9	6	248	30.3
	50-64	32	25	555	86.2	11	6	170	24.1
	65-79	24	11	127	16.8	9	1	15	2.1
	80+	32	14	67	11.4	16	2	11	1.8
	All	117	73	1 703	230.4	46	16	497	61.3
Accidental alcohol poisoning	15-17	1	1	62	4.3	0	0	0	0
	18-29	6	6	335	29.0	0	0	0	0
	30-49	20	20	751	104.3	10	10	394	48.1
	50-64	39	39	903	141.9	7	7	173	24.2
	65-79	17	17	239	29.3	3	3	46	6.3
	80+	0	0	0	0	0	0	0	0
	All	83	83	2 289	308.8	20	20	613	78.7
Suicide and self-inflicted injury	0-14	4	0	0	0	3	0	0	0
	15-17	8	3	213	14.9	2	+0	23	1.3
	18-29	111	48	2 634	232.7	38	6	378	28.9
	30-49	280	112	4 381	588.9	93	14	591	68.0
	50-64	247	64	1 535	243.6	100	10	269	38.0
	65-79	145	15	176	23.0	51	1	15	2.1
	80+	67	7	35	5.9	31	1	4	0.6
	All	862	249	8 973	1 109.1	318	32	1 280	139.0

Table A5.14 Alcohol-related productivity costs due to mortality in various age groups, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alco-hol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related deaths*	*Alcohol related PYLL*	*Cost due to alcohol (million SEK)*
Homicide	0-14	3	1	67	2.8	3	1	44	1.4
	15-17	0	0	0	0	0	0	0	0
	18-29	13	8	452	39.9	12	4	264	19.7
	30-49	29	21	810	112.1	15	6	256	29.9
	50-64	12	6	166	26.8	3	1	32	4.6
	65-79	7	3	32	4.1	3	0	0	0
	80+	2	1	5	0.7	1	0	0	0
	All	66	40	1 532	186.4	37	12	596	55.5
Undetermined injury	0-14	2	0	0	0	0	0	0	0
	15-17	0	0	0	0	1	+0	23	1.4
	18-29	50	28	1 539	136.9	19	7	397	29.4
	30-49	74	42	1 652	221.9	27	11	445	53.5
	50-64	73	31	789	126.5	27	7	192	27.1
	65-79	18	4	49	6.6	11	1	12	1.6
	80+	4	1	4	0.7	8	1	3	0.6
	All	221	107	4 033	492.5	93	26	1 071	113.6
Other accidents	0-14	4	0	0	0	1	0	0	0
	15-17	3	1	45	3.1	0	0	0	0
	18-29	41	10	538	48.3	3	+0	25	1.9
	30-49	105	41	1 623	215.8	23	7	308	34.8
	50-64	92	24	570	90.4	35	5	137	19.4
	65-79	132	9	101	13.8	95	1	12	1.7
	80+	478	33	148	25.2	619	6	30	5.1
	All	855	118	3 024	396.6	776	20	512	62.9
Total	0-14		6	454	20.0		2	162	5.8
	15-17		12	777	53.8		4	234	13.7
	18-29		149	8 207	726.3		25	1 500	112.1
	30-49		381	14 616	1 994.2		82	3 304	393.6
	50-64		397	9 668	1 544.9		83	2 334	330.8
	65-79		-195	-1 843	-267.8		-312	-3 780	-559.4
	80+		-429	-2 071	-348.5		-1 054	-5 599	-950.4
	All		322	29 807	3 722.7		-1 171	-1 845	-653.8

Table A5.15 Alcohol-related productivity costs due to early retirement (loss of market production only, base case (3% discount rate)).

		Men				Women			
		Total cases	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*
Mouth & oro-pharynx cancers	30-49	3	1	91.7	5.1	3	1	66.7	2.3
	50-64	13	4	86.5	11.1	12	4	85.4	6.7
	All	16	6	87.5	16.1	15	5	81.7	9.1
Oesophageal cancer	30-49	1	+0	100	2.1	0	0	0	0
	50-64	9	4	94.4	10.7	8	3	87.5	6.4
	All	10	5	95.0	12.9	8	3	87.5	6.4
Stomach cancer	30-49	2	+0	62.5	0.4	1	+0	100	0.3
	50-64	6	+0	83.3	1.0	4	+0	87.5	0.4
	All	8	1	78.1	1.4	5	+0	90.0	0.6
Liver cancer	30-49	0	0	0	0	1	+0	100	1.3
	50-64	1	+0	100	0.6	2	1	62.5	0.3
	All	1	+0	100	0.6	3	1	75.0	1.6
Laryngeal cancer	30-49	4	2	100	8.9	0	0	0	0
	50-64	12	6	93.8	16.0	3	1	91.7	1.5
	All	16	8	95.3	24.9	3	1	91.7	1.5
Breast cancer	30-49	0	0	0	0	35	5	80.7	17.3
	50-64	0	0	0	0	146	18	80.7	36.8
	All	0	0	0	0	181	23	80.7	54.1
Other neoplasms	18-29	0	0	0	0	3	+0	75.0	0.9
	30-49	10	1	90.0	4.9	20	2	85.0	6.5
	50-64	39	4	84.6	7.9	63	6	88.9	11.1
	All	49	5	85.7	12.8	86	8	87.5	18.6
Diabetes mellitus	18-29	1	-0	100	-0.3	1	-0	100	-0.3
	30-49	50	-2	86.0	-7.6	51	-4	65.7	-10.5
	50-64	328	-10	88.6	-21.4	190	-14	86.2	-24.7
	All	379	-12	88.3	-29.2	242	-18	81.9	-35.5

Table A5.15 Alcohol-related productivity costs due to early retirement (loss of market production only, base case (3% discount rate)), cont´d.

		Men				Women			
		Total cases	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*
Alcoholic psychoses, alcohol abuse, alcohol dependence syndr, alc cirrhosis	18-29	0	0	0	0	2	2	100	8.5
	30-49	148	148	97.8	702.2	28	28	99.1	108.3
	50-64	246	246	97.1	720.4	65	65	95.4	158.3
	All	394	394	97.4	1 422.5	95	95	96.6	275.1
Unipolar major depression	18-29	5	+0	85.0	1.5	3	+0	100	0.3
	30-49	99	7	90.7	29.7	189	5	87.2	15.7
	50-64	429	29	93.1	72.6	715	17	86.9	30.4
	All	533	36	92.5	103.8	907	22	87.0	46.4
Epilepsy	18-29	1	+0	100	2.3	0	0	0	0
	30-49	1	+0	25.0	0.4	2	1	62.5	2.2
	50-64	2	1	100	2.3	0	0	0	0
	All	4	2	81.3	5.1	2	1	62.5	2.2
Hypertensive disease	18-29	1	+0	75.0	1.4	0	0	0	0
	30-49	11	4	72.7	13.3	10	3	87.5	10.5
	50-64	176	55	88.6	101.4	171	50	79.5	67.2
	All	188	59	87.6	116.2	181	53	80.0	77.7
Ischemic heart disease	30-49	42	-8	88.1	-32.4	22	-4	76.1	-11.8
	50-64	925	-173	86.7	-336.0	323	-60	84.8	-93.9
	All	967	-181	86.9	-368.4	345	-64	84.2	-105.7
Cardiac arrhythmias	30-49	6	2	83.3	7.9	3	1	66.7	2.7
	50-64	84	28	89.0	50.2	46	15	79.9	21.3
	All	90	30	88.6	58.1	49	16	79.1	24.0
Haemorrhagic stroke	18-29	2	+0	0	1.3	0	0	0	0
	30-49	18	2	87.5	9.3	24	-6	86.5	-22.0
	50-64	83	10	89.2	22.3	71	-18	91.2	-38.1
	All	103	12	89.1	33.0	95	-25	90.0	-60.1
Ischemic stroke	30-49	25	-1	85.0	-4.4	11	-5	75.0	-13.2
	50-64	318	-14	91.1	-30.0	161	-64	89.9	-108.0
	All	343	-15	90.7	-34.4	172	-68	89.0	-121.2
Oesophageal varices	50-64	0	0	0	0	1	+0	100	1.1
	All	0	0	0	0	1	+0	100	1.1
Cirrhosis of the liver	30-49	1	1	100	2.3	2	1	100	3.4
	50-64	6	3	100	8.0	5	2	75.0	3.9
	All	7	3	100	10.3	7	3	82.1	7.2

Table A5.15 Alcohol-related productivity costs due to early retirement (loss of market production only, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*
Cholelithiasis	50-64	0	0	0	0	1	-0	25.0	-0.1
	All	0	0	0	0	1	-0	25.0	-0.1
Acute and chronic pancreatitis	30-49	4	1	100	5.1	1	+0	100	0.9
	50-64	11	3	97.7	7.1	6	1	75.0	1.8
	All	15	4	98.3	12.3	7	2	78.6	2.7
Psoriasis	30-49	11	4	84.1	16.5	23	8	80.4	25.3
	50-64	53	19	87.3	46.0	53	18	90.1	35.3
	All	64	23	86.7	62.5	76	26	87.2	60.7
Transportation accidents	18-29	2	+0	87.5	2.1	0	0	0	0
	30-49	14	4	76.8	13.6	12	1	66.7	2.2
	50-64	20	3	85.0	7.1	23	1	89.1	1.5
	All	36	7	81.9	22.9	35	2	81.4	3.7
Poisonings, effects of	30-49	1	+0	50.0	0.4	5	1	75.0	2.1
	50-64	13	2	88.5	3.5	2	+0	87.5	0.2
	All	14	2	85.7	3.9	7	1	78.6	2.2
Falls	30-49	2	1	100	2.8	0	0	0	0
	50-64	1	+0	100	0.5	5	+0	85.0	0.5
	All	3	1	100	3.3	5	+0	85.0	0.5
Fires, effects of	30-49	1	+0	50.0	0.8	0	0	0	0
	50-64	5	2	75.0	4.0	2	+0	62.5	0.8
	All	6	2	70.8	4.9	2	+0	62.5	0.8
Self-inflicted injuries	30-49	1	+0	100	1.0	1	+0	75.0	0.2
	50-64	2	+0	62.5	0.8	0	0	0	0
	All	3	1	75.0	1.8	1	+0	75.0	0.2

Table A5.15 Alcohol-related productivity costs due to early retirement (loss of market production only, base case (3% discount rate), cont´d.

		Men				Women			
		Total cases	*Alco-hol-re-lated cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*	*Total cases*	*Alco-hol-related cases*	*Re-duced work capac-ity(%)*	*Loss due to alcohol (million SEK)*
Other accidents injuries	18-29	23	2	83.7	10.6	25	2	85.0	5.5
	30-49	292	51	83.6	212.5	329	45	81.2	149.1
	50-64	543	63	86.9	145.0	544	34	84.3	61.1
	All	858	116	85.7	368.0	898	81	83.2	215.7
Cardiomyopathy	30-49	11	4	79.5	14.7	4	1	87.5	2.8
	50-64	54	19	88.9	45.1	15	3	71.7	3.8
	All	65	23	87.3	59.8	19	4	75.0	6.6
Gastritis	50-64	3	1	91.7	1.0	4	+0	75.0	0.6
	All	3	1	91.7	1.0	4	+0	75.0	0.6
Total	18-29	367	4		19.0	348	4		14.9
	30-49	3 571	222		1 009.7	5 279	83		295.5
	50-64	11 431	303		897.4	14 650	85		186.2
	All	15 369	530		1 926.0	20 277	173		496.5

Table A5.16 Sensitivity analysis on alcohol-related productivity costs due to mortality in the population aged under 65 years (using a 3% discount rate).

	Men				Women			
	Total cases	*Alco hol-related deaths*	*Alco-hol-related PYLL*	*Cost due to alcohol (million SEK)*	*Total cases*	*Alcohol-related deaths*	*Alcohol-related PYLL*	*Cost due to alcohol (million SEK)*
Cancers								
Mouth & oropharynx	66	23	227	85.8	23	7	86	28.4
Oesophageal cancer	75	34	296	121.7	23	10	89	33.4
Stomach cancer	109	7	70	28.6	68	4	49	16.7
Liver cancer	88	30	240	100.7	44	15	156	57.8
Laryngeal cancer	7	3	25	11.4	0	0	0	0
Breast cancer	6	0	0	0	500	62	704	250.3
Other neoplasms	27	3	27	8.6	23	2	17	6.8
Diabetes mellitus	182	-6	-67	-23.9	76	-6	-78	-23.6
Alcoh. & neuropsych dis.								
Alcoholic psychoses	1	1	2	1.1	0	0	0	0
Alcohol abuse	24	24	252	103.4	7	7	51	18.8
Alcohol dependence	176	176	2 073	786.3	41	41	381	149.9
Unip. major depress.	1	+0	1	0.3	1	+0	+0	0.1
Epilepsy	43	16	342	85.4	26	10	184	46.3
Cardiovascular diseases								
Hypertensive disease	26	8	82	30.4	10	3	30	10.7
Ischemic heart dis.	1 389	-260	-2 056	-873.7	390	-72	-554	-222.3
Alc. cardiomyopathy	18	18	176	72.0	4	4	33	13.7
Cardiac arrhythmias	12	4	39	15.4	17	6	89	22.9
Haemorrhagic stroke	222	26	250	99.2	173	-44	-432	-160.7
Ischemic stroke	101	-5	-30	-13.3	54	-22	-173	-64.6
Oesophageal varices	1	+0	13	3.2	0	0	0	0
Gastrointestinal diseases								
Cirrhosis of the liver	202	93	865	356.1	82	36	330	128.1
Cholelithiasis	-1	3	-8	-2.8	3	-1	-7	-2.5
Acute & chron pancreat	27	7	101	34.4	5	1	20	6.0
Chronic pancreatitis (alcohol induced)	1	1	3	1.6	0	0	0	0
Psoriasis	0	0	0	0	0	0	0	0
Injuries & accidents								
Motor vehicle	287	95	2 948	580.3	82	8	295	48.1
Water traffic, drown.	89	55	960	268.9	16	7	194	35.9
Falls	77	38	537	179.6	20	5	75	20.0
Fires/flames/heat/cold	61	48	794	226.9	21	13	228	65.5
Alcohol poisoning	66	66	1 065	312.7	17	17	251	77.6
Suicide & self-infl inj	650	227	5 504	1 329.0	236	31	700	164.4
Homicide	57	37	967	229.4	33	12	368	73.3
Undetermined injury	199	102	2 533	600.1	74	25	599	136.1
Other accidents	245	75	1 688	435.7	62	12	242	66.2
Total		**947**	**19 615**	**5 194.4**		**195**	**3 928**	**1 003.3**

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