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The costs and avoidable costs of alcohol-misuse for County Durham and Darlington and for England

Elizabeth Castle

Abstract:

This dissertation contributes to current discussions in public health policy regarding the scale and the management of the excess alcohol consumption problem and the evaluation of possible policy interventions. The dissertation provides a comprehensive assessment of relevant literature and an analysis of the societal costs of alcohol misuse and the avoidable and unavoidable costs of alcohol-related liver cirrhosis for County Durham and Darlington and for England.

The costs of alcohol misuse for County Durham and Darlington and for England are estimated at £207.52 million and £17.79 billion respectively. In County Durham and Darlington, the estimated discounted costs of alcohol-attributable liver cirrhosis, over a ten year period are £5.07 million for males and £2.19 million for females, however, potentially 65% and 71% of these costs can be avoided, for males and females respectively. In England the estimated total discounted costs of alcohol-attributable liver cirrhosis, over a 10 year period are £455.46 million for males and £232.51 million for females, however, it is estimated that, potentially, 64% and 69% of these costs can be avoided, for males and females respectively.

Discussions in this dissertation indicate that alcohol-related harm will increase. It is, therefore, ever more important to ensure the most economically efficient policy interventions are implemented. To do this, policy must be based on the best available evidence and data, to which this dissertation contributes significantly. It is recommended that the findings in this dissertation be applied to evaluations of alcohol-related interventions to facilitate prioritisation, appraisal and ongoing improvement within the public sector.

**The costs and avoidable costs of alcohol-misuse for
County Durham and Darlington and for England**

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2011

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Acknowledgements

I would first and foremost like to thank Arthur Walker for being an excellent supervisor. He has provided support beyond expectation, a wealth of knowledge and the inspiration for this dissertation. I cannot adequately convey my gratitude in words. I would also like to thank Rob Dixon for his support and recommendations which have led to the comprehensive study presented here. Importantly, I would like to thank Neil Martin, from Balance, for sharing his expertise and knowledge; providing the foundations for this dissertation. From NHS County Durham and Darlington, I would particularly like to thank Claire Sullivan for her excellent local knowledge and Richard Errington for his support in gaining approval for this analysis; enabling this dissertation to exist. Finally I would like to thank Tracy Hickman and the NEPS team for hosting my KTP project in times of turbulence in the NHS. This support has allowed me to make this dissertation what it is.

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Executive summary

- 1. Objective:** The objective of this dissertation is to contribute to current discussions in public health policy regarding the scale and the management of the excess alcohol consumption problem and the evaluation of possible policy interventions. The dissertation provides a comprehensive assessment of relevant literature and an analysis of the costs and avoidable costs of alcohol misuse for County Durham and Darlington and for England.
- 2. Context:** Alcohol consumption per capita has more than doubled in the last 60 years leading to almost a quarter of all adult in England engaging in risky drinking behaviour, with particular concern regarding the “*binge drinking*” culture. In 2009/10 alcohol-related hospital admissions exceeded one million for the first time and it is estimated that alcohol is present in half of all crimes.

NHS County Durham and Darlington is responsible for commissioning healthcare services for the local population of 600,000 residents. The inequalities gap in County Durham and Darlington is large with districts falling into both the 2% most deprived and 2% least deprived areas in England. This area also experiences a significantly higher level of alcohol-attributable hospital admissions compared to the national average.

The current Government’s preference for the least intrusive interventions may be partly attributable to an inappropriate level of influence from alcohol industry representatives and, thus, there is pressure on the Government from public health and charitable organisations to “do more”.

- 3. Benefits:** In 2010, £44.4 billion was spent on alcoholic drinks, in the UK, with revenue to the Government from alcohol duties and tax estimated to be £14.6 billion (2009/10). The gross societal benefit encompasses both the total revenues from alcohol sales plus the value of consumer surplus.

4. Costs:

County Durham and Darlington	
	Estimate:
Crime Costs	£81.56 million
Workplace and wider economy costs	£90.51 million
Healthcare costs	£35.45 million
Total	£207.52 million
Per head of adult population	£418

England	
	Estimate:
Crime Costs	£9.83 billion
Workplace and wider economy costs	£6.02 billion
Healthcare costs	£1.94 billion
Total	£17.79 billion
Per head of adult population	£426

The cost per head of adult population for County Durham and Darlington is lower than for England due to relatively lower alcohol-related crime experienced in County Durham and Darlington compared to the national level. The cost of healthcare, however, is significantly higher than the relative national cost due to significantly higher alcohol-related healthcare activity. As a result healthcare spend on alcohol-related activity is 2.0% and 3.4% of total expenditure for England and County Durham and Darlington respectively. From the NPHO alcohol profiles, alcohol-related mortality in County Durham and Darlington is not significantly different to national outcomes and, thus, it is suggested that the higher costs for healthcare may be as a result of higher use of alcohol-related healthcare services per patient.

5. **Avoidable costs:** In County Durham and Darlington, the estimated discounted costs of alcohol-attributable liver cirrhosis, over a ten year period, are £5.07 million for males and £2.19 million for females, however, potentially 65% and 71% of these costs can be avoided, for males and females respectively.

In England the estimated total discounted costs of alcohol-attributable liver cirrhosis, over a 10 year period, are £455.46 million for males and £232.51 million for females, however, it is estimated that, potentially, 64% and 69% of these costs can be avoided, for males and females respectively.

It has been estimated that 71% and 72% of the discounted costs of alcohol-attributable liver cirrhosis for Swedish male and females, respectively, can be avoided. Estimates of avoidable costs, compared to Swedish costs, are lower, particularly among English males, due to the more harmful drinking behaviour of the English population.

- 6. Recommendations:** It is recommended that future interventions in County Durham and Darlington must evidence their impact on alcohol-related health harms due to the significantly worse outcomes experienced compared to national outcomes. It is recommended that these interventions are preventative initiatives and particularly impact the localities of Derwentside, Durham and Chester-le-Street and Easington, as these areas within County Durham produce the highest cost per head of population relative to other localities.

Discussions in this dissertation indicate that alcohol-related harm will increase. It is, therefore, ever more important to ensure the most economically efficient policy interventions are implemented. To do this, policy must be based on the best available evidence and data, to which this dissertation contributes significantly. It is recommended that the findings in this dissertation be applied to evaluations of alcohol-related interventions to facilitate prioritisation, appraisal and ongoing improvement within the public sector.

This dissertation recommends that the Government continue to engage with the alcohol industry as there are significant benefits of this relationship, on the basis of equal influence of industry and public health representatives both through strong leadership and co-ordination from the Government and the continued development and implementation of unbiased, evidence based recommendations.

This dissertation also recommends that a range of policy interventions are implemented and are not limited to those considered least invasive. In particular, evidence reviewed in this dissertation supports the implementation of a minimum price per unit of 50p.

Chapter One: Introduction

1.1 The scale of alcohol misuse

Alcohol consumption is an integral part of British culture; often associated with enjoyment and satisfaction; evidenced by the £44.4 billion spent in 2010 on alcoholic drinks, in the UK (Euromonitor, 2011). Excessive alcohol consumption is, however, responsible for causing significant harm to individuals and society as a whole; with alcohol present in half of all crimes (IAS, 2010) and alcohol-related hospital admissions, in England, exceeding one million for the first time in 2009/10 (HSJ, 2011). Alcohol consumption is prominent throughout British history, as are the destructive health and social implication of excess. These concerns are even acknowledged by England's most famous historic playwright:

"... that men should put an enemy in their mouths to steal away their brains! That we should, with joy, pleasance, revel, and applause, transform ourselves into beasts!"

(William Shakespeare (Othello: Act 2, Scene 3), 1603)

The extent of harm, mentioned briefly above, is not limited to a minority of the population, as almost a quarter of English adults consume volumes of alcohol which are considered risky (IC, 2010). The scale of alcohol-related societal harms justifies research which supports effective policy intervention hence a significant objective of this dissertation is to positively contribute to current discussions in public health policy regarding the management of alcohol consumption. This dissertation makes recommendations based on both the analysis of costs and through a comprehensive assessment of relevant literature. This approach provides a basis for the development of appropriate, evidence-based, recommendations.

1.2 Rationale for the research

Whilst the scale of the issue justifies alcohol-related research generally, the motivations for the specific analysis undertaken in this dissertation are as follows:

1. The previous comprehensive study of national societal harms is outdated

In 2003, the Cabinet Office published "*Alcohol misuse: How much does it cost?*" This report estimates the alcohol-related economic costs of crime, healthcare and workplace and wider economy issues for 2001. In recent years separate updated methodologies and cost estimates for crime and healthcare have been published by the Home Office (2010) and Department of Health (2008) respectively. These most recent estimates are often combined to form an overall societal cost; however, this approach is not without serious limitations. This dissertation will, therefore, identify, develop and apply best practice methodologies to provide a comprehensive update of the economic costs of alcohol-misuse for England.

2. There is a lack of specific local level analysis

In 2010, Balance (the North East of England's Alcohol Office) produced a local estimate of the economic cost of alcohol misuse. Whilst this represents a significant development, the analysis lacked access to local healthcare data required to produce a truly localised and accurate estimate. It was also based on the national methodologies outlined above, however, did not account for their limitations. This dissertation will, therefore, build upon past analyses to produce a considered comprehensive estimate of the economic costs of alcohol-misuse for County Durham and Darlington and, in doing so, provide a methodology applicable to any English locality and valuable knowledge for local policy development and evaluation.

3. Robust evaluation is required to support effective policy decisions

This dissertation estimates the current economic costs of alcohol misuse nationally and locally. An important aspect of the work is an analysis of the maximum extent to which future health care costs might be reduced by policy intervention. A significant strength of this dissertation is the combination of these analyses, providing a better foundation for resource allocation, the basis for future policy appraisals and evaluations and the foundations to measure the cost-effectiveness of alcohol policy, at both a national and local level.

1.3 Objectives

Objectives of the dissertation:

1. To outline and contribute to current discussions in public health policy regarding the management of alcohol consumption
2. To make recommendations for future policy interventions based on a comprehensive assessment of relevant literature

Objectives of the analysis:

1. To evaluate past studies to identify, develop and apply best practice, to estimate the economic cost of alcohol-misuse for England and for County Durham and Darlington
2. To provide a methodology applicable to any English locality and to provide valuable knowledge for local policy development and evaluation
3. To contribute to discussions regarding avoidable costs analysis through the application of methodologies to English data, both national and local
4. To provide recommendation of further research for Cost of Illness Studies (COI) and avoidable costs of illness studies

1.4 Structure of the dissertation

This dissertation is broadly divided into three sections:

1. The context of alcohol consumption in the UK	
Chapter 2	Discusses the political landscape
Chapter 3	Discusses the nature of national and local alcohol consumption
2. The analysis of benefits and costs	
Chapter 4	Evaluates the benefits of alcohol consumption
Chapter 5	Evaluates the economic costs of alcohol-related crime
Chapter 6	Evaluates the economic costs of workplace and wider economy
Chapter 7	Evaluates the economic costs of alcohol-related healthcare
Chapter 8	Evaluates the avoidable costs of alcohol-attributable liver cirrhosis
3. Discussion, conclusions and recommendations	
Chapter 9	Discusses the learning from the dissertation
Chapter 10	Provides conclusion and recommendations

Figure 1.1: The structure of the dissertation

Chapter Two: Alcohol policy

Objectives of chapter two:

- To discuss and evaluate current and potential alcohol-related policy interventions
- To provide an understanding of current discussions surrounding alcohol-related policy
- To discuss the potential future impact of the NHS reform on alcohol services

Summary of chapter two:

- The current Government favours interventions which are least intrusive. It is suggested that this may be partly attributable to an inappropriate level of influence from alcohol industry representatives.
- There is pressure on the Government from public health and charitable organisations to “do more”. Minimum pricing, in particular, is a favoured intervention backed up by robust economic evaluation.

2.1 Introduction

In November 2010, the Government published their strategy for public health (Department of Health, 2010) which, although not specific to alcohol misuse, provides an insight to the potential future management of this issue. It outlines, amongst other things, “*a radical shift*” in the approach to tackling public health challenges proposing a move from, “*Whitehall diktat*”, “*nannying*” and “*regulation*” to; “*personal responsibility*” and “*voluntary change*” (Department of Health, 2010). The recent White Paper “*Health Lives, Healthy People*” presents a “*ladder of interventions*” to illustrate the varying levels of intervention’s intrusiveness (see Figure 2.1). The White Paper clearly states that “*where the case for central action is justified, the Government will aim to use the least intrusive approach necessary to achieve the desired effect*” (Department of Health, 2010). Regarding public health, the government proposes interventions from the lower end of the ladder preferring to “*nudge*” the population to lead healthier lifestyles.

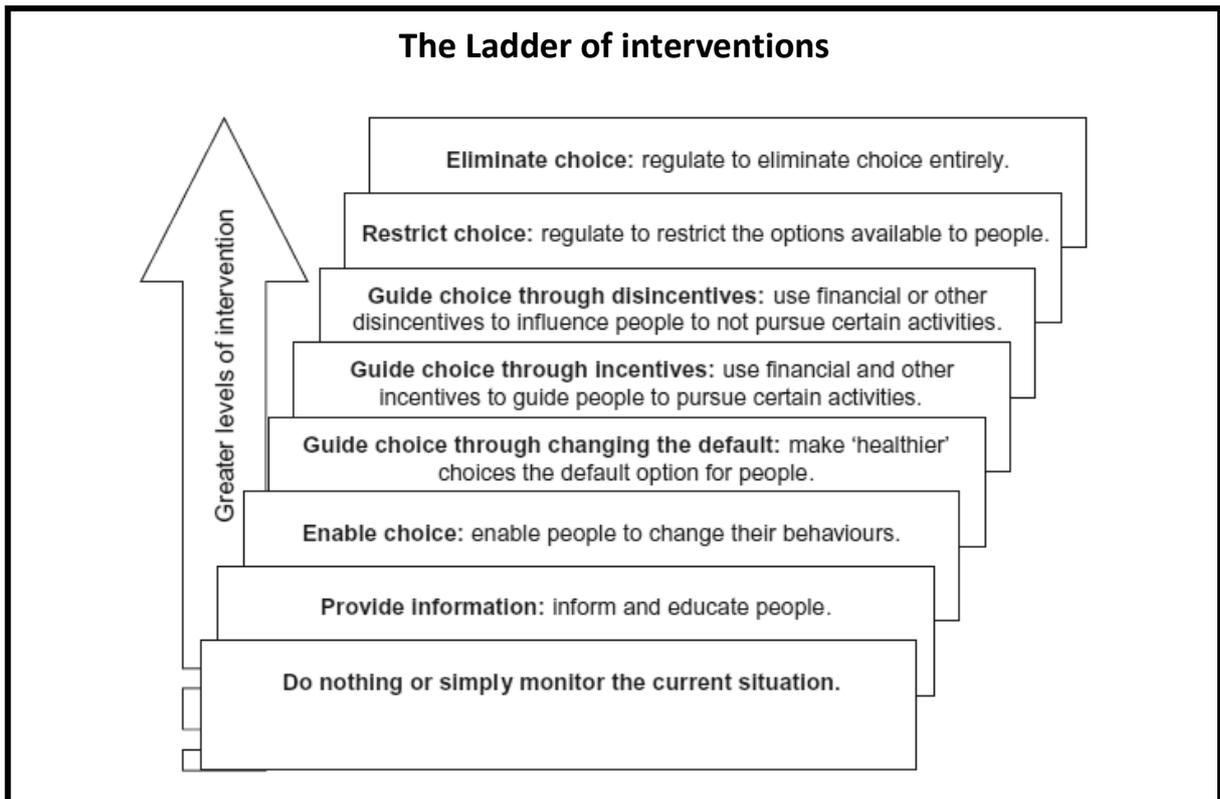


Figure 2.1: A ladder of interventions (Department of Health, 2010)

A recent document from the Department for Transport (DfT, 2009) outlines three main types of interventions and provides an understanding of the potential of each to produce behavioural change. This section discusses the suitability of available policy options for the management of alcohol-misuse. The three interventions considered are:

- Persuasion (education, advertising, social marketing, information provision)
- Economic interventions (price and financial incentives)
- Legislation and enforcement

2.2 Persuasive interventions

The least intrusive, or 'soft', approaches include interventions such as education, information provision and mass media persuasions (social marketing campaigns). These 'nudge' approaches are often judged as cheap and uncontroversial alternatives to more challenging public initiatives. Within the public sector there are many examples of the use of 'soft' interventions that, rather than restrict or limit choices, encourage and persuade individuals to make healthy decisions (DfT, 2009). The Change4Life social marketing campaign, for example, is thought to have cost £75 million over three years (Sky News, 2009). This section discusses the suitability of persuasive interventions to reduce alcohol-related harm.

In microeconomics, perfect information (and the ability to process this information) is an assumption of rational choice theory. This suggests that individuals, provided with information regarding alcohol consumption and its consequences, are able to make optimal choices leading to both individual and societal benefits.

One translation of this theory into practice is the provision of unit information on alcoholic drinks products. It was estimated, in 2009, that 90% of the adult population had heard of measuring alcohol consumption in units and 75% had heard of daily drinking units, however, only 13% of drinkers keep check on the amount of units they drank (Information centre (IC), 2010). The provision of information regarding the unit contents on alcoholic drinks labels was introduced to support individuals to monitor their alcohol consumption and encourage healthy behaviour. Figure 2.2 outlines the best practice guidance for alcoholic drinks labelling.

Example of a best practice alcoholic drink label

1. The alcohol content (units) per volume, and where relevant, alcohol content (units) per bottle
2. The Government's recommended maximum daily benchmark for alcohol intake for men, women and pregnant women
3. A health message such as "Know your limits" or "Drink responsibly"
4. A link to www.drinkaware.co.uk



The image shows a sample label for an alcoholic drink. On the left side of the label is a simple line drawing of a bottle. Inside the bottle, the text '1.7 UK Units' is written in a large, bold, sans-serif font. To the right of the bottle, the text 'Know your limits' is written in a large, bold, sans-serif font. Below this, in a smaller font, it says 'UK Chief Medical Officers recommend'. Underneath that, it says 'Adults do not regularly exceed:'. Then, it lists 'Men 3-4 units daily' and 'Women 2-3 units daily'. Below this, it says 'Avoid alcohol if pregnant or trying to conceive'. At the bottom of the label, the website 'www.drinkaware.co.uk' is written in a small font.

Figure 2.2: Best practice alcoholic drink label (Insight Investor Responsibility Team, 2007)

The inclusion of this information was introduced in 2007 as a voluntary agreement between the Government and alcohol producers. In 2009, however, research into the compliance levels of the drinks industry found only 15% of products met the agreed standards (Alcohol Concern, 2010). There has since been pressure to make alcohol labelling mandatory, however, the Government's non-intervention, 'soft' approach seems to extend to the management of the alcohol industry. Low compliance with the voluntary standards makes the evaluation of the impact of information provision, in this example, difficult. The alcohol industries involvement with policy development is further discussed in section 2.2.1.

Evaluations of information provision as a means of changing behaviour often conclude that it is unrealistic to expect large scale changes from information provision alone as it supports rather than stimulates behavioural change. The provision of information regarding the unit contents of alcoholic drinks, for example, can support an individual to monitor and reduce their alcohol consumption, but is often sought out after the decision has been made to change behaviour (Kings Fund, 2008). The theory of planned behaviour (Ajzen, 1985) proposes that successful behaviour change requires more than the provision of factual information, such as the recommended daily/weekly alcohol consumption limits. To influence behaviour, information provision must also tackle perceived normative beliefs, making individuals believe that *"healthy behaviour is typical behaviour"* (Kings Fund, 2008). Social marketing campaigns, often through mass media channels, attempt to influence social norms by promoting desired healthy behaviours as expected behaviour, and undesired behaviour as socially unacceptable. In 2008, *"How much is too much"* advertising campaign (the Drinkaware Trust), for example, aimed to reduce the increasing problem of heavy home drinking through suggestive peer perceptions of socially unacceptable alcohol consumption (see Figure 2.3).

I see you like to recycle...
(wow, you drink a lot)

Big party at the weekend?
(it was a party... right?)

Do you come here often?
(a little too often perhaps)

I see you like to recycle...
(wow, you drink a lot)

How much is too much?
Find out for yourself at drinkaware.co.uk

Is the amount you drink harming your health?
Find out at drinkaware.co.uk

Is the amount you drink harming your health?
Find out at drinkaware.co.uk

How much is too much?
Find out for yourself at drinkaware.co.uk

THE DRINKAWARE TRUST

Figure 2.3: “How much is too much” advertising campaign (Drinkaware, 2008)

Mass media campaigns such as this are attractive because of their wide reach, appeal and relative cost-effectiveness. Statistics regarding the visibility and resulting awareness of alcohol-misuse campaigns are impressive. The evaluation of the Scottish *“Don’t push it”* campaign highlighted a total ‘reach figure’ (the combined figure of those claiming to have seen the TV advert, heard a radio advert or seen at least one of the poster adverts when prompted) of 94% (Scottish Executive, 2007). This campaign achieved, both, the highest level of recall of any Scottish Government alcohol misuse campaign and highest level of recognition among its target audience (including comparisons to commercial sector campaigns) (Scottish Executive, 2007). Similar awareness figures were reported for the English *“Know your limits”* advertising campaign.

The success of social advertising also extends to positive attitudinal changes, for example, a significant increase in respondents reporting *“feeling embarrassed about drunken behaviour”* was seen in the evaluation of attitudes before and after the *“Don’t push it”* campaign indicating an increased awareness of own drinking behaviour and changing attitudes towards socially accepted and desired healthy behaviour (Scottish Executive, 2007).

Despite addressing social norms, achieving significant awareness and attitudinal change there continues to be debate surrounding social advertising’s ability to change behaviours. A recent meta-analysis of 48 studies of the behavioural effects of mass-media health campaigns (DfT, 2009) found that 9% more people performed healthy behaviours after the campaign than before. Although the resulting behavioural change from mass media campaigns is relatively low; due to the large population exposure, it could be argued that social advertising does have the potential to change the behaviours of a significant number. It is thought, however, that advertising delivers only short-term changes and individuals quickly revert back to past behaviours and it can, therefore, be argued that advertising may not be suitable for social-change campaigns looking to encourage long-term behavioural change (DfT, 2010).

Critics of the use of information provision and ‘soft’ approaches may argue that, regarding alcohol-misuse, in recent years a large amount of money has been spent on social advertising with seemingly little effect on behaviours. It is difficult to understand the impact of information provision on behaviour change due to the influence of external factors, for example, price change and legislation. It is suggested that social marketing has a significant role in behavioural change but is most effective in combination with other interventions. Considering the notion of combined interventions it could be argued that the effectiveness of social-advertising has been limited by conflicting policies, which

have effectively increased the availability and relative affordability of alcohol (discussed in further sections). The Government, therefore, must consider the impact of other policy interventions to ensure the proposed 'nudge' approach will be effective.

A further determinant of the success of the proposed strategic direction is individual's levels of self-efficacy. Self-efficacy refers to an individual's belief that they can change their lives if they want to. A previous study (Morleo et al., 2010) into alcohol-related attitudes and beliefs found younger and affluent groups were more likely to report self-efficacy than deprived and older groups. Levels of self-efficacy are important as they are an indicator of the level of support required by individuals and communities to change their circumstances. Alcohol-misuse has significant links to deprivation and it could be argued that the proposed 'nudge' strategy could potentially widen the inequalities gap as deprived groups are less likely to respond to these interventions as they often lack the required belief that one can change.

In conclusion, it is unfair to judge persuasive approaches as cheap and uncontroversial alternatives to more challenging interventions as information provision has a significant role in behavioural economics and has demonstrated influences over the awareness and attitudes towards alcohol-misuse. Evidence suggests that persuasive interventions alone are unlikely to make the substantial changes the Government hope for, however; analysis of this approach is limited by the influence of external factors including other, sometimes conflicting, policy interventions and the attributes of the target population. The value of persuasive interventions is, therefore, probably as an acceleration tool to complement the implementation of 'bigger' initiatives rather than a replacement for other interventions (DfT, 2008).

2.2.1 The alcohol industry's involvement in policy decisions

It is widely acknowledged that the alcohol industry has a crucial role to play in reducing alcohol-related harm, however, its level of influence in the development of alcohol policy is often criticised due to a clear conflict of interest. This section discusses the advantages and disadvantages of a partnership with the alcohol industry and the role of public health research, such as that presented in this document, with regards to this issue.

One benefit of an effective partnership is access to the wealth of expertise and knowledge possessed by the alcohol industry. Consumer behaviour intelligence such as drinking patterns and drinking behaviours, both generally and in relation to price change or promotional activity would be

invaluable to policy makers looking to reduce alcohol-related harm through voluntary behaviour change. Orley and Logan (2005) also argue that the alternative to partnership is to exclude industry from the development of strategy and policy and risk creating an adverse relationship with potentially equally adverse outcomes. The negative implications of failing to build effective relationships are observed in the food sector in which a very tense relationship exists (Guardian, 2010) between the Food Standards Agency (FSA) and food manufacturers and retailers. It can be argued that the conflicting actions of both the FSA and industry and the resulting strained relationship have slowed progress in the areas of public health promotion and obesity prevention.

Secretary of State, Andrew Lansley, believes in partnership with industry and that a deal between business and government is the key to improving the long-term health of the nation (Guardian, 2010). To support the development of the Public Health Strategy and as part of the Public Health Responsibility Deal, the Government has formed five networks in the areas of food, alcohol, physical activity, health at work and behavioural change. Chairing the alcohol deal with Liberal Democrat minister Paul Burstow, is the Wine and Spirit Trade Association head, Jeremy Beadles (Guardian, 2010). Whilst the membership of the networks includes leading charities and public health organisations, they are dominated by industry representation including Diageo, manufacturer of leading alcohol beverage brands, and leading supermarkets, ASDA and Tesco, infamous for the sale of alcohol at below cost price.

Concerns have been raised regarding the emphasis on a partnership with industry in the development of alcohol-related policy (Guardian, 2010) due to the clear conflict of interest that exists for members who are tasked with both reducing the public consumption of alcohol whilst maximising sales and profits of their alcoholic products. Critics are also worried that an unbalanced partnership, in which industry input becomes too influential, will result in policies and strategy that reflect corporate rather than public interest.

The issue of industry's involvement in policy development is not a new concern. The previous Government's alcohol strategy, *"National Alcohol Harm Reduction Strategy for England"* (Cabinet Office, 2004), whilst praised in some areas, was heavily criticised for adopting, arguably, only the least effective policies based on recommendations from the alcohol manufacturers and retailers, outweighing the recommendations made by health professionals (House of Commons Health Committee, 2009). In 2003 the World Health Organisation (WHO) (Babor et al., 2003) reviewed the potential effectiveness of a range of proposed alcohol policies clearly outlining those which were

evidence based and which were not. Room (2004) later highlighted the lack of ‘high impact’ policies which were ultimately included in the strategy (Drummond, 2004). This analysis was summarised by the Health Committee in 2009 (see Figure 2.4).

An analysis of effective alcohol strategies and their inclusion in the Alcohol Harm Reduction Strategy and Licensing Act

Strategy	Impact	Alcohol Harm Reduction Strategy and Licensing Act
Taxation and Pricing	High	"More complex than price"
Restricting availability	High	24 hour availability
Limiting density of outlets	High	"Local planning"
Lower Blood Alcohol Content (BAC) driving limits	High	No change
Graduated licensing for young drivers	High	No
Minimum drinking age	High	No
Brief interventions/treatment	Medium	"Lack of evidence" Needs assessment; evidence review, Alcohol service framework
Safer drinking environment	Medium	Voluntary codes: safer glasses
Heavier policing	Medium	Antisocial behaviour orders On the spot fines
Public education campaigns	Low	Change safe drinking message Unit labelling
School based education	Low	More education
Voluntary advertising restrictions	Low	Yes

Figure 2.4: The Alcohol Harm Reduction Strategy mapped against Babor et al. (2003) analysis of effective alcohol strategies (Health Committee, 2009)

Further evidence to question the appropriateness of the industry’s involvement in developing alcohol policy is the slow progress made regarding the voluntary *Social Responsibility Standards* introduced in 2005 (Ward, 2010). The standards were designed to cover all aspects of alcohol sales and marketing activities and although adherence was voluntary the standards were signed by 16 trade associations (Ward, 2010).

In 2008 an analysis by KPMG found, whilst there were pockets of good practice, the implementation of the Standards was inconsistent and in most cases commercial imperative overrode adherence (Home Office/KPMG, 2008). There was also no evidence to suggest a direct causal link between the impact of the standards and a reduction in alcohol-related harm and the review concluded that the Standards should be strengthened and enforced more effectively (Home Office/KPMG, 2008). The failure of the industry to adhere voluntarily to standards they developed indicates caution and more evidence is required before developing policy in this way.

The key question is whether the alcohol industry can ever truly be expected to set aside corporate interests and develop strategy to encourage individual to drink responsibly when evidence suggests that 75% of alcohol is consumed by people who exceed the recommended levels? It is estimated that if everyone who currently drinks above recommended guidelines was to drink at a moderate level, consumption of alcohol would fall by 40%. If sales decrease by the same percentage this scenario would cost the alcohol industry over £13 billion a year in lost revenue (2006-07) (Health Committee, 2009).

The overarching difficulty of the partnership is the industry's greater economic power and political influence, which puts other partners in a disadvantaged and poorly represented position. Potential solutions to this issue include clear terms of reference and rules of engagement set out at the initial stages of the partnership, to protect the interests of the 'weaker' partners. This, however, relies on trust between the partners and strong, relatively impartial coordination and leadership of the partnership. By selecting the alcohol network to be chaired by the head of the Wine and Spirit Trade Association (which represent over 333 companies producing, importing, transporting and selling wines and spirits) (WSTA, 2011) the Government has potentially given inappropriate power to industry representatives. Another potential solution is to limit industry involvement to strategic areas with clear shared benefits, for example, local partnership schemes aiming to reduce crime and disorder. However, excluding industry from selected policy and strategy development still risks creating an adverse relationship and the negative implications mentioned above.

Public health evidence regarding alcohol-related harms and the effectiveness of proposed policies has an enormously important role in managing the influence of industry. Public health evidence counteracts industry's lack of understanding of alcohol-related problems (which some see as deliberate ignorance) (Baggott, 2006). Baggott, 2006, states that "*the body of public health evidence*

was seen as a particular threat to the industry because it provided strong arguments for control policies” (Baggott, 2006). The Government can't be seen to simply ignore strong evidence for policy change, therefore, lessening the political influence of industry. It is hoped the analysis contained in this document will help steer local policy and strategy by providing local intelligence.

In conclusion, there are significant benefits of collaborating with industry including access to consumer intelligence expertise and knowledge. Excluding industry completely from policy decisions risks the development of a poor relationship and potential adverse outcomes. The alcohol industry is politically influential and possesses strong economic power and, therefore, concerns exist regarding their level of involvement and the true beneficiaries of policy decisions under this arrangement. Some concerns have been realised regarding high levels of non-compliance to the agreed voluntary standards and the lack of enforcement measures and consequences of this. Public health intelligence is playing an important role in managing industry's influence by providing robust evidence against the recommendations of industry representatives.

2.3 Economic interventions

Research shows that alcohol consumption, like the consumption of many consumer goods, is affected by its affordability. There are strong arguments for increasing the price of alcohol based on evidence demonstrating an increased price leading to a significant decrease in the consumption of alcohol and, therefore, a decrease in alcohol-related harms. This section discusses the issues surrounding alcohol taxation and minimum pricing to build a fuller picture of the economic issues around alcohol misuse.

Alcohol is taxed via two routes; VAT, a uniform rate applied to many goods which is currently set at 20%, and excise duties, which varies depending on the alcoholic product concerned. Excise duties are reviewed annually by the Chancellor of the Exchequer (IAS, 2008). Compared to other European countries alcohol is taxed relatively highly. In 2009/10 the revenue generated from alcohol duties stood at £9.0 billion rising to £14.6 billion when including income from VAT (BBPA, 2010). Whilst alcohol duties make a substantial contribution to Exchequer tax revenues it is important to note that most current estimates of annual economic cost of alcohol-misuse to England stands at between £17.7 and £25.1 billion (Strategy Unit, 2003).

Despite the relatively higher level of alcohol tax and duty experienced in the UK compared to other European countries, they are declining in real terms. Duties on spirits have remained constant since

1997, and although duties on wine and beer have been adjusted for inflation, the increase does not reflect the growth in personal incomes thus increasing the affordability of alcohol (IAS, 2008). To illustrate the impact of the increased affordability of alcohol; in Finland, in 2004, the Government reduced alcohol excise duty by an average of 33% in an attempt to reduce the number of cheap imports. This resulted in an immediate 17% increase in alcohol-related mortality (IAS, 2008).

Part of the debate surrounding alcohol taxation is the inconsistency of alcohol duties. Beer, wine, cider and spirits are each managed by separate duty regimes. To illustrate the relative levels of duty on the four products, figure 2.5 presents the duty per typical on-trade serving and the duty per unit of alcohol (10ml of pure alcohol) (HM Treasury, 2010).

The relative levels of duty on alcoholic products

Product (ABV)	Standard serving	Duty per serving	Units per serving	Duty per unit
Beer (4.2%)	568ml	41p	2.4	17p
Wine (12.5%)	175ml	39p	2.2	18p
Cider (4.5%)	568ml	19p	2.6	7p
Spirit (37.5%)	25ml	22p	0.9	24p

Figure 2.5: Relative levels of duty on alcoholic products (HM Treasury, 2010)

Critics of this system, calling for equal levels of duty per unit, have argued that *“alcohol is alcohol”* and regardless of the source of its consumption it has the same properties and, therefore, impact and harms (HM Treasury, 2010). In response, supporters of the approach argue that the *“composition and characteristics of drinks... [and] the different health and social dimensions between products”* are important and it is individual’s drinking patterns and behaviour, not the drinks categories that lead to harm; evidenced by problem drinkers often consuming the same products as responsible drinkers (HM Treasury, 2010).

Due to the broadness of the categories it is expected that both problem and responsible drinkers will consume products from the same categories. It is often specific products within the categories, such as strong ‘industrial’ ciders and cheap spirits, which are notorious for causing harm. It is, therefore, unfair to argue that problem drinkers cannot be targeted through the products they consume; however, the four categories presented are too broad to realise this aim. Duties within the product categories do vary based on the strength (Alcohol by volume- ABV) of the products. In all categories

higher strength products attract higher duties, however, with regards to ABV; duties are not standard across the product categories.

Further to this discussion is the notion of, not only standardising but also increasing excise duties. The attractiveness of this proposal is that the increased revenue could be spent on both treating current and preventing future alcohol-related harms. Earmarking revenues from alcohol tax and duties specifically for alcohol programmes, as suggested, is an example of hypothecating taxes. The Treasury is highly opposed to hypothecated taxation (House of Commons Transport Committee, 2010), arguing that it restricts the Government's capacity to base expenditure on prioritisation (Doetinchem, 2010). Prioritisation of society's requirements is, however, complex, evidenced by the differing agendas of political parties. Supporters of hypothecated taxation argue, therefore, that it *"limits a governments' propensity to spend according to their own agenda"* (Doetinchem, 2010). This dissertation argues that alcohol misuse should be considered a priority and, thus, it should receive appropriate resource allocation, however it recognises that "appropriate" resource allocation may not result from hypothecated taxation. Even if the proposed increased income is not spent on alcohol programmes this dissertation would still support this based on arguments of the relative affordability of alcohol.

Standardising and increasing excise duty on alcohol would be relatively easy to implement and certainly simpler to regulate than current arrangements. The recent review of alcohol taxation (HM Treasury, 2010), however, recommends very few changes to the current system on the grounds that it would be unfair to standardise or increase duties as this would penalise responsible drinkers and small producers.

Another issue with increasing tax is that it does not necessarily impact on the price. Alcohol duties are paid by the producers and importers, however, changes in excise duty are often passed through to wholesalers; retailers and ultimately consumers. The market power of the organisations within the supply chain is often the determinant of who carries the burden of increased tax. Large supermarkets, for example, have significant purchasing power and often choose to cross-subsidise the sale of alcohol products. Therefore, compared to the increase in duties, alcohol prices in supermarkets have increased at a lesser rate (HM Treasury, 2010). Irresponsible promotions, such as, heavy discounts and sales of alcohol below cost price to encourage footfall are, therefore, often criticised but are not unlawful.

Minimum pricing of alcohol would set the price of alcohol according to the units of alcohol a product contains and is a favoured solution to regulating alcohol prices and ensuring retailers are unable to sell alcohol below a baseline cost. Under this regime irresponsible promotion, such as “all you can drink for a £10” will be no longer possible (Alcohol Concern, 2009). An important feature of the minimum pricing is that it directly affects the price consumers pay for alcohol. Consumer’s response to price changes i.e. the price elasticity, has been analysed by the Academy of Medical Sciences. Figure 2.6 presents the price of alcohol relative to income and consumption patterns over 42 a year period.



Figure 2.6: Consumption of alcohol in the UK (per person aged 15+) relative to its price: 1960-2002 (IAS, 2008)

Price elasticities vary with time, location and product. The treasury estimates beer to have a price elasticity of -1.0 i.e. for every percentage rise in price there will be the same percentage fall in consumption. Price elasticities for spirits and wine were estimated at -0.9 and -1.1 respectively (IAS, 2008). Price elasticities are complex and a clear implication of a minimum pricing approach is that there must be a standard minimum price per unit of alcohol regardless of the categories alcoholic beverages to ensure consumer do not simply switch to an alternative.

The previous government seemed to disregard the idea of minimum pricing due to the unpopularity with industry and the public. The current government are more supportive and have committed to enforcing a ban on the sale of alcohol below cost price but not to setting a minimum price per unit. Banning the sale of alcohol below costs price is a positive development but does not effectively address the issue of the affordability of alcohol. The potential social and economic benefits are, therefore, questionable and it is argued by campaigners that this action is simply not enough (Alcohol Concern, 2011).

Alcohol Concern recommends a minimum price of 50p per unit of alcohol (Alcohol Concern, 2009) based on the findings from research undertaken by The School of Health and Related Research at University of Sheffield which modelled the potential impact of minimum pricing at varying levels and on a variety of population groups (Meier et al., 2008). This report provides strong evidence in support of minimum pricing, demonstrating that an increased price significantly impacts heavy drinkers and the young, i.e. the typically problematic drinkers, whilst impacting moderate drinker's finances negligibly. It found that moderate drinkers i.e. 33% of the population who drink on average 6 units per week (IC, 2010 and Meier et al., 2008), will spend an extra £11.81 per year or 22.7p per week if they reduce consumption by 3.5% as predicted. Even if they do not decrease their consumption at all, moderate drinkers will still only pay £14.45 per year more, or 27.7p per week (Alcohol Concern, 2009).

The higher impact on the target population is a consequence of minimum pricing affecting the price at which alcohol typically associated with problem drinking can be sold at, thus making it unaffordable for the young and heavy drinkers to continue drinking at risky levels. An analysis undertaken by Alcohol Concern (2009) presents the impact of a 50p per unit minimum price on a variety of popular alcoholic beverages. The positive impact on health was also covered in this report and is summarised in Appendix 1. For those most adversely effected (those subject to a 50%+ price difference) see Figure 2.7.

The alcoholic drinks affected by the suggested 50p minimum price per unit

(those experiencing a $\geq 50\%$ change)

Category	Example	% price difference
Cheap wines	Sainsbury's Basic White Wine	66%
	Sainsbury's Basic Red Wine	66%
Cheap lager	Sainsbury's Basic	73%
High-strength lager	Special Brew	50%
	Sainsbury's Super Strength	50%
'Industrial' ciders	Diamond White	142%
	Sainsbury's Basic Cider	255%
	Sainsbury's Strong Dry Cider	191%
Cheap spirits	Sainsbury's Basic vodka	118%
	Sainsbury's Basic Gin	105%

Figure 2.7: Alcoholic drinks affected by the suggested 50p minimum price per unit (by $\geq 50\%$)

(Alcohol Concern, 2009)

Minimum pricing also supports small breweries and producers as, in most cases; prices for these products already meet the proposed standards. It is suggested that cheap alcohol from Europe could potentially threaten UK business; however, critics of the alcohol industry accuse it of exaggerating this problem and that, particularly regarding beer, it is primarily the industry's own costs and profit margins that are responsible for higher prices in the UK (IAS, 2008).

In conclusion, there seems to be a clear imbalance between the revenue generated from alcohol duties and tax and the estimated economic cost of alcohol-misuse to society. It is, therefore, in both government and public interest to tackle this issue. From the literature it is felt that banning the sale of alcohol below cost price will not sufficiently decrease the affordability of alcohol and, therefore, there is a strong case for a minimum price per unit of 50p. The strength of the evidence and potential beneficiaries far outweigh the criticisms and those potentially penalised by minimum pricing.

2.4 Legislation and enforcement

Legislation and enforcement interventions appear at the top of the *“ladder of interventions”* and often involve restricting or eliminating choice to individuals. The minimum age, for example, for the sale and consumption of alcohol is 18-years-old; effectively eliminating the choice to consume for those under that age. Regulatory interventions are considered to be highly effective but often ignored by politicians (see Figure 2.4). This section outlines recent discussions regarding alcohol-related legislation and regulatory policies.

In the 1980’s many US states raised the minimum drinking age to 21, resulting in some significant reductions in alcohol-harm, such as alcohol-related road deaths. The reverse was experienced in New Zealand, in 1999, when the minimum age was lowered from 20 to 18. There is now pressure to implement stricter ID checks and to increase the minimum age back to 20-years-old (BBC News, 2004). Based on this evidence there have been suggestions that to tackle the increasing problem of underage drinking and its consequences the minimum age should be raised in the UK from 18 to 21. It is argued, however, that an age-limit already exists and yet young people are still able to purchase and consume alcohol, therefore, there is no reason to think this would change by simply raising the age limit; and this is certainly evident in the US. It is perhaps more appropriate to enforce current legislation regarding age-limit more strictly through, for example, better monitoring and tougher penalties. It has been found through effective monitoring and the identification and exposure of persistent offending premises, improves test-purchase results (Alcohol Concern, 2008).

Section 2.2 discussed the impacts of conflicting alcohol policies, in particular the increased availability of alcohol. In November 2005, the 2003 licensing act came into force. It was a single unified system regarding a range of regulated activities. This act allowed licensed premise to apply for longer opening hours, including applications for 24hr opening (Alcohol Concern, 2008). In 2009, around 1,000 outlets (of a potential 60,000) were granted 24hr licenses; over 600 of these were supermarkets and service stations. The British Beer and Pub Association (BBPA) have outlined that most venues that applied for extensions only applied for Thursday, Friday and Saturday evenings, with the majority expecting to close at 1am or 2am (Alcohol Concern, 2008). The objective of extended licensing hours was to reduce the levels of crime and disorder resulting from fixed closing times, however, many argued that extended hours would, in fact, accentuate this issue and encourage higher consumption and binge drinking. A number of studies have attempted to evaluate the impact of the act (Alcohol concern, 2008) with mixed results, although it is widely thought that longer opening hours have simply transferred criminal and disorderly behaviour to later in the night

(Health Committee, 2009). Longer opening hours could also have contributed to the trend of 'pre-loading' (the consumption of large quantities of alcohol at home before a night out) due to increased availability of alcohol from retail outlets and an increased access to premises beyond the previously common 11pm closing time.

In 2008, Alcohol Concern published a document entitled "*Unequal partners: A report into the limitations of the alcohol regulatory regime*" which argued that "*the current [licensing and regulation] system is not working and does not protect the public from irresponsible licensees*" due to two key factors:

1. The current voluntary regime allows licensees to ignore the principles set out in the codes as it suits them as there are no meaningful sanctions for those who are found to be in breach
2. Government departments have not always provided sufficient resources or guidance to effectively tackle problem licensees by using their considerable powers under the licensing act 2003. These are now discussed further.

Alcohol Concern argues that legislation has been wrongly based on the assumption that alcohol-related offences are committed by a minority of persistent yobs, when evidence shows that they are often first time offenders who lead 'conventional' lives i.e. study and/or work during the week and socialise at the weekends. This assumption contributed to the introduction of the "*Social Responsibility Standards for the Production and Sale of Alcoholic Drinks in the UK*". The voluntary responsible deal exists between the government and trade associations. There are questions regarding the influence trade associations have over managers and staff of licensed premises as they are potentially too distant from those with the power to influence change at a local level i.e. managers and owners of licensed premises.

There is evidence that a correlation exists between irresponsible licensees and alcohol-related violence and accidents. Irresponsible behaviours, evidenced as predictors of alcohol-related harm, include the poor management of drunk and/or aggressive customers, the tolerance of fights, the tolerance of drug-taking, and the presence of minors on the premises. Environmental factors seen to increase the probability of alcohol-related harm include restricted access to the bar, insufficient seating and loud music. Owners and managers of licensed premises are legally obliged through licensing conditions to minimise harmful on-site practices and are, therefore, uniquely positioned to minimise the chances of alcohol-related harm (Alcohol Concern, 2008). There is further evidence

regarding the positive impact of staff training schemes, aimed to equip the staff to deal more effectively with intoxicated and underage customers, on average levels of intoxication. It was found, however, that 36% and 43% of the nation's pubs have no disciplinary procedures for staff found selling to drunk and underage customers respectively (Alcohol Concern, 2008). Internationally, the greatest levels of good practice can be found where there are clear legal and/or financial penalties for irresponsible sales, coupled with effective enforcement of existing laws (Alcohol Concern, 2008).

The Licensing Act 2003 provided Local Authorities (LA) with considerable powers to deal with alcohol-related harm including reviewing licenses and the designation of Alcohol Disorder Zones (ADZ).

A strength of the Licensing Act 2003, is that one or more of the six responsible authorities (Police, H&S, Trading Standards, Child Protection, Fire service or environmental protection) may insist that the license is reviewed if it is apparent the poor practices exist e.g. causing incidents, such as accidents and violence, or if it is found that staff are persistently making illegal sales. Through this review process the LA have the authority to revoke the licence, force licensees to adopt specific harm-reduction strategies or can take no action. There are, however, issues with this process including the cost to LA and the length of the process (Alcohol Concern, 2008). Research shows that a gap exists between income from fees, to sell/serve alcohol, paid by licensees and the cost of undertaking reviews, to the sum of around £97 million. At this level only 15% of LAs cover the full costs of taking action from existing income. This shortfall is a large disincentive for LA to take action, potentially allowing a large amount of irresponsible behaviour to continue. It has been suggested that the existence of persistent illegal sales is due to lack of action by LA and the power to revoke licenses is an empty threat. Alcohol Concern recommends a review of the fees structure to ensure appropriate income is available to LAs to assist with the management of irresponsible and often illegal practices (Alcohol Concern, 2008). The length of review of licenses is also too long. It takes up to 28 days for acceptance of a review, 20 days until a community hearing and 21 days for licensees to lodge an appeal, therefore, potentially the process could take months. The length of the process causes issues with undertaking test-purchases, used to strengthen the case against licensees, as they are able to temporarily alter behaviours before review (Alcohol Concern, 2008).

LAs have the power to designate areas as Alcohol Disorder Zones (ADZ) and thus, specific measures can be introduced in ADZ to decrease harm. Analysis of the potential impact of ADZ suggests that they could lead to a reduction in alcohol-related violence of up to 10% based on findings from trials in

Manchester City Centre 1999/2000 where assaults fell by 46%. However, only a third of LAs intend to implement ADZ due to concerns about set-up and management costs and legal challenges from licensed premises. It is argued that central government must provide more support and unambiguous guidance to LAs for the successful implementation of ADZ.

The public are further stakeholders of alcohol-misuse issues and have the right to make representation and seek reviews against premises they feel are acting irresponsibly. Public support of action is important; however, information about how the public can engage is often only available on LA website and, therefore, can exclude many members of the community, for example, the disadvantaged and old.

Within the literature it is also apparent that legislation and regulatory interventions are most effective in combination with information provision, outlined in section 2.2, to gain public support, awareness and understanding of proposed restrictions. Recommendations for successful legislative action include regulations that are/have:

- Clear and unambiguous including a clear rationale and evident benefits
- Easy to monitor with an associated high probability that non-compliance will be detected and that there are high levels of enforcement of tough penalties
- Be within the competence of the individual to comply with
- High quality supporting information provision (media campaigns) including material impacting social norms

In conclusion, legislative action is considered a highly effective tool to manage alcohol misuse, yet is often ignored by governments. Whilst there is little support for a rise in the minimum age for alcohol purchase there is a general consensus that better monitoring, stricter enforcement and tougher penalties for non-compliance are required to support all existing legislations. This can be achieved through better engagement with owners, managers and staff of licensed venues who are in a unique position to instigate local level change. LAs must utilise the power granted under the licensing act 2003, but to achieve this must also receive increased support both financially and in terms of central support and unambiguous guidance. The final under-utilised 'change-agent' is the public who could increase public support and social pressure for the industry to adhere, however, the general public are, arguably, currently disengaged.

2.4.1 Introducing a local focus

The Government is proposing major changes to the way in which healthcare services are managed and delivered. The White papers, *“Equity and Excellence”* (Department of Health, 2010) and the *“Healthy Lives, Healthy People”* (Department of Health, 2010), present the Government’s vision for modernising the NHS and provide an insight to the potential future management of health services. These changes will have a significant impact on the delivery of alcohol services. This section will discuss the potential impacts of the reforms and the implications for the analysis presented in this document.

Part of the proposal is the transfer of the public health commissioning function of Primary Care Trusts (PCTs) into the responsibility of LAs, by April 2012. Allocated funding will include a protected public health budget; and “health premiums” which, taking into account local inequalities, will reward those who make progress on specified health outcomes (Department of Health, 2010). It is hoped that public health professionals will lead decisions regarding the use of the ring-fenced budget and will also influence wider spending decisions across the scope of the LA. The motivation for this proposed change is that LAs manage a greater range of services which impact on people’s health and wellbeing; *“local government is best placed to influence many of the wider factors that affect health and wellbeing”* (Department of Health, 2010).

The societal cost of alcohol-misuse is estimated between £17.7 billion and £25.1 billion (Strategy Unit, 2004); 50-60% of this cost relates to licensing and alcohol-related crime. Alcohol-related crime has implications for; local health, for example, A&E attendances as a result of binge drinking; and local wellbeing, for example, public fear of crime and avoidance of town centres. Public health, therefore, has a vested interest in reducing the wider societal impacts of alcohol-misuse as well as health-specific impacts. Engineer et al. (2003) presents a model of factors leading to criminal and disorderly behaviour which includes a significant proportion of factors surrounding the drinking environment (see Figure 2.8). Whilst public health can continue to promote healthy drinking attitudes; as part of the LA, it will also have greater influence over the management of factors in the wider context of alcohol-misuse that lead to social-harm. For example, LAs are currently responsible for licensing the sale and supply of alcohol (DCMS, 2010) and the current Government has proposed stronger powers for LAs to refuse, remove, or review licences without representation from one of the other responsible authorities (Home Office, 2011). The combination of public health intelligence, such as the identification of irresponsible licensees, and LAs licensing powers presents a real opportunity for the effective management of alcohol-related societal harm.

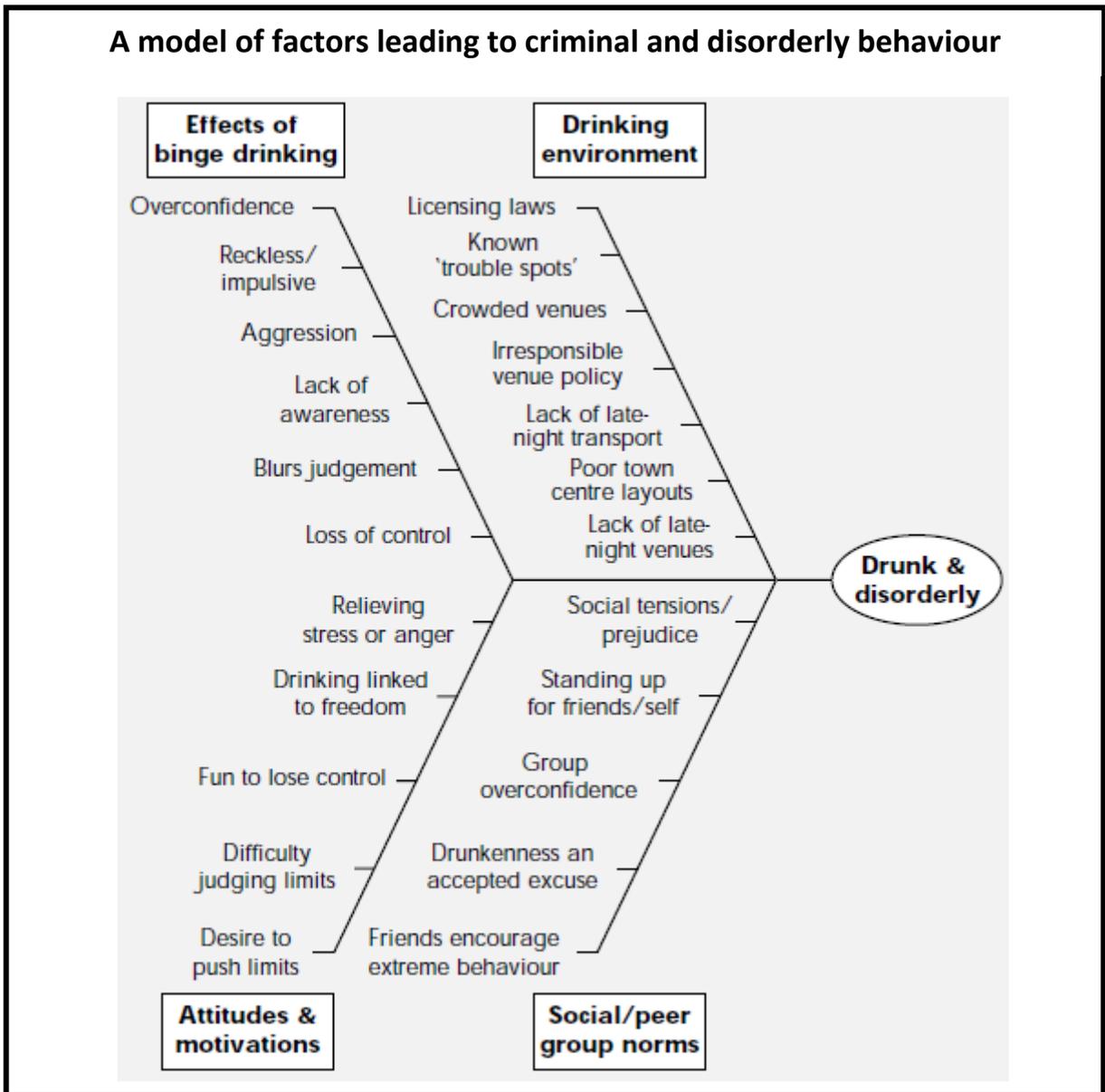


Figure 2.8: A model of factors leading to criminal and disorderly behaviour (Engineer et al., 2003)

Despite the potential of the transfer of public health there are concerns surrounding the proposed changes. Change is always challenging and LAs will be taking on responsibility of a new function at a time of declining capacities and financial uncertainty, made more difficult by the ambiguity surrounding the protected public health budget and HR implications of the transfer (NHS alliance, 2010). As LAs struggle to operate under current pressures and public health functions deal with the major upheaval there is a real risk of alcohol and other public health priorities being sidelined, and that the parties involved will be so preoccupied by their own internal issues that opportunities of effective local partnerships and high quality, cost-effective local solutions will not be realised and wasteful duplication of work may occur (NHS alliance response).

There are also concerns regarding the use of the protected public health budget due to the decreasing resources within LAs and the ambiguity regarding the scope of public health. For example, in 2009 NHS County Durham and Darlington pledged Durham County Council £1 million over two years for road gritting to help reduce fall injuries, particularly among the elderly, and car accidents due to the associated major health consequences (The Telegraph, 2009). Whilst this decision was made without external pressure, it illustrates the potentially indistinct nature of public health and LA responsibilities and the potential for the protected budget to lose its public health focus by exposing public health to political interference.

Another major part of the reforms is the abolition of PCT and Strategic Health Authorities (SHA) and the transfer of healthcare commissioning responsibilities to GP consortia and an NHS Commissioning Board. The motivation for GP commissioning is the notion that GPs are best placed to make decisions about the services required to meet the needs of the populations they serve. Potentially, allowing GPs to control the healthcare budgets will encourage continued coordination with public health and the implementation of preventative services to avoid the secondary care cost they will be responsible for. However, some argue that with the separation from healthcare services GPs will lose focus on public health issues as their time will be dominated by the new commissioning responsibilities and clinical commitments.

Currently, the full alcohol care-pathway in County Durham and Darlington (which is discussed in section 3.2.4) is commissioned and managed by a single organisation; NHS County Durham and Darlington. Managing the full pathway has significant advantages in relation to strategic planning, demand management and service implementation. In some areas the creation of multiple GP consortia have been proposed to replace the existing PCTs leading to mismatched geographical boundaries of commissioning organisations (i.e. GP consortia and LAs) potentially leading to complex service and pathway arrangements which would require robust coordination between the organisations for the arrangements to be effective. Therefore, a further issue with the separation of healthcare and public health includes a significant risk of vulnerable people falling through the gaps between the commissioning systems (Faculty of Public Health, 2010).

The relationship between organisations will be of significant importance. The analysis in this dissertation, for example, is made possible because all data required is held by the PCT. In the proposed reforms, LAs will hold data for areas such as preventative services and wider healthcare costs, whilst GPs will hold the data regarding secondary healthcare services. There is a real risk of

incomplete and disjointed intelligence if knowledge sharing between the organisations is unsuccessful. If public health functions have restricted or no access to GPs intelligence the potentially effective move of public health to LAs, described earlier, may be undermined.

In conclusion moving public health functions into LAs presents a wealth of opportunities and from the literature it seems this part of the reform is not widely opposed. There are, however, serious concerns regarding the timing of such massive upheaval, the potential flaws of the proposed new commissioning system and, in particular, there is large resistance to the transfer of commissioning responsibilities to GP consortia. It is argued that the benefits and motivations for the reforms could be achieved without the proposed large scale changes. To an extent, this is evident in County Durham and Darlington where, regarding alcohol services, a strong and effective relationship between the PCT, LAs and other stakeholders of alcohol-misuse already exists.

A clear implication of the reforms will be the need for intelligence tailored to the new populations of the proposed commissioning organisations. To ensure the continued value of the analysis in this document, the data is intentionally flexible i.e. can be broken down to a GP practice level and built up to reflect the population of the new organisations. It is also hoped that analysis by GP practice will overcome the potential disregard of alcohol issues by engaging GPs as they take on their new responsibilities, and encourage the implementation of preventative services.

Chapter Three: National and Local Alcohol Consumption

Objectives of chapter three:

- To provide an understanding of alcohol-consumption, nationally and locally
- To provide a brief introduction to alcohol-related harm to the British population
- To provide an understanding of the local alcohol treatment pathway and commissioned services

Learning from chapter three:

- Alcohol consumption per capita has more than doubled in the last 60 years leading to around a quarter of all adults in England engaging in risky drinking behaviour, with particular concern regarding the “binge-drinking” culture
- Alcohol-harms are not limited to a minority or subset of the population with a large proportion of the population reporting experiences of alcohol-related problems in the last year
- County Durham and Darlington experiences significantly higher levels of alcohol-attributable hospital admissions compared to the national level. It is hoped the introduction of a whole-system Community Alcohol Service will reduce this pressure on secondary care.

3.1 National alcohol profile

3.1.1 Introduction

Evidence of recreational alcohol consumption stretches back over 7000 years and is a significant part of British history and culture. Importantly, this is not the first time in history that excessive consumption has been a concern, for example, in the eighteenth century there was “*the infamous and prolonged “Gin Craze”*” (Alcohol Concern, 2009)! This section provides a short introduction to current alcohol consumption the UK and a brief introduction to its resulting problems.

3.1.2 Consumption per capita

Per capita consumption is indicative of levels of alcohol-misuse within a population. Per capita consumption of alcohol provides policy makers with an estimation of the magnitude and trends of alcohol-related problems (WHO, 2011). Figure 3.1 presents alcohol consumption in the UK per capita between 1900 and 2007. Consumption has been rising since the end of the Second World War, although notably still not as high as experienced at the beginning of the 20th century (Alcohol Concern, 2009). The types of alcohol consumed have also changed with wine consumption experiencing a large increase, whilst, on average, beer consumption has fallen.

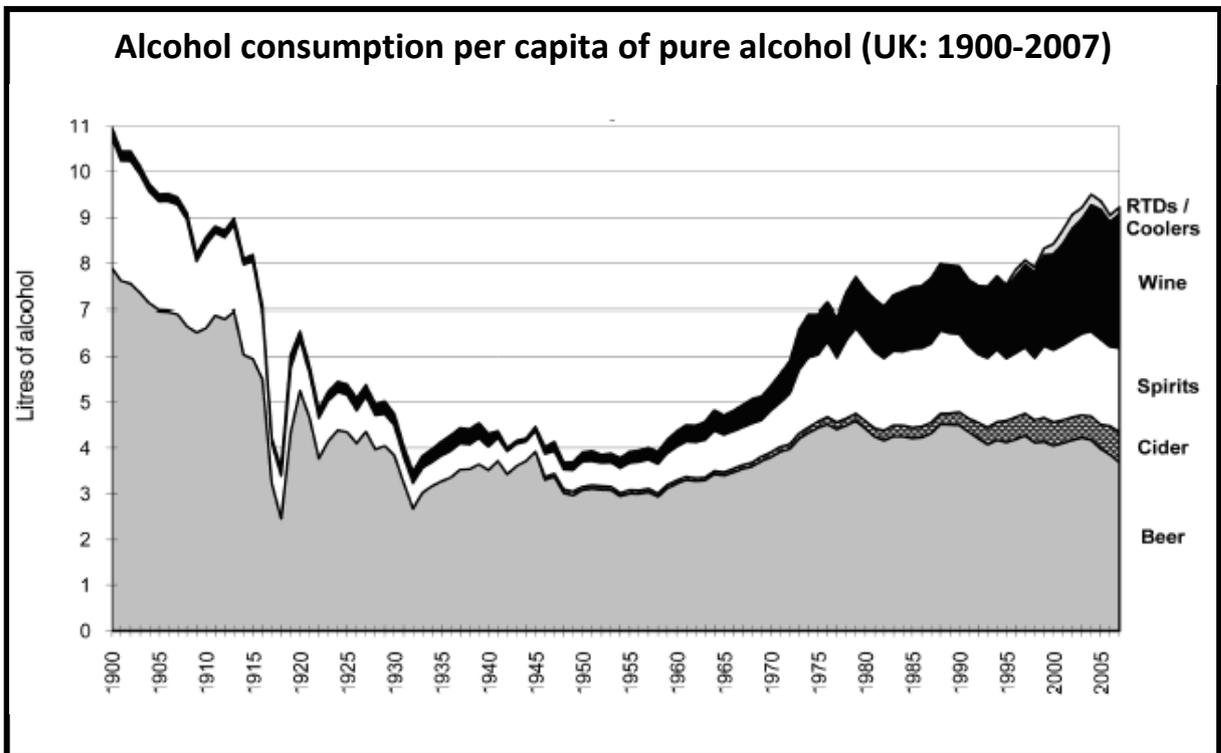


Figure 3.1: Alcohol consumption, UK: 1900-2007 per capita consumption of 100% alcohol (Tighe, 2009)

Figure 3.2 outlines alcohol consumption per capita for European countries and the USA.

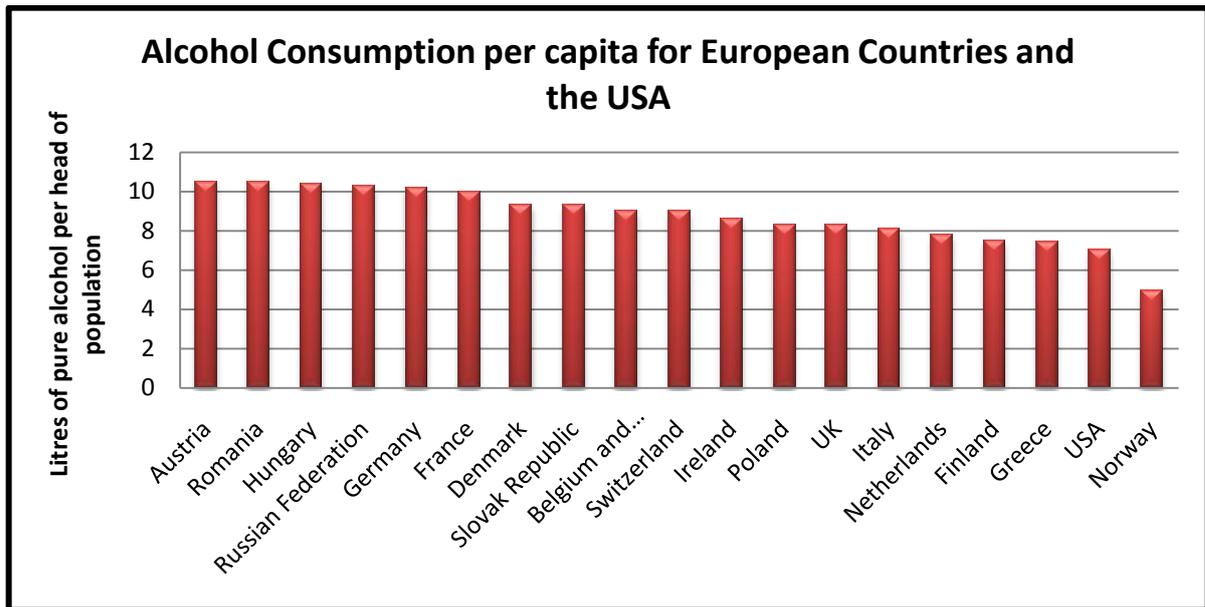


Figure 3.2: Alcohol consumption per capita for European countries and the USA, 2006 (BBPA, 2008)

The fact that the UK sits in the lower half of the group yet has an infamously harmful drinking culture indicates an issue with analysing consumption per capita alone. More meaningful analysis would be a comparison of alcohol consumption per head of population who drink. The population of the USA, for example, has a much lower proportion of drinkers compared to European countries, therefore, measured by “drinking” head of population has relatively high consumption which is not reflected in the above figure. Average consumption also does not reflect consumption patterns and drinking cultures of populations. An interesting analysis of drinking patterns and cultures is quoted below:

“The dryness or wetness of a drinking culture is not only determined by drinking levels but also by drinking patterns, social control of drinking and the composition of alcohol-related problems in society... Within the countries of Western Europe, the stereotypical example of a dry drinking culture is a Nordic country with low per capita consumption, explosive drinking on weekends and a restrictive alcohol control policy. The stereotype of a wet drinking culture, on the other hand, is a southern European country with high levels of drinking, distributed evenly during weekdays, and in the absence of any far-reaching restrictions on availability of alcohol”

(Ramsted, 2001)

3.1.3 Drinking behaviours and alcohol-misuse harms

To further understand alcohol consumption in the UK this section discusses the nations' drinking behaviours. In England, most adults drink alcohol; 89% and 81% of male and females respectively but alcohol-consumption varies among the population, outlined in Figure 3.3.

Drinking behaviours in England, 2008

	Non-drinker	Safe-drinker	Increasing risk-drinker	Higher-risky-drinker
Males	11%	61%	21%	7%
Females	19%	52%	15%	5%

Figure 3.3: Drinking behaviours in England, 2008 (Information Centre, 2010)

The binge drinking culture is largely what has given the UK its poor alcohol-consumption reputation; often dubbed, *“Booze Britain”* by the media. Also referred to as “heavy episodic” and “risky single occasion” drinking, the Cabinet office have defined this behaviour as twice the daily recommended upper limit for drinking, therefore, a binge drinking episode is the consumption of ≥ 8 and ≥ 6 units of alcohol for males and females respectively. Binge drinking is often associated with young people highlighted in the European School Survey Project on Alcohol and Drugs (ESPAD) in which 54% of 15 to 16-year-old British students reported ‘binge drinking’ in the last 30 days, almost the highest percentage in Europe (Alcohol Concern, 2009). Binge drinking is, however, not limited to the teenage population as it is estimated that 20.1% of the population 16+ engage in binge drinking behaviour (NWPFO, 2011)

The range of alcohol-related problems are discussed throughout this document; categorised as health, crime and workplace and the wider environment costs. Figures 3.4 and 3.5 introduce the range of reported issues of alcohol-misuse among British adults. The value of the information contained in the figures is an illustration of the extent of personal alcohol-related issues such as guilt, remorse and failed expectation which are incredibly difficult to quantify but are equally important to recognise.

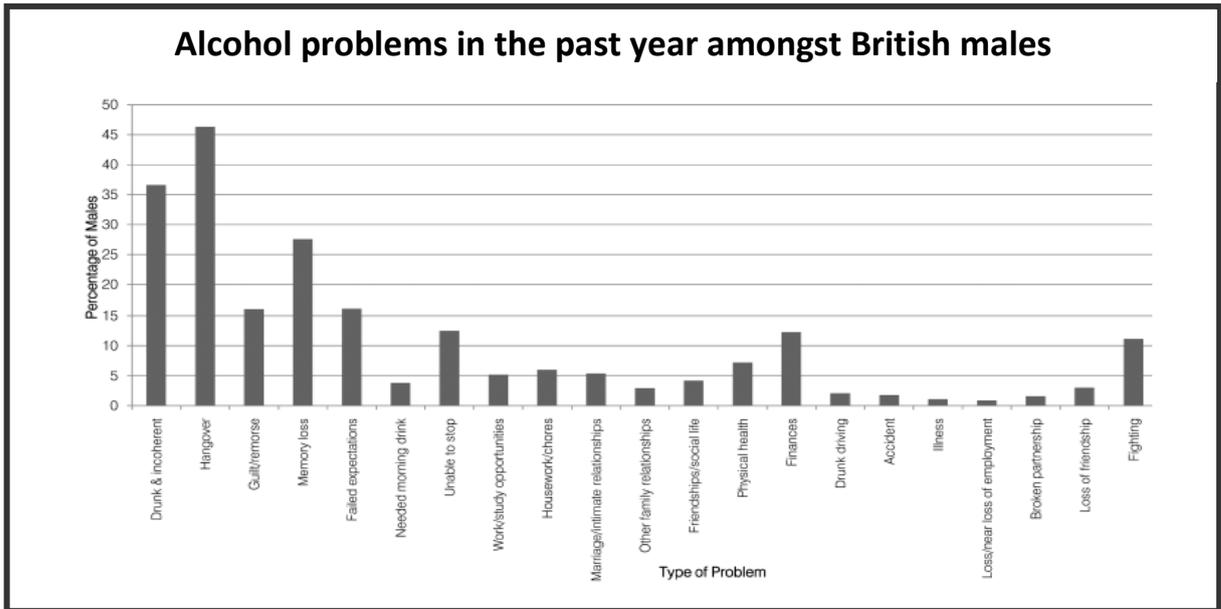


Figure 3.4: Alcohol problems in the past year amongst British males (Plant et al., 2002)

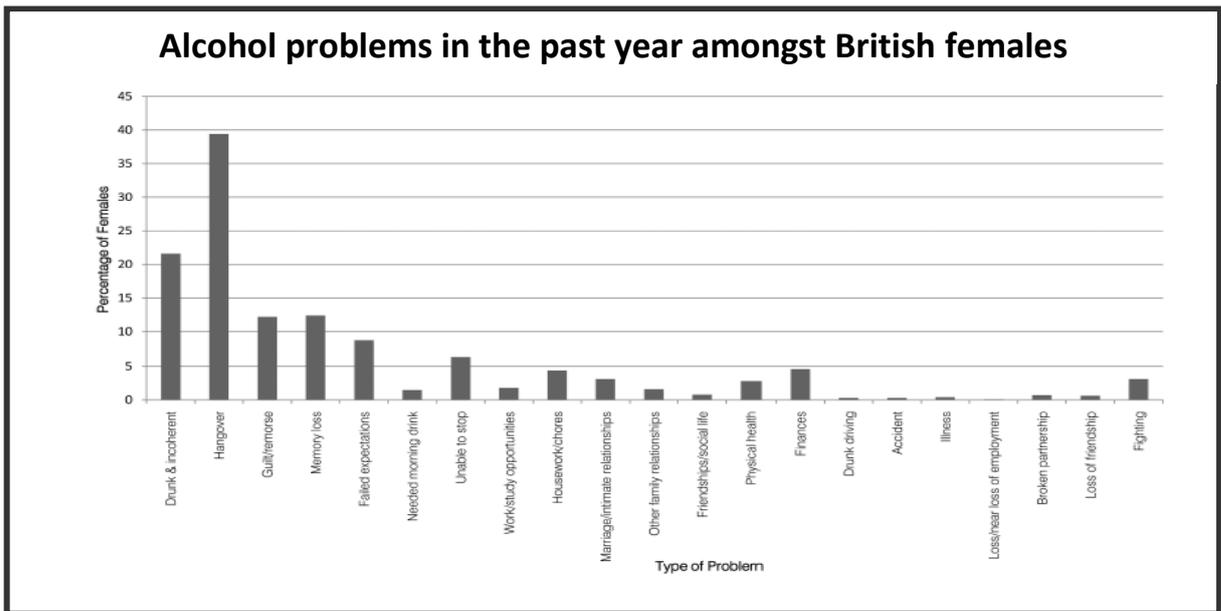


Figure 3.5: Alcohol problems in the past year amongst British females (Plant et al., 2002)

Alcohol consumption has more than doubled in the last 60 years, justifying current concerns. Although it is not the first time in history that that excessive alcohol-consumption has been a concern and compared to other European countries alcohol consumption per capita is lower, the drinking culture and behaviours of the British population are harmful and, from the brief introduction to alcohol-related harms, is not limited to a minority or sub-set of the population.

3.2 Local alcohol profile

3.2.1 Introduction

This section will introduce and discuss the issue of alcohol misuse in County Durham and Darlington. This section begins by discussing the local alcohol profile provided by the North West Public Health Observatory (NWPHO) and local attitudes and behaviours towards alcohol. Finally, it discusses the alcohol treatment pathway and commissioned services for the management of alcohol-misuse in County Durham and Darlington.

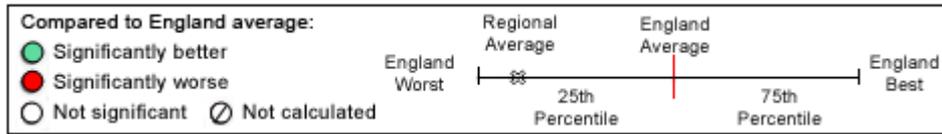
The areas of County Durham and Darlington are situated in North East England. Whilst County Durham and Darlington have separate PCTs their populations are commissioned for by a single organisation; NHS County Durham and Darlington, which commissions health services for a highly diverse population. To illustrate; England can be divided into 32,482 geographical areas called Lower Super Output Areas (LSOAs); in County Durham and Darlington there are 384 LSOAs. Based on a number of criteria these areas can be ranked to indicate levels of deprivation, with 1 representing the most deprived area. County Durham and Darlington LSOAs rank between 102 and 32,094 (Department for Communities and Local Government, 2010).

In 2009, the population of County Durham and Darlington was 606,800 (ONS, 2009). It is estimated (later in this document) that, in 2008/09, 20% of the population drank at increasing risk levels, with a further 6% drinking at higher risk levels. Increasing risk drinking is classified as males drinking between 22 and 50 and women drinking between 15 and 35 units of alcohol per week. Higher risk drinking is males and females drinking over 50 and 35 units of alcohol per week respectively. At these levels individuals are at a higher risk of numerous physical and mental health conditions and causing substantial harm to others (Durham County Council and NHS County Durham, 2011).

3.2.2 Local alcohol profiles for County Durham and Darlington

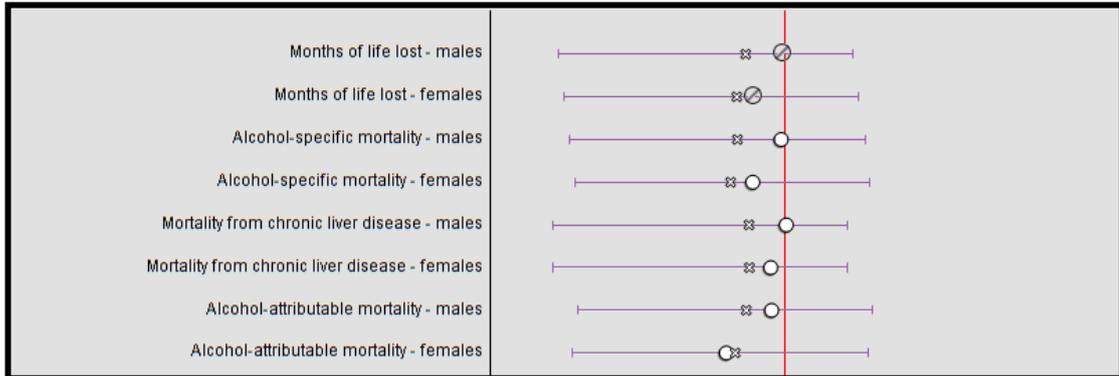
The NWPHO provides local alcohol profiles for all English PCTs and LAs. Figures 3.6 and 3.7 summarise the finding of the profiles for County Durham and Darlington PCTs. Alcohol-related indicators are presented on a scale against the regional and national averages.

The key for these figures:



Local Alcohol Profile for County Durham

Impacts on health:



Impacts on the healthcare system:



Impacts on the wider environment:

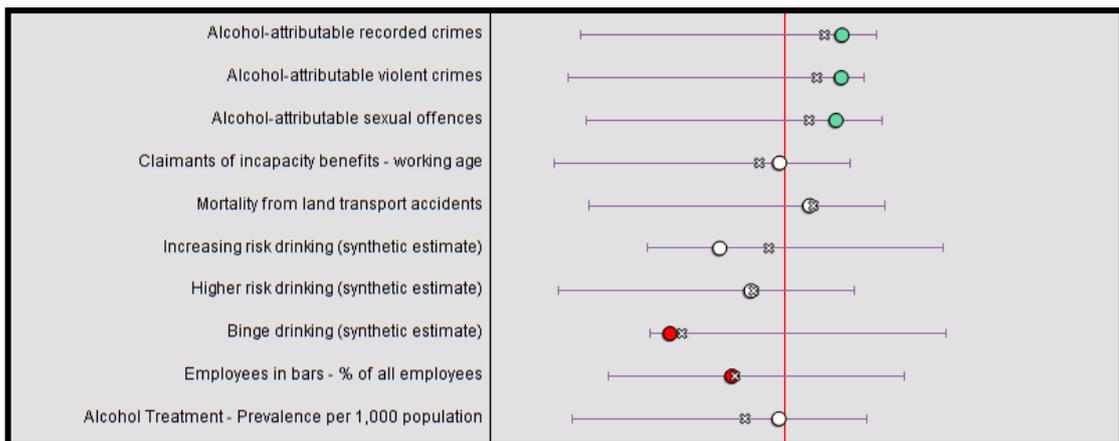
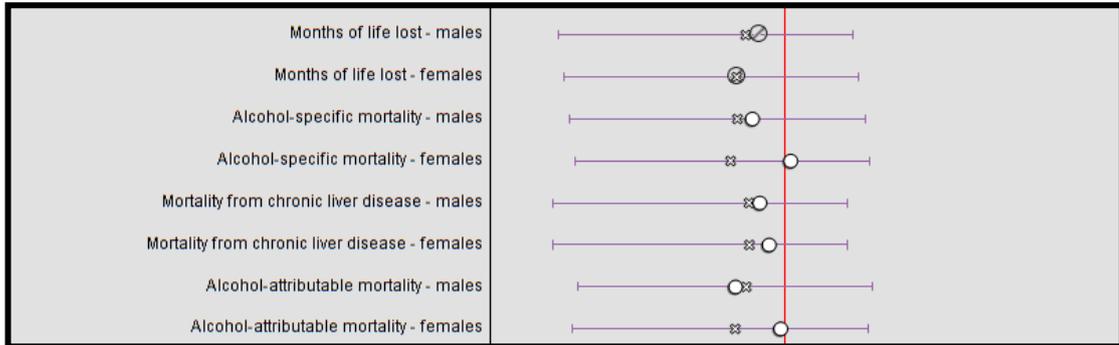


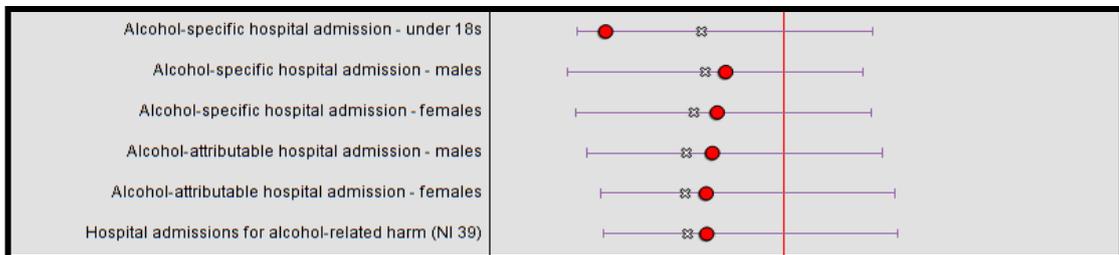
Figure 3.6: Local Alcohol Profile for County Durham PCT (NWPCHO, 2011)

Local Alcohol Profile for Darlington

Impacts on health:



Impacts on the healthcare system:



Impacts on the wider environment:

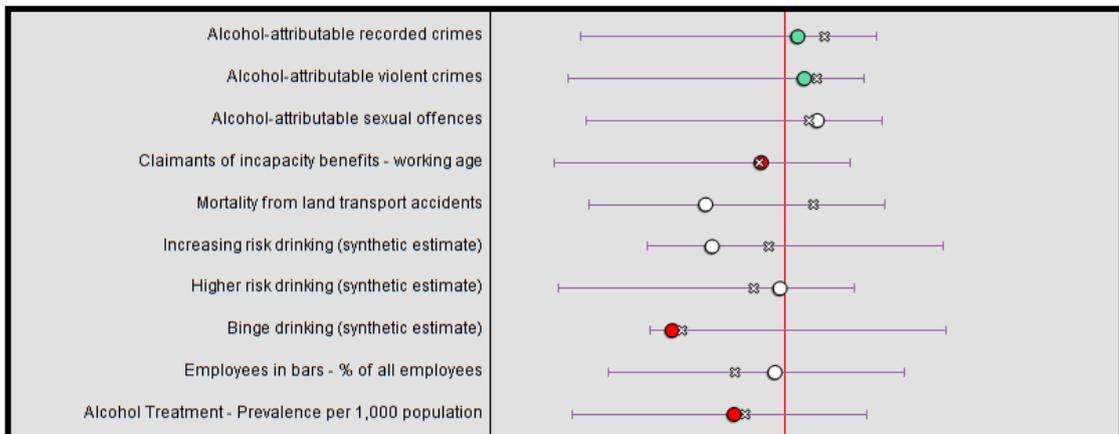


Figure 3.7: Local Alcohol Profile for Darlington PCT (NWPFO, 2011)

Regarding impacts on health, although almost all indicators are worse than national average, none are significantly worse and in almost all case the regional average is worse than County Durham and Darlington PCTs outcomes.

With regards to the impact on the healthcare system, there is a stark contrast to the health indicators as all healthcare system indicators are significantly worse than the national average, although in most cases are still better than the regional performance. The exception to this is levels

of under-18 alcohol-specific admissions, which especially in Darlington, shows particularly poor performance in national and regional comparisons.

It would be reasonable to assume that if health outcomes are not significantly different to national average, healthcare-system outcomes would follow suit i.e. one may expect alcohol-specific mortality and alcohol-specific hospital admissions to be relatively reflective of one another. Both hospital admissions and death-certificates are assigned International Classification of Disease (ICD) codes, to indicate the causes of the incident. Both alcohol-related hospital admissions and mortality are a result of an analysis of these codes and, therefore, the very similar methodologies would further support the suggestion of similar outcomes. Based on this understanding it is suggested that if alcohol-related health and drinking behaviours are not significantly different from national averages and there are not significantly more alcohol-misusing-individuals per population; significantly higher alcohol-attributable hospital admissions may be due to a relatively higher use of healthcare services by individuals in County Durham and Darlington compared to the national picture.

To understand this further, an analysis of unique patient admissions would be recommended.

Unique admissions can be interpreted in two ways:

1. An analysis of individual users of healthcare service would be interesting to help understand more about high-intensity users, for example, to identify binge drinkers who persistently end up using healthcare services.
2. An analysis of unique alcohol-related *episodes* of care (i.e. a course of cancer treatment would class as one episode of care) to investigate the theory that there are a higher number of hospital contacts among patients presenting for such an episode.

The analysis presented later in the document does not use patient identifiable data and, therefore, these theories cannot be explored in this dissertation. It is recommended, however, that this analysis is considered in future studies.

Investigating past data reveals how the situation discussed above has developed over time. Alcohol-attributable mortality in County Durham and Darlington has stayed more-or-less in-line with national trends since 2002-04; however, alcohol-attributable hospital admissions have increased at a greater rate than national trends, enough to result in significantly worse outcomes (see Figures 3.8 and 3.9).

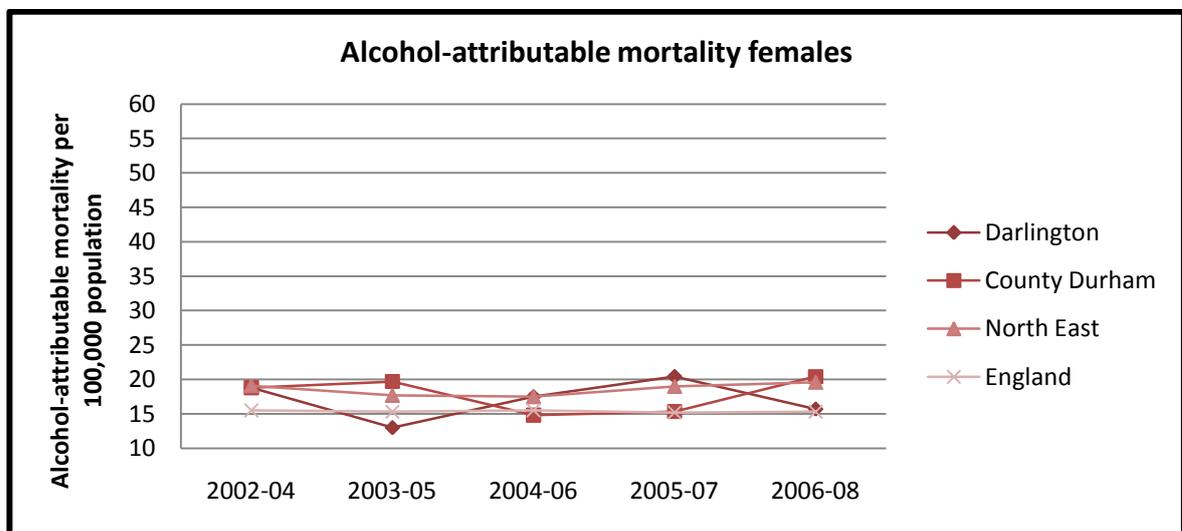
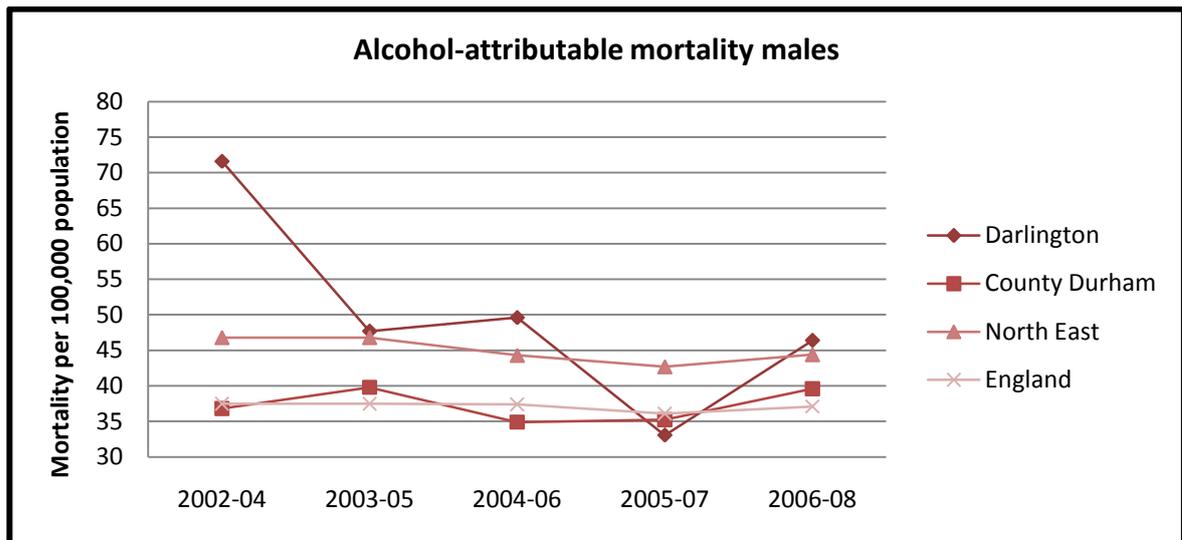


Figure 3.8: Alcohol-attributable mortality (males and females) 2002/03 to 2009/10 (NWPFO, 2011)

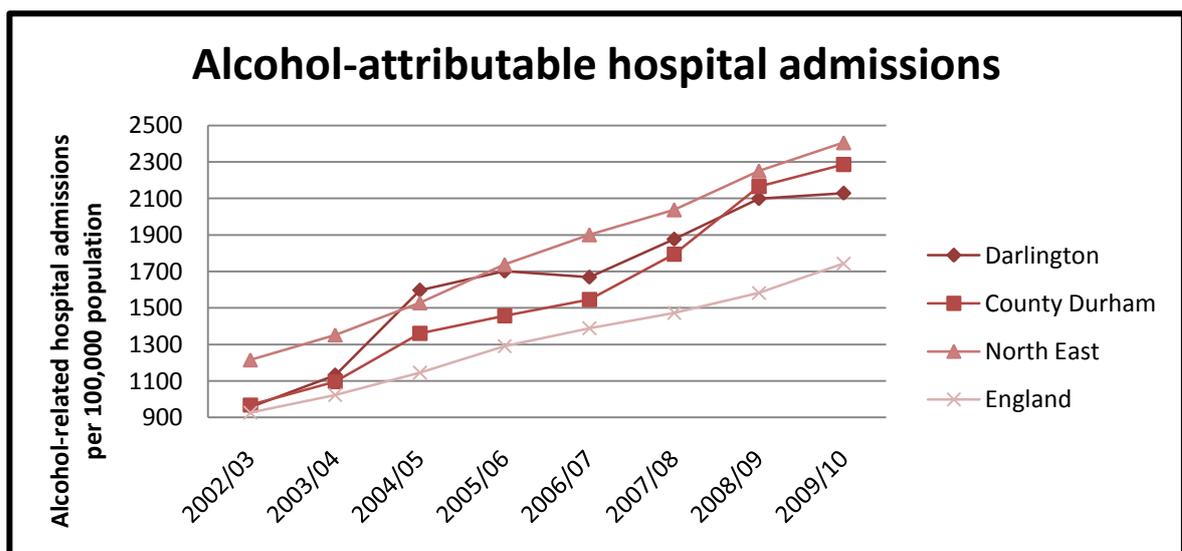


Figure 3.9: Alcohol-attributable hospital admissions 2002/03 to 2009/10 (NWPFO, 2011)

The costs of alcohol-related hospital admissions and mortality are discussed in later sections of the dissertation and they are significant. To reduce these costs it is recommended that alcohol-related use of healthcare services is investigated to understand unique users and episodes. The results of this analysis will be highly informative to an alcohol-harm reduction strategy and the potential for reducing hospital-admissions relative to national comparisons.

3.2.3 Behaviours and attitudes to alcohol

To provide a brief overview of attitudes and behaviours in County Durham and Darlington the following has been summarised: The North East Big Drink Debate (Balance, 2009) carried out market research to understand the North East population's behaviours and attitudes towards alcohol. 11,000 North East residents took part from which 2,131 were from County Durham and around 392 were from Darlington. Findings included:

- Around 1 in 10 of people have consumed 6 or more units on a single occasion weekly in the last six months and around 1 in 20 have consumed 6 or more units in a single sitting daily or almost daily
- Alcohol is most often consumed at home (1 in 2) and in bars, clubs and pubs. In the North East overall, alcohol is typically purchased most often in supermarkets (1 in 2) and in pubs, bars and clubs (3 in 10)
- 74% drink alcohol to relax and unwind, 72% drink alcohol to socialise, 25% drink alcohol to forget worries and concerns, 19% drink alcohol to get drunk and 18% to relieve boredom, 16% drink alcohol to boost confidence and because their friends do
- Family, friends and GPs are the preferred sources of help for alcohol-related problems.
- Putting on weight and negative health consequences are the leading personal concerns regarding alcohol, although on average residents of Darlington are less concerned with these consequences compared to other North East residents
- Children and young people drinking in parks/on street corners, violence caused by people drinking and people being drunk and rowdy in public are the leading social concerns (Alcohol Learning Centre, 2009)

3.2.4 The alcohol pathway and commissioned services and projects

The National Treatment Agency (NTA) developed a guidance framework for substance misuse which outlined a tiered system for different levels of treatment (see Figure 3.10). The higher the tier the more intensive and specialist the intervention. Patients do not necessarily progress through the tiers in numerical order but will access services most appropriate to their current needs and, therefore, there is often overlap between the services provided in each tier (for further information see Appendix 2).

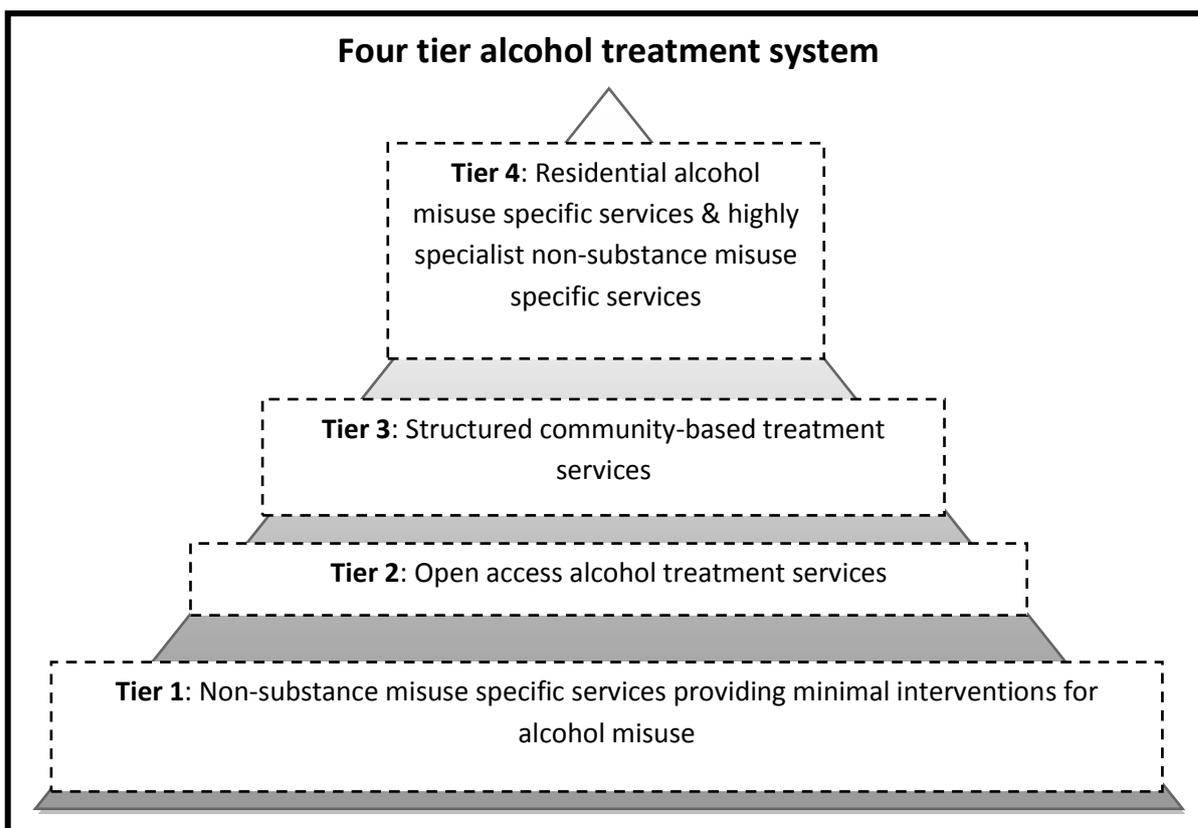


Figure 3.10: Four tier alcohol treatment system (adapted from NTA, 2002)

In County Durham and Darlington preventative services, such as brief advice, are provided by a range of providers in tier 1. GPs, for example, are under a Directed Enhanced Service (DES) agreement to screen newly registered patients and a Local Enhanced Service (LES) agreement to screen existing patients for alcohol-misuse. Further development, in tier 1 includes the introduction of the systematic recording of alcohol-consumption in A&E cases. Evidence from this is not yet available, which impacts the scope of the health service cost estimate, discussed in chapter 7. Treatment (tiers 2, 3 and 4) is provided by the Community Alcohol Service (CAS). Fully operational since October 2008, CAS provides a whole system approach to the management of alcohol misuse

providing prevention, treatment and control (alcohol learning centre, 2011). A key benefit of the whole system approach is the ability to be accessible whilst maintaining control. In practice this means patients are able to self-refer but a more 'robust' approach can be taken to those with complications, for example, risk to children and family members, mental health issues and long-term physical conditions (Stephenson, 2010). Figure 3.11 outlines the tiered structure in County Durham and Darlington.

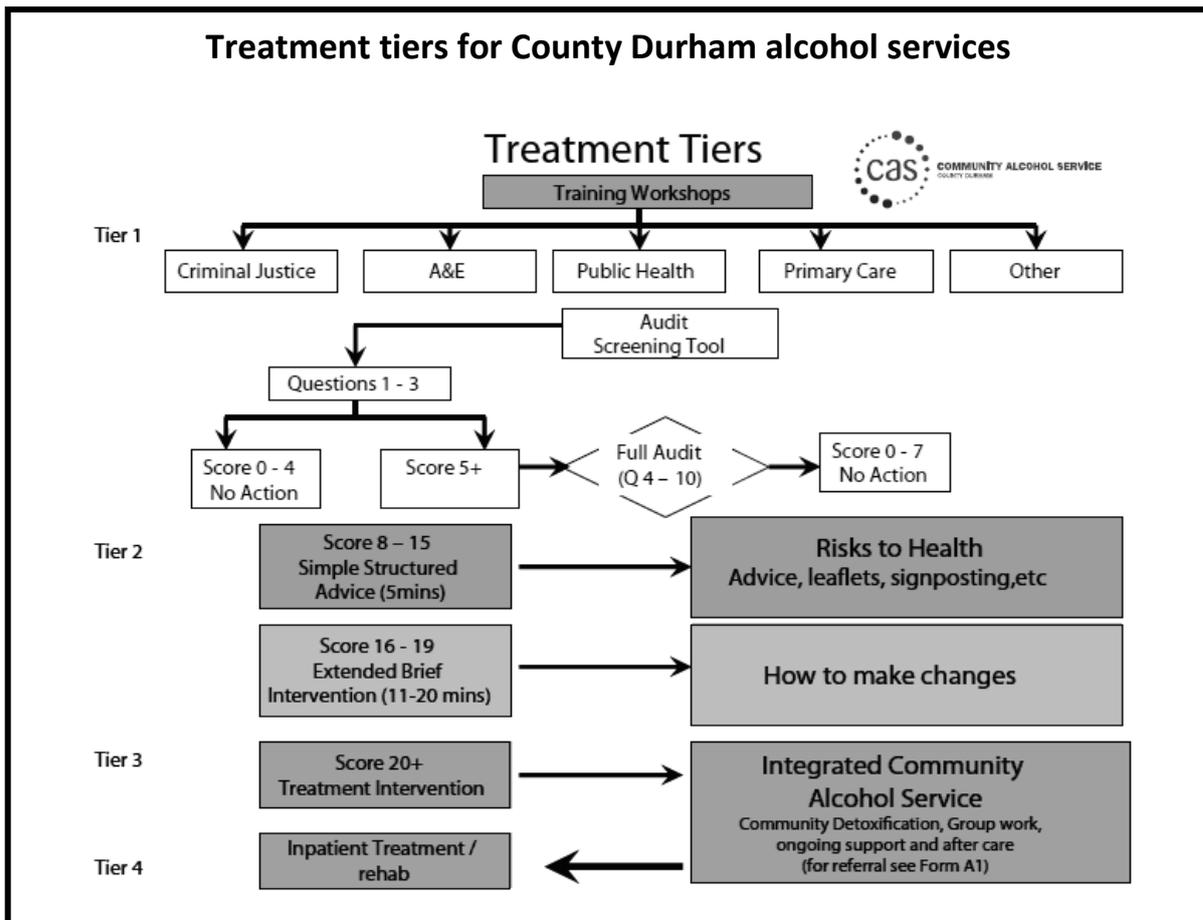


Figure 3.11: Treatment tiers for County Durham alcohol services (County Durham DAAT, 2011)

In the 12 months following the implementation of the CAS service, 2,348 referrals were received with 788 commencing treatment. The DES and LES agreements seem to be working well as 41% of referrals are from the GP. A further 21% of referrals are self-referred which indicates a positive sign of alcohol-misuse recognition and 8% came from the Criminal Justice System (CJS) (Stephenson, 2010). A&E services did not feature as a significant referrer into CAS which is unexpected considering the media attention given to the impact of alcohol on A&E.

The whole-system approach to alcohol services describe above is well thought out and seems appropriate to the services being delivered. Referral rate and accessing treatment, as a proportion of need, seems low although this data represent only a 12 month period and the first year of implementation. The CAS has the potential to reduce the pressure of alcohol-related illness on secondary care, however, it is suggested that A&E services must be better engaged in order to achieve this.

Chapter Four: The economic benefits of alcohol consumption

Objectives of chapter four:

- To discuss the economic benefits of alcohol consumption to society and individuals

Learning from chapter four:

- The gross societal benefit encompasses both the total revenues from alcohol sales and consumer surplus
- The net societal benefit is the gross societal benefit minus the cost of production
- There are difficulties in quantifying the total societal benefits of alcohol-consumption, however, this chapter provides a methodology for this

4.1 Benefits to society

In 2010, £44.4 billion was spent on alcoholic drinks in the UK (Euromonitor, 2011). Although this is a 1% decline compared to 2005, the last few decades have seen a significant increase in alcohol sales both in terms of volume and value. One result of the growth in this market has been increased employment throughout the supply chain, from farming and distribution to pubs and bars, with the Cabinet Office estimating that the industry generates approximately one million jobs (IAS, 2008).

Cost-benefit analysis usually assumes, often only implicitly, that we live in a fully-employed economy. However, it is clear that in many areas of the country there has been persistent economic weakness, and the benefits of new activity where no activity would have taken place should be part of any decision process. In this light, the growing alcoholic drinks market has played an important role in the regeneration of many UK towns and cities. The increasing popularity of alcohol-related entertainment has resulted in a number of large scale regeneration projects, for example, the Printworks in Manchester, which has stood empty for 12 years until 1998, and is now an entertainment venue containing mostly bars and night-clubs (The Printworks, 2011). The direct benefits of these developments are increased employment opportunities and the occupation and the regeneration of premises which, otherwise, may have been left empty and derelict. To LAs the result is the avoidance of maintenance and crime costs often associated with empty buildings and the increased revenue from the alcohol-related businesses who occupy these spaces. Many of these regeneration projects have resulted in the cities becoming destination cities for those seeking

alcohol-related entertainment and have added to cities attractiveness to tourists which brings wider economic activity and benefits.

The Cabinet Office (2003) discounts many of the benefits of alcohol consumption arguing that the benefits associated with the growth of the alcoholic-drinks industry are wrongly based on the assumption that; in the absence of alcohol consumption, the money spent on alcohol would not have been used in any form of other expenditure, and this is highly unlikely. Therefore, if all consumer expenditure simply switches to other products and services, it can be argued that employment opportunities and demand for commercial premise will continue to exist and, thus, the net-benefit is zero.

However, if these economic benefits of alcohol consumption are to be discounted whilst the costs remain, it must also be assumed that in the absence of alcohol consumption, the money previously spent on alcohol would not be spent on other products and services with equally harmful outcomes to alcohol. Whilst it is probable that, in the absence of alcohol, levels consumer expenditure would remain at a similar level but on a less harmful bundle of products and services, it seems inappropriate to discount the benefits completely as the net effect of alcohol consumption is significant in determining the level and pattern/distribution of economic activity. Therefore, this dissertation will continue to regard increased employment and premises occupation as explicit benefits.

There has been very little analysis, however, to quantify the societal economic benefits of alcohol consumption beyond the accessible data regarding LA and government revenues from licensed premises, duties and tax.

The cost of alcohol consumption, detailed in later sections, includes both direct costs borne by government/public sector organisations and the wider societal costs and, therefore, to understand the net impact of alcohol consumption it is recommended that the wider societal benefits (such as increased employment) should also be quantified.

Revenue to the government, from alcohol duties and tax has risen year-on-year and was estimated to be £14.6 billion in 2009/10 (HM Revenues and Customs, 2011). As a percentage of total Government revenues, however, alcohol duties have declined with other income streams becoming more important. Alcohol duties contribution as a percentage of government tax from 1958/59 to

2004/05 is outlined in Figure 4.1. The decreasing importance of alcohol revenue to the government potentially increases the motivation for the management of alcohol-misuse and supports earlier discussions regarding the increase of alcohol duties (chapter 2).

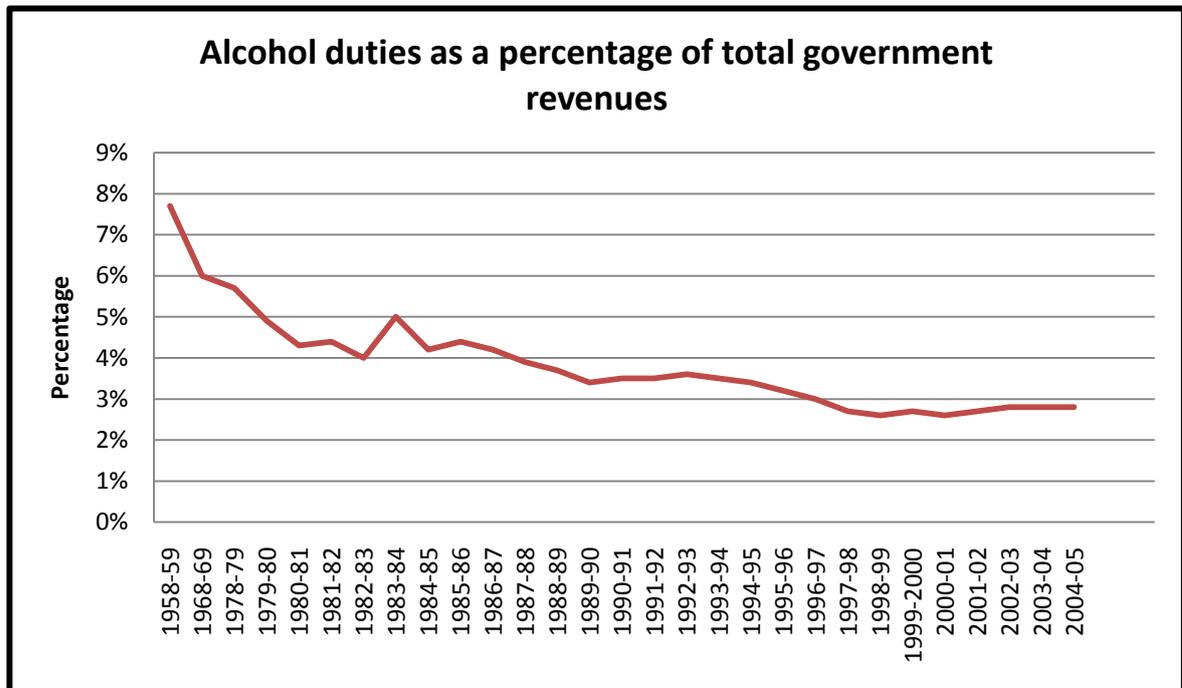


Figure 4.1: Alcohol duties as a percentage of total government revenues 1958/59 to 2004/05 (Data from: HM Revenues and Customs, 2011)

If in the absence of alcohol consumers would continue current expenditure on less harmful products and services it is assumed that the £5.6 billion in VAT revenue (currently from alcoholic drinks) would continue to be collected, however, the £9.0 billion income from alcohol duties would not. Thus in the evaluation of the net effect of consumption it important to understand under what assumptions the estimate has been made. This will be further discussion in chapter 9.

4.2 Benefits to individuals

4.2.1 Pleasure and satisfaction from consumption

It is estimated that, in 2009, the average household spent £14 per week on alcohol (3% of total household expenditure), amounting to total of £363 million (ONS, 2010). Since 1978 household expenditure has been rising whilst spend on alcohol has remained relatively constant, therefore, as a percentage of household income, alcohol expenditure has declined (see Figure 4.2). Despite this

decline, alcohol consumption has increased over the same time period (see Figure 4.3), evidencing the increasing relative affordability of alcohol discussed in chapter 2.

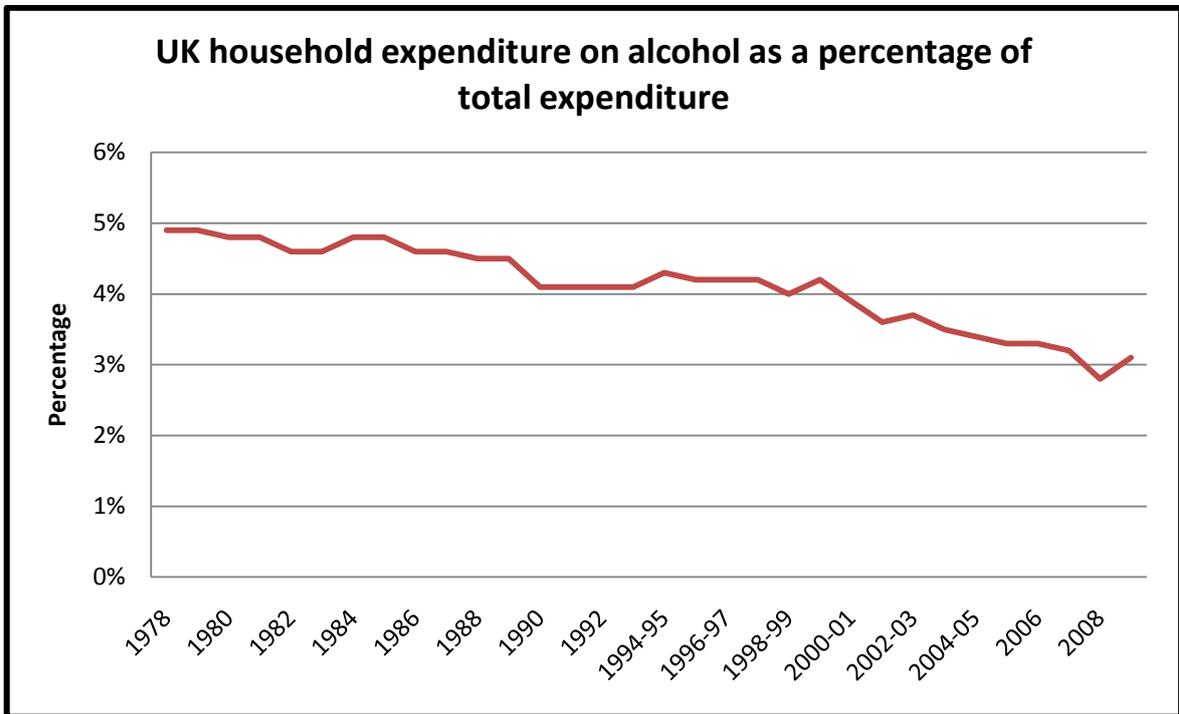


Figure 4.2: Household expenditure on alcohol as a percentage of total expenditure (Data from: ONS, 2010)

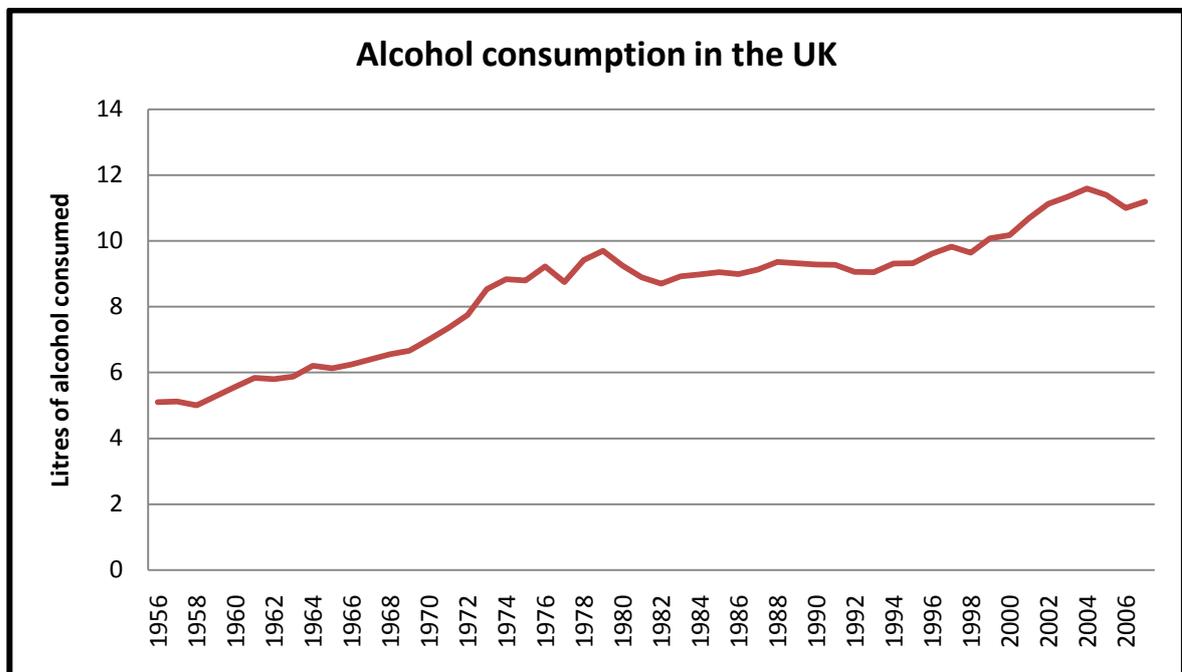


Figure 4.3: Alcohol consumption (litres of alcohol) (Data from: IAS, 2010)

The principal benefit of alcohol is the pleasure/satisfaction individuals derive from its consumption. Alcohol consumption can aid social interaction, provide community cohesion and can play an integral part in the forming of relationships. Whilst much of these benefits cannot be measured, the Cabinet Office outlines a method used to quantify individual's satisfaction; the concept of consumer surplus. Consumer surplus refers to the difference between the amount individuals are willing to pay for a good or service and the amount they are required to pay (i.e. the market price). To illustrate; consumer surplus is represented by the area between the demand curve (D) and the horizontal line representing the market price paid by consumers (P^1) (see Figure 4.4).

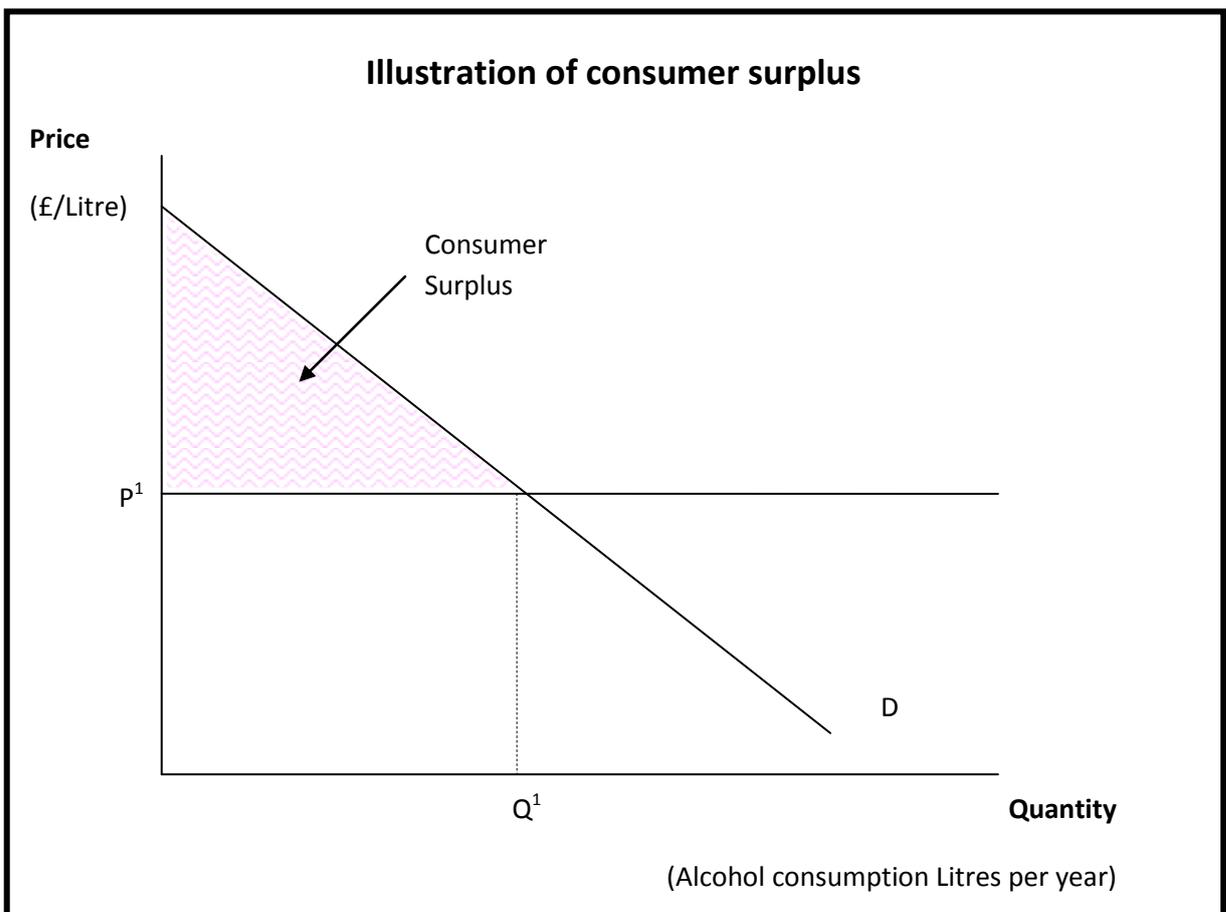


Figure 4.4: Illustration of consumer surplus (Anderson and Baumberg, 2010)

It is difficult to estimate what consumer would have been willing to pay for a product, however, it can be assumed from past consumption patterns and expenditure outlined above that consumer surplus is likely to have increased as alcohol has become relatively more affordable.

Policy decisions will have implications for consumer surplus. Increased taxation, for example, will reduce consumer surplus as the area between what consumers are willing to pay (D) and are

required to pay decreases (line P1 moves to line P2). The majority of lost consumer surplus is transferred to increase government revenue (a), however, some is lost through reduced consumption as a result of increased price; this is called deadweight loss (b) (Anderson and Baumberg, 2010) (see Figure 4.5).

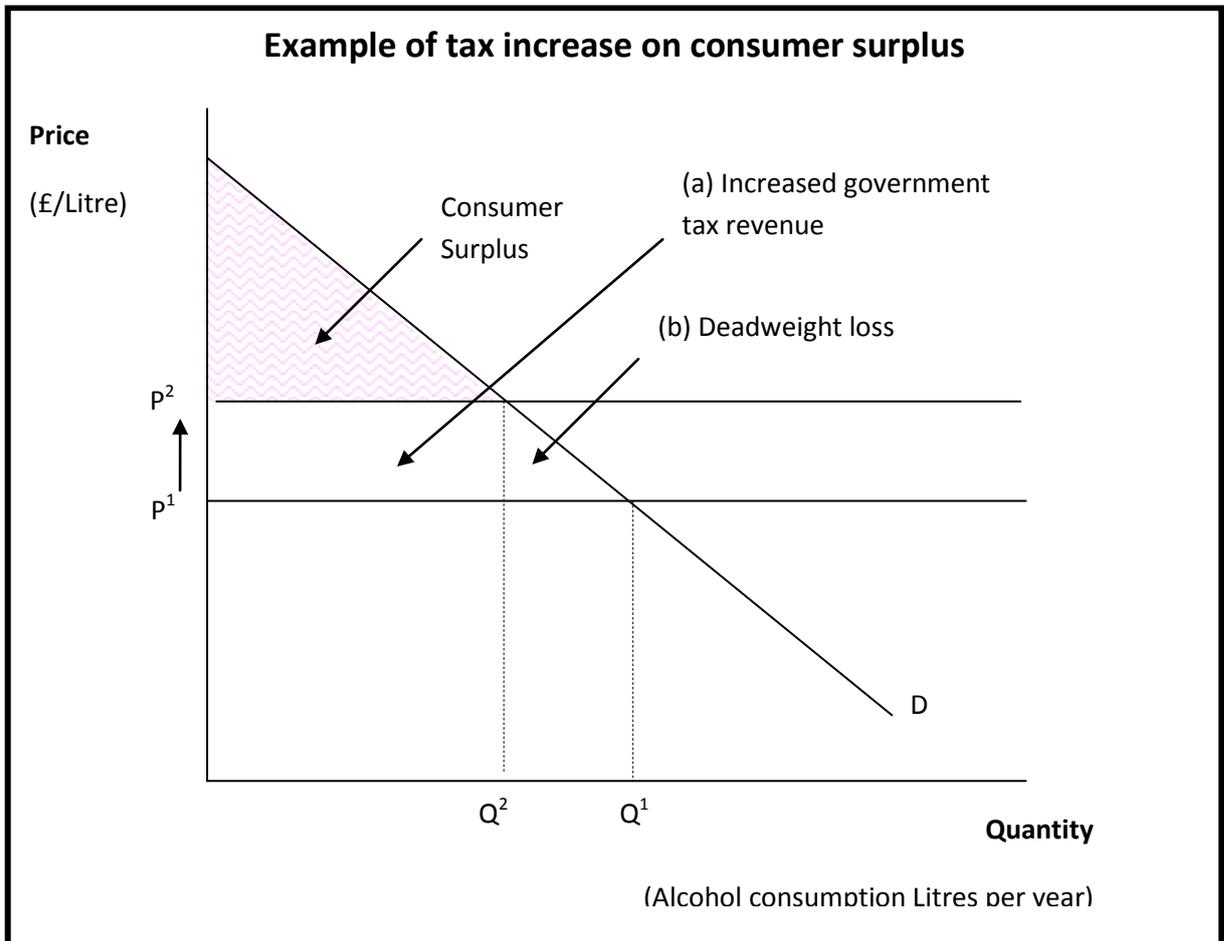


Figure 4.5: Example of tax increase on consumer surplus (Anderson and Baumberg, 2010)

Using data from the Sheffield alcohol policy model and based on the assumption of economically rational demand for alcohol, Anderson and Baumberg (2010) found; that based on a 10% price increase, the consumer surplus transferred to the government in the form of taxation revenue (a) is 38 times the fall in consumption or deadweight loss (b). This is equal to €2200 million increased consumer expenditure which would transfer as increased government revenue and an intangible cost estimated at €58 million in deadweight loss (Anderson and Baumberg, 2010).

The total satisfaction individuals derive from consuming alcohol represents the gross societal benefit as it encompasses both the total revenues from alcohol sales and consumer surplus, represented by

[(a) + (b) + (c)] in Figure 4.6. Total expenditure on alcohol broadly consists of revenues to suppliers (retailers/manufacturers/producers) and revenues to the Government.

The net societal benefit is, therefore, the gross benefit minus the costs of production (leaving aside for the present the external costs of alcohol consumption, such as crime and disorder, which are discussed later in the dissertation). Cost of production does not include alcohol duties and tax, staff costs and the costs of premises as from a societal perspective, Government revenue, increased employment and the occupation of premises are perceived as societal benefits, as discussed previously. Figure 4.6 assumes a constant marginal cost (c^1) and, thus, net benefit is calculated by [(a) + (b)] – (c).

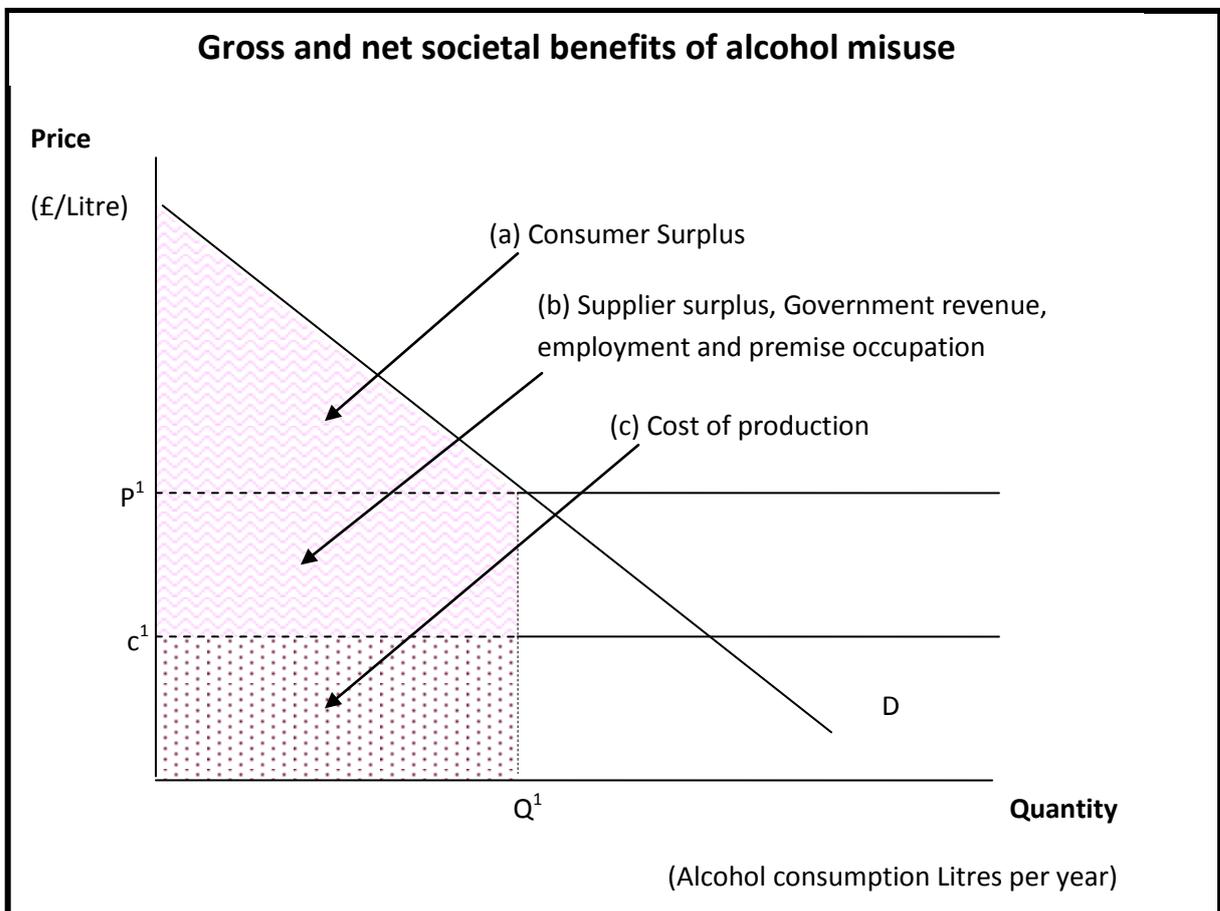


Figure 4.6: Gross and net societal benefits of alcohol misuse

Whilst it is known that in 2010 total revenue from alcohol [(a) + (b)] was £44.4 billion, this dissertation does not know the cost of production nor does it attempt to estimate the monetary value of consumer surplus (c), although, it is felt that this evaluation would be of high value.

Intangible costs and benefits of alcohol consumption, such as consumer surplus, and the inclusion of these costs in COI studies are discussed further in chapter 9.

4.2.2 The health benefits of alcohol consumption

Whilst some consumers may place a higher value on alcohol consumption based on perceived health benefits, the total reduction in ill health due to alcohol consumption is unlikely to be a large part of consumer surplus valuations. The beneficial effects might better be described as a cost-saving, offsetting health costs, rather than an explicit benefit of alcohol consumption.

There has been much debate regarding the health benefits of alcohol consumption. The North West Public Health Observatory (NWPHO) provides a definitive list of conditions which are wholly and partly attributable to alcohol and part of the research includes an analysis of beneficial health effects of alcohol consumption. Four conditions are outlined which are ischaemic heart disease, ischaemic stroke, type II diabetes and gallstones (NWPHO, 2011).

The health benefits of alcohol are measured by the same methodology as health costs allowing the two to be compared. Based on 2005 data the NWPHO estimated that alcohol consumption prevented 3,813 deaths and 34,528 hospital admissions. It must be noted, however; deaths and hospital admissions cause by alcohol-misuse far outweighed the preventative effects (NWPHO, 2008).

There are other suggested benefits of alcohol, however, most are published by the news/media organisations rather than clinical bodies and are often taken out of the context of the original studies. Such claims have included: *"Women who drink wine are less likely to gain weight"*, *"Beer is full of nutrients"*, *"Drinkers live longer than teetotallers"* and *"People who drink alcohol are happier"*. The Drinkaware trust rightly state that *"most of the studies behind the headlines focus on a single supposed benefit of alcohol. But human beings don't exist in a protective bubble. Just because alcohol may reduce your risk of one disease, it may increase the risk of another"* (Drinkaware, 2011).

Chapter 5: The economic cost of alcohol-related crime

Objectives of chapter five:

- To explore the area of alcohol-related crime in England and locally
- To combine and discuss the strengths of the original Cabinet Office (2003) and Department of Health update (2008) of alcohol-related crime and to provide an updated national cost estimate
- To use evidence from national studies to estimate the economic cost of alcohol-related crime in County Durham and Darlington

Learning from chapter five:

- The application of the Department of Health update (2008) required careful evaluation because if applied, unaltered, to this dissertation, the results would include significant double counting of costs
- Data sources were often not entirely 'fit for purpose' and many adjustments had to be made
- Despite this an attempt has been made to estimate costs and the results are satisfactory (see below for a summary of costs)

Summary of costs:

England, 2008/09	Estimate:
Alcohol-related offences	£9,385,241,199
Alcohol-specific offences	£200,000,000
Drink driving offences	£92,662,425
Alcohol-related PNDs	-£368,411
Licensing costs	£24,440,000
Cost to licensees	£128,500,000
TOTAL	£9,830,475,213

County Durham and Darlington, 2008/09	Estimate:
Alcohol-related offences	£78,972,765
Alcohol-specific offences	N/A
Drink driving offences	£758,249
Alcohol-related PNDs	-£3,100
Licensing costs	£290,000
Cost to licensees	£1,540,000
TOTAL	£81,557,914

5.1 Alcohol-related offences

5.1.1 Previous estimate

In England and Wales, criminal offences are recorded using a coding system and there are twenty-one offences considered to be alcohol-related (Dubourg et al., 2005 and Brand and Price, 2000). An analysis of the codes of recorded offences provides an initial estimate of alcohol-related crime.

Not all crimes, however, come to the attention of the police; for example, it is suggested that less than a quarter of violent offences that result in treatment at Accident and Emergency Departments are known to the police (Warburton and Shepherd, 2004). To understand the full extent of alcohol-related crimes Dubourg et al. (2005) and Brand and Price (2000) provide “*multipliers*” which can be applied to numbers of reported offences.

Estimated total offences (reported and unreported) are then adjusted by estimated Alcohol-Attributable Fractions (AAFs) i.e. the proportion of offences that are considered to be attributable to alcohol; and finally a unit cost for each offence can be applied to reach an estimated total cost of alcohol-related crime.

It was estimated that, in England, general offences attributable to alcohol cost between £8.27 billion and £13.96 billion (Department of Health, 2008) (adjusted from England and Wales estimate to England only, based on ONS mid-year population estimates [ONS 2009]).

An accurate estimate of the impact of alcohol on crime is difficult to achieve as Blood Alcohol Content (BAC), or similar, is not collected as standard unless the offence is alcohol-specific. Victims of crime are often asked about their perception of the perpetrators alcohol-consumption and its

influence in the offence; however, these views are subjective and can be inaccurate. Inaccuracy also exists when asking perpetrators about their alcohol consumption as they may not always be honest and/or fully aware of the amount consumed. Individual's perceptions of the present and influence of alcohol in offences are often much higher than the AAFs applied to offences, which suggests the use of AAFs may lead to a conservative estimate of the level of alcohol-related crime (YHEC, 2010). Multipliers, alcohol-attributable fractions and unit costs of offences can be found in Appendix 3.

The Balance study provides a local estimate of the cost of all alcohol-related offences by dividing the national costs, outlined above, proportionately by numbers of local alcohol-related crimes outlined in the Local Alcohol Profiles for England (NWPHO, 2011). Using this methodology, the estimated cost of alcohol-related offences, in County Durham and Darlington is between £69.58 million and £117.50 million.

5.1.2 Re-evaluating the cost of alcohol-related general offences

Average unit costs, applied in the above estimates, are the sum of ten cost estimates; grouped into three categories:

- 1. Costs in anticipation of crime**
 - a. Defensive expenditure
 - b. Insurance administration
- 2. Cost as a consequence of crime**
 - a. Physical and emotional impact on direct victims
 - b. Value of property stolen
 - c. Property damaged/destroyed
 - d. Property recovered
 - e. Victim services
 - f. Lost output
 - g. Health service
- 3. Costs in response to crime**
 - a. Criminal Justice System (CJS)

(Brand and Price, 2000)

The Department of Health (2008) update on the costs alcohol-related crime, estimates costs separately from other alcohol-related costs. It is, therefore, logical that all ten cost costs are included;

however, as part of a full analysis of the economic costs of alcohol-misuse, some of these costs must be excluded to avoid duplication and an over-estimate. These are discussed below.

“Health service” costs and “lost output” costs are also included in the average unit costs. These costs are calculated separately in further sections and, therefore, are excluded from the crime costs to avoid double counting. Regarding health service costs, the cost of alcohol-related general offences may be overestimated to the sum of £1.44 million. Regarding lost output costs, the cost of alcohol-related general offences may be overestimated to the sum of £1.91 million (see Appendix 4).

Further to this, the inclusion of estimated unreported crime is important to understanding the full-picture and the ‘hidden harms’ of alcohol misuse. The application of the average unit cost is, however, inaccurate in the cases of crimes that go unreported due to the inclusion of CJS costs. These are, arguably, not applicable in unreported cases as the majority of CJS costs regard the management of reported crime, for example, “prison service costs” and “jury service” (Dubourg et al., 2005). The exception is potentially “police activity” which is arguably applicable even in unreported cases. Based on these assumptions, regarding CJS costs, the cost of alcohol-related general offences may be overestimated to the sum of £779.09 million (see Appendix 5).

The cost of victim support would also arguably not be present in unreported cases as victims are unlikely to have access to these services. Using a similar calculation to above, regarding victim services costs, the cost of alcohol-related general offences may be overestimated to the sum of £13.25 million (see Appendix 5).

The revised upper cost estimate for England and Wales, for alcohol-related general offences is £10.63 billion representing a 28% decrease from the alcohol-related crime and licensing cost estimate in the Department of Health update (2008). Data for a lower cost estimate is not available and therefore, assuming the lower cost estimates decreases by the same percentage (28%), the lower cost estimate for England and Wales, for alcohol-related general offences is £6.30 billion.

Costs used in the Department of Health update are 2003 prices; therefore, to generate a comparable cost for 2008/09 HM Treasury GDP deflators are applied. The resulting estimated cost; for 2008/09, for England, for alcohol-related general offences is between £6.98 billion and £11.79 billion (adjusted from England and Wales estimate to England only, based on ONS mid-year population estimates [ONS, 2009]). The mid-point of these values is £9.39 billion.

Applying the methodology outlined previously, alcohol-related crime costs for County Durham and Darlington can be estimated between £58.74 million and £99.20 million, with a mid-point of £78.97 million.

In conclusion, the potential cost of alcohol-related crimes could be much higher if unreported cases were reported; however, it is inaccurate to include these as they are only potential costs i.e. some of these costs have not actually been incurred. Further, if costs estimates of alcohol-related crime were presented as a single estimate it is fair to include healthcare and loss-output costs, however, for the purposes of a complete estimate of alcohol-related harm these costs must be removed to avoid double counting.

5.2 Alcohol-specific offences

5.2.1 Alcohol specific offences

Further to the offences outlined in the previous section there are a number of low-level offences specific to alcohol. In England and Wales it is an offence to be:

- Drunk in a public place
- Drunk and incapable
- Drunk and disorderly

(The National Archives, 2011)

Consequences of these offences tend to incur much lower costs than those outlined in the previous section and it has been estimated that the cost of alcohol-specific offences for England and Wales is around £0.2 billion (Department of health, 2008).

A significant problem of estimates of alcohol-specific offences is the lack of published routine data regarding the number of arrests for alcohol-specific behaviour. The Cabinet Office's Harm Reduction Strategy for England quotes 80,000 arrests for drunkenness and disorderly behaviour, however, the source of this data is not stated. It is recommended that to accurately estimate the cost of crime, statistics regarding alcohol-specific crimes must be routinely published. Information would consist of the number of alcohol-specific arrests (drunkenness, drunk and incapable and drunk and disorderly) and the consequences of these arrests (found guilty, cautioned, PND, no action and other).

Local costs cannot be calculated due to lack of data and specific cost estimates. Parts of these costs are, however, captured in the estimate of the cost of alcohol-related PND.

5.2.2 Drink driving offences

The cost estimate by the Prime Ministers Strategy Unit (Cabinet Office) (2003) estimated the cost of drink-driving offences by the following.

- Arrest costs
- CJS court costs
- Lost output costs
- Health costs
- Human costs

As discussed previously, lost output and health costs are calculated in other sections and, therefore, are excluded from this estimate. Human costs are not included due to data limitations, however, discussions regarding the inclusion of human costs in COI studies can be found in chapter 9.

In the Department of Health's (2008) updated cost estimate only CJS costs are included, however, the source and methodology to calculate unit costs are not clear and, therefore, estimated costs applied in the original Cabinet Office (2003) study are updated and applied here.

In 2006 (the latest available statistics), 83,975 people were charged with and convicted of drink driving in England and Wales. This figure represents between 80-86% of total convictions when considering those with drink-driving as a secondary offence to, for example, "*death by dangerous driving*" (Drink-driving website, 2011). Based on these figures a lower and upper estimate of 97,645 and 104,969 drink-driving offences were committed and convicted in 2006.

The average cost per drink driving arrest updated to 2008 prices is £237.12. The unit costs for magistrate and crown courts are also updated to 2008 prices; £720.53 and £3,537.14 respectively (HM Treasury, 2011). It was assumed that all accidents resulting in fatal casualties (370) went through the Crown court, although, this is likely to be an underestimates of the total, as some accidents resulting in serious injury may also take this route.

Adjusted using population estimates it can be estimated that the economic cost of drink-driving offences in England is between £89.35 million and £95.97 million with a mid-point of £92.66 million.

In 2008, Durham Constabulary (which includes Darlington) made 1,174 arrests for drink-driving offences. 666 resulted in court action with the remaining 508 resulting in other disposals (Durham Constabulary, 2009). Assuming all court proceeding went through the magistrates court (a conservative estimate) this results in an estimated economic cost of drink driving in County Durham and Darlington of £758,249.

A clear limitation of this analysis is the lack of timely data. In this example 2006 activity data has been applied (for the national estimate) yet the prices are 1997 estimates adjusted to 2008 prices. It is argued that, whilst 2006 activity data is not ideal over recent years the number of drink-driving conviction has remained relatively constant (see Appendix 6) and, therefore, it is assumed the 2006 estimate is fairly accurate. The cost estimates are, however, more of a concern. The Department of Health updated estimate quotes new cost estimates for magistrate and crown court proceeding but with the source of this cost estimate unclear and no knowledge of the basis of the cost it was decided that the original costs (Cabinet Office, 2003) would be more favourable.

5.3 Alcohol-related PNDs

A penalty notice for disorder (PND) is a type of fixed penalty notice that can be issued for a specified range of minor disorder offences. PNDs give the police additional options for action; a financial punishment for misbehaviour and deterrent from re-offending. The costs of issuing a PND are much lower than other available police actions as they take an officer approximately 30 minutes to issue (Home Office, 2011), compared with 2 ½ hours to prepare an evidential case file. The fine attached to PNDs is either £80 or £50 depending on if it was an upper or lower tier offence (Home Office, 2011). Seven upper tier and five lower tier alcohol-related offences exist:

Upper tier:

Drunk and disorderly

- Sale of alcohol to drunken person
- Supply of alcohol to a person under 18
- Sale of alcohol to a person under 18
- Purchasing alcohol for a person under 18
- Purchasing alcohol for a person under 18 for consumption on the premises
- Delivery of alcohol to a person under 18 or allowing such delivery

Lower tier:

- Drunk in a highway
- Consumption of alcohol in a designated public place
- Consumption of alcohol by a person under 18 on relevant premises
- Allowing consumption of alcohol by a person under 18 on relevant premises
- Buying or attempting to buy alcohol by a person under 18

(Ministry of Justice, 2010)

The revised cost of crime analysis estimates the cost of alcohol-related PNDs at £800,000, however, below is the updated cost estimate.

The Criminal Statistics outlines 51,599 alcohol-related PNDs were issued in England and Wales in 2008 (Ministry of Justice, 2010). It is estimated that there is a payment rate of about 52% (Ministry of Justice, 2010) resulting in an estimate revenues from PNDs of £2.09 million. Whilst the Home Office states issuing a PND requires ½ hour of police time, the updated estimate assumes an average of 1 ½ hours of police time at £33.03 per hour. Using these as lower and upper estimates of revenue from PNDs and adjusted using population estimates, it is estimated that the net economic cost is between -£1.17 million (i.e. revenue is greater than costs) and £0.44 million. The mid-point of these estimates is -£0.37 million.

Applying the methodology outlined previously, alcohol-related PND costs for County Durham and Darlington can be estimated between -£9,876 and £3,676 with a mid-point of -£3,100.

A limitation of this analysis is the application of the estimated cost per hour of police time. The £33.03 is based on an analysis of crimes, average police time spent on various activities and total staff costs (Department of Health, 2008). This analysis was undertaken using 2005 data and has not been updated in this study. Due to the methodology used to calculate this cost, an accurate update of the cost of police time is more complicated than simply applying the GDP deflator. Estimates can be made regarding wage increases; however, it would have to assume no efficiencies, regarding police time, costs per case, administration staff etc, have been made.

5.4 Licensing costs

Section 2.4 outlined a £97 million shortfall between the income licensing authorities receive from licensees and the cost of implementing and administrating the licensing system. This cost is based on an analysis of a sample of LAs over the three years following the introduction of the licensing act 2003.

Whilst this is a large amount it is important to recognise that this estimate includes set-up and transitional costs of implementing the system and, therefore, is not reflective of the potential future shortfalls of the new licensing arrangements. The report, by Elton et al. (2006) attempted to estimate the future gains and losses of the new system by identifying the expected revenue and the ongoing running costs. In the final year of analysis (2006/07) £37.9 million was identified as the ongoing costs of the system, however, it was noted that this figure still included many costs associated with set-up and transition and was an overestimate of ongoing costs.

The report concludes that a 7% rise in fees is recommended to cover the expected shortfall and, thus, in the national study of the cost of alcohol-misuse a cost of £4 million is quoted as the shortfall between annual income (estimated at £52 million) and annual costs of the licensing system. This potentially has underestimated the *actual* cost to licensing authorities as the 7% increase was based on all licensing authorities bearing no transitional costs and performing at the efficiency of the upper quartile LA. It is argued that actual costs over the years following the study are unlikely to meet this objective as, in 2007/08; LA would have needed an average 87% rise, of £45.24 million, in income to cover costs. Based on a 7% increase, LAs are expected to find £41.6 million worth of transitional costs and efficiency savings, representing 42% of current costs. To illustrate:

Potential shortfalls between licence fee revenue and cost

Scenario	Income	Cost	Cost (% of income)	Gain/loss (current income)	Proposed income	Gain/loss (proposed income)
Ideal	£52 million	£55.6 million	107%	- £3.6 million	£55.6 million	Break-even
Current (2006/07)	£52 million	£97.2 million	187%	- £45.2 million	£55.6 million	- £41.6 million

Figure 5.1: Analysis of potential shortfalls between licence fee revenue and cost

The proposed 7% is a reasonable objective and it is logical to quote a £4 million deficit to Licensing Authorities, however, this study is concerned with actual costs and it is argued that in 2008/09 LAs costs are unlikely to have seen the decrease necessary to break-even. The best estimate is to take a mid-point between the ideal and current scenarios based on no change in income, therefore, the costs of alcohol-misuse to Licensing Authorities is estimated between £3.6 million and £45.2 million with a mid-point of £24.4 million.

National licensing costs were broken down by the licensing figures for the localities (DCMS, 2009) resulting in an estimated cost to Licensing Authorities in County Durham and Darlington of between £40,000 and £520,000 with a mid-point of £290,000.

5.5 Licensees

The previous section outlined £52 million annual income from licensing fees. The national cost estimate excludes temporary event notices and personal licences to arrive at a cost of fees of £44.6 million. Administration costs of applying for licenses have also been estimated at £83.9 million resulting in a total cost to licensees of £128.5 million.

The balance study breaks this national cost down by the licensing figures for the localities (DCMS, 2009) resulting in an estimated cost to Licensees in County Durham and Darlington of £1.54 million.

It is unclear whether the above analysis includes the administration costs of failed applications. In 2008/09, 548 new licenses and 319 variations to licenses were refused which will incur administration and lost income costs to licensees, however, the number of refusals accounts for only 1% of applications. Further costs include, in 2008/09, 309 appeals against applications were completed and 1,125 reviews of licensees were completed. Whilst it is recognised that compliance with the new system will incur costs for licensees these costs are currently unquantifiable due to a lack of information.

Chapter 6: Workplace and wider economy costs

Objectives of chapter six:

- To provide an understanding of the relationship between alcohol consumption and the workplace
- To discuss issues in the wider economy of alcohol-misuse
- To quantify, where possible, the economic costs of alcohol-misuse

Learning from chapter six:

- The relationship between alcohol consumption and employment is complex and there is no definitive answer as to the causality between them
- In many circumstances the impact of alcohol on the workplace is difficult to quantify as its effect is difficult to measure
- The cost of incapacity benefits is considered a “redistribution of wealth” and, thus, is not included as a further cost. It is estimated, however, to support discussions in chapter 9.

Summary of costs:

England 2008/09	Cost:
Employee Absenteeism	£1,499,769,797
Unemployment	£2,153,721,146
Mortality	£2,368,065,965
Total	£6,021,556,908

County Durham and Darlington 2008/09	Cost:
Employee Absenteeism	£23,210,000
Unemployment	£29,695,000
Mortality	£37,600,000
Total	£90,505,000

6.1 Employee absenteeism

In past studies the economic cost of lost output due to absenteeism has been estimated by calculating the number of lost working days due to alcohol and applying an average cost based on average costs per employee, including employers costs such as national insurance and pension contributions (Balance, 2010).

The Cabinet Office (2003) estimated that, in 2001, across the whole UK workforce over 176 million working days were lost as a result of absenteeism. Based on an analysis of the prevalence of drinking behaviour it was estimated that between 6% and 15% of this figure can be attributed to alcohol.

The Cabinet Office analysis accounts for part-time and full-time employment rates and assumes that rates of absenteeism were the same among full and part-time employees. A lower estimate, based on estimated absenteeism of alcohol dependent employees, found that in 2001 nearly 11 million days were lost in England due to alcohol-misuse, resulting in an economic cost of £1.21 billion. An upper estimate was also calculated, taking into consideration that absenteeism due to alcohol-misuse also occurs among non-dependent drinkers, and found that in 2001 17.28 million days were lost in England due to alcohol-misuse, resulting in an economic cost of £1.79 billion. The mid-point of these estimates is £1.50 billion.

A local study by Balance (2010) (the North East England alcohol office), based on the above analysis, calculated, for 2008-09, the cost of alcohol-related employee absenteeism in County Durham and Darlington was between £19.08 million and £27.34 million (Balance, 2010). The mid-point of these estimates is £23.21 million.

Estimates of activity and cost by prevalence of drinking behaviours are based on the assumption that the increasing average consumption of alcohol is directly linked to increasing levels of absenteeism; and increased frequency of drinking leads to increased frequency of absenteeism. Research has shown that higher average alcohol consumption over time increases the risk of the development of chronic conditions and the direct association between the presence and severity of chronic conditions and levels of absenteeism, supports this assumption (Gmel and Rehm, 2003) (Jones et al., 1995). Further to this, research shows that individuals suffer from cognitive impairment, such as reduced hazard perception and co-ordination, at a blood alcohol content (BAC) level as low as 0.05%. Cognitive impairment increases the risk of injury-based absences and, thus, frequency of drinking,

even at a moderate level, potentially increases levels of these types of absences (Bacharach et al., 2010).

Although there is evidence to support the above, research has found that the impact of alcohol consumption on employee's absenteeism is more complex than this simple assumption. Alcohol-related chronic conditions, for example, tend to develop over a long period and, therefore, current consumption is not necessarily a good predictor of current health-status and levels of absenteeism. This is perhaps why past evidence regarding the relationship between alcohol and absenteeism is varied. Recent research by Bacharach et al. (2010) argues that an individual's frequency of heavy drinking episodes, are a better predictor of absenteeism and as binge drinking behaviour is not exclusive to dependent and risky drinking this provides further evidence as to the variability of past evidence.

The Cabinet Office analysis recognises that it is not only dependent drinkers who contribute to alcohol-related absenteeism; however, even the upper estimate is based on the prevalence of increasing-risk drinkers. This suggests that present costs underestimate the problem of alcohol-misuse on the workplace. A recommendation for further analysis is the estimate of economic cost based on a combination of drinking behaviours and binge-drinking estimates.

6.2 Unemployment

In a similar analysis to that on employee absenteeism, it was found that nationally heavy male drinkers spend an average of 11.4 days per annum out of employment and that heavy drinkers face a 7% decrease in the probability of employment. Based on this it is estimated that 15.04 million days of employment are lost to alcohol-misuse resulting in an estimated cost of £1.73 billion. Accounting for the lower female participation rates and high rates of part-time employment it was found that female heavy drinkers spend an average of 8.1 days on average per annum out of employment, resulting in an estimated 4.97 days of lost employment at a cost of £428.67 million. This brings the total cost of alcohol-related unemployment to £2.15 billion (Cabinet office, 2003).

The Cabinet Office study presents the cost of alcohol-related male unemployment as a lower estimate and the combined genders cost as the upper estimate. It is unclear from the document as to reasoning behind this, although, it potentially is based on a study by Marmot et al. (1993) which found no clear relationship between women's unemployment and alcohol consumption. Studies have since discussed this relationship and it is, therefore, argued that costs of male and female

alcohol-related unemployment are equally significant and should be presented as a single cost figure. It is thought that an estimate based on drinking behaviour, despite the issue previously described, would be a more accurate and fairer assessment of lower and upper cost estimates.

The prevalence of higher risk drinkers in the North East was used as a locality weighting on both the upper and lower national estimates. This resulted in an estimated annual cost of alcohol-related unemployment in County Durham and Darlington as between £26.42 million and almost £32.97 million with a mid-point of £29.70 million.

Whilst, research has shown a definite link between alcohol and unemployment, an interesting discussion exists regarding the unclear causation of the relationship between the two factors. Heavy alcohol consumption may cause reduced employment as alcohol affects an individual's ability to cope with demanding tasks and increases inactivity, reducing the chances of finding and gaining employment. On the other hand it can also be argued that heavy alcohol consumption is a consequence of unemployment i.e. the increased emotional and financial impact and increased unoccupied time leading to increased alcohol consumption.

The above estimates are, again, subject to the debate of the significance of average consumption/drinking behaviour on unemployment. Based on the above discussion it is assumed that it is the psychological, rather than physical, consequences of alcohol-consumption that have the greatest impact on unemployment. Whilst evidence suggests mental wellbeing is not adversely affected at moderate drinking levels; cognitive functions, which are important in finding and obtaining employment have shown to be affected even at low levels of alcohol consumption, however, more investigation is required to evaluate this theory.

6.2.1 Incapacity benefits

Incapacity Benefits (IB) and other welfare service costs are often excluded from COI studies because, from a societal perspective, they are considered "redistributions" of wealth i.e. the value of taxes paid are approximately equal to the benefits collected. The administration costs of managing the process of redistribution and any distortions to incentives caused by taxes and benefits that reduce efficiency are, however, considered a loss to society. The calculation of the cost of alcohol-attributable benefits cannot be added to total societal costs due to double counting; however, it is a useful analysis for later discussions regarding different perspectives on costs (see chapter 9).

The Department of Work and Pensions (DWP) have recently published analysis of alcohol misusers who access DWP who access DWP benefits (DWP, 2010). In 2008, 42,000 individuals cited “*alcohol use*” as their main reason for claiming IB (DWP, 2010). IB is paid weekly at three different rates based on the length of unemployment. A basic calculation using the average of these three rates, and multiplying this by the 42,000 claimants, finds an annual cost of IB of £181.64 million. This cost does not account for the age of claimants and assume all 42,000 claim for the full 52 weeks. Whilst the details are perhaps approximate, it does provide a guide to the magnitude of annual public expenditure costs. The DWP study also estimates that 159,900 individuals in receipt of DWP benefits are dependent drinkers (DWP, 2010) and thus the above calculation is considered a low estimate of the potential scale of alcohol-attributable benefit expenditure.

In the North East, in 2008, there were 2,830 individuals citing “*alcohol use*” as the main reason for claiming incapacity benefits (DWP, 2010). Breaking this figure down by population estimates (ONS, 2010) it can be estimated that 666 persons in County Durham and Darlington claim incapacity benefits for alcohol misuse resulting in an estimated cost of £2.88 million.

6.3 Workplace efficiency

The impact of alcohol on the individual can lead to varied workplace inefficiencies. It is estimated that around 200,000 British workers turn up to work hung-over from the night before (PruHealth, 2006), although, Drinkaware (2011) estimates this figure to be higher at 520,000. Hangovers are associated with tiredness, poor concentration and lower productivity. Employees under the influence of alcohol are also at increased risk of accidents and injury. An individual’s reduced productivity may be able to be measured if expected output is specifically defined, however, it is impossible to measure the impact of alcohol-misuse on the productivity of a population and, therefore, a cost figure is not provided. This section will, however, discuss the issue to highlight potential further undefined costs.

Economists often believe a strong relationship exists between health and earnings (Cabinet Office, 2003). The discussion of whether, better health leads to better job prospects or if higher income leads to better health is further complicated by the delayed development of chronic conditions as a result of alcohol consumption. In relation to income, interestingly, whilst binge drinkers are at a higher risk of unemployment and on average earn around £7000 less per annum, heavy drinkers often earn more (IAS, 2009). Binge drinking is often associated with young people, lower incomes and fewer chance of career progression. Higher incomes are often associated with longer hours and

higher stress and alcohol is used to cope with these factors, almost certainly influenced by higher earners increased levels of disposable income. Traditionally doctors have always been associated with high alcohol misuse but, it has been suggested, due to increased awareness of the risks and changing cultural factors (e.g. increased Asian and women doctors) this is now less true. Professions with high levels of alcohol misuse include bar staff, publicans, catering professionals, entertainers, hairdressers, butchers and labourers. The least likely to experience alcohol-related issues are women who work with children (IAS, 2009).

The identification of professions with high levels of alcohol misuse highlights an interesting discussion. Costs are assumed to be avoidable in the absence of alcohol, however, the some of professions outlined above would be heavily reduced or even cease to exist in the absence of alcohol. Whilst it is highly unlikely alcohol consumption will diminish overnight it, again, highlights the importance of discussing the benefits of alcohol and the net effect of consumption. If it is assumed the costs are avoided in the absence of alcohol it must also be assumed that individuals' employability and, thus, economic contributions are also uncompromised.

Evidence suggests that moderate alcohol consumption may have positive effects on employee's health such as reduced levels of CHD and reduced tension and stress levels. This in turn may impact morale, performance and improve promotional opportunities. Moderate consumption may also have positive implications regarding networking opportunities and the motivation gained from socialising with work colleagues (Cabinet Office, 2003). Excessive alcohol consumption, however, can have equally negative impacts as outlined above.

The issue of the impact of reduced efficiency will vary between organisations. As mentioned, there is potential to measure the impact of alcohol consumption on workplace efficiency for certain employment, however, these results would not translate to the general working population. It is important that whilst organisations may not be able to monitor the risks of alcohol-misuse they must mitigate against them. No specific legislation exists requiring organisations to implement alcohol policies; however, much is covered by Health and Safety at work legislation and a large number have implemented alcohol policies including British Rail, Royal Bank of Scotland and Marks and Spencer (IAS, 2009).

6.4 Premature mortality

In some circumstances alcohol-misuse can result in death due to, for example, accidents, injuries and chronic conditions. Deaths, like inpatient stays (described later) are coded using the International Classification of Diseases (ICD) codes. The Cabinet Office analysis identifies deaths both specific to alcohol and partially-attributable. Death due to alcoholic fatty liver disease, for example, is considered wholly attributable to alcohol misuse, whereas, death due to colon cancer is partly attributable to alcohol-misuse. The estimated number of alcohol-related deaths forms the basis for the number of potential years of life lost (YLL) due to alcohol misuse. The economic cost of alcohol-related deaths refers to the quantification of the loss of output in the economy i.e. if an individual's death could be prevented until the average UK life expectancy, then society would benefit from the increased economic activity that individual would contribute. The Cabinet Office, for 2001, estimated the cost of premature mortality between 15,316 premature deaths at a cost of £2.25 billion and 21,958 premature deaths at a cost of £2.48 billion. The mid-point of these estimates is £2.37 billion.

The Balance study distributes the national cost down to a local level by the number of alcohol specific deaths in County Durham and Darlington. This resulted in an estimated economic cost of premature deaths, in County Durham and Darlington, of between £35.79 million and £39.41 million. The mid-point of these estimates is £37.60 million. The estimate of alcohol-related deaths is quite accurate due to relatively comprehensive coding and recording of causes of death and the nationally agreed attributable fractions of related conditions.

Based on inpatient analysis (discussed in chapter 7), in England, only around 10% of hospital admissions are due to acute conditions. The majority, 90%, of hospital admissions are for chronic and mental health conditions. Acute conditions are often associated with younger people, for example violence, injury and alcohol poisoning and, therefore, deaths from these conditions are more significant when considering lost economic output as contribute a higher number of YLL. There are protective qualities of alcohol against conditions such as Coronary Heart Disease (CHD), however, this is more relevant to the older generation and, therefore, regarding policies to reduce deaths among younger people, is of less interest (NWPHO, 2008).

The local cost estimate is based on a distribution of costs from the original national study for 2001. Whilst the cost have been inflated to reflect 2008/09 prices, between 2001 and 2009 alcohol-related deaths have also risen by over 24% (ONS, 2011) and, therefore, this could be a significant

underestimate of current costs. A 24% increase on the estimated local cost results in estimated costs of between £44.23 million and £48.70 million with a mid-point of £46.47 million.

6.5 Costs to others

6.5.1 The economic cost of alcohol misuse to family members

Alcohol-misuse has a number of intangible costs often considered to be personal costs, borne by individuals, and unquantifiable, for example, it is estimated that around 1.3 million children are living in households with alcohol problems (Alcohol Concern, 2008). This section discusses and attempts to quantify these economic costs of alcohol misuse that are external to the user of alcohol but fall on the user’s family, however, it is recognised that much more research is needed in this area.

Section 6.2.1 outlined 42,000 individuals claiming incapacity benefits due to “alcohol use” and potentially up to 59,900 people claiming benefits who misuse alcohol. It can be assumed that a significant proportion of these individuals will require support from family with resulting costs associated with providing carer support. A recent report by the UK Drug Policy Commission (UKDPC) (2009), attempts to estimate the costs to carers and the resource savings to public-sector organisations. Whilst the report focused on individuals and carers of those with illegal-drug dependencies, the issues raised are similar and, therefore, estimates of costs will roughly reflect those faced by carers of alcohol-misusers. The costs and resource saving outlined in this report are:

Unit cost per annum per family member of a problem drug user

Type of cost	Costs (£) (2008)
Unit cost per annum per family member of a problem drug-user	
Day to day costs	2,330
Drug incidental costs	1,165
Costs of crime on carer	2,840
Lost carer employment opportunities	2,712
Healthcare costs	450
TOTAL	9,497

Figure 6.1: Unit cost per annum per family member of a problem drug user (UKDPA, 2009)

There is too little evidence to estimate the day-to-day costs for alcohol, and the cost of crime on carers is discussed in the previous section. Healthcare costs are interesting as these should technically be captured in the following sections; however, it is highly unlikely that the impact of a family member's alcohol-misuse on, for example, the mental wellbeing of an individual will be captured as an alcohol-related healthcare incident. It is, therefore, very difficult to estimate and it is recommended that further research is required. This section will, therefore concentrate on drug/alcohol-incident costs and cost of lost carer employment opportunities.

Drug incidental costs refers to the financial support family member contribute, including that which is innocently or unwittingly given, for individuals to obtain. Regarding alcohol, in 2008, average weekly alcohol consumption was 3.5 times less than the minimum consumed by individuals classed as harmful drinkers (Information Centre (IC), 2011). If this is applied to average annual household expenditure on alcohol, for England (of £696.80), it results in a crudely estimated annual cost of £2,448. This is in line with the Scottish estimate of average annual expenditure on alcohol per harmful drinker, of £2,130 (Meier et al., 2009). In the UKDPC study, half of this cost is assumed to be paid for by family members, resulting in a cost of £1,224 per carer, per year.

Clarke (1994) estimated that the average time sacrifice a family member made to care for a drug-user was 226 hours per annum. From the census data, however, it can be estimated that carers spend an average of 19.7 hours per week caring, equating to 1,024.1 hours per annum (Buckner and Yeandle, 2007). The estimate by Clarke is based on a sample of 169 families in which a member had co-occurring mental illness and substance abuse (Clarke and Drake, 1994). It is suggested that if the family members observed in the Clarke study, providing fewer hours per week of care, do not recognise themselves as "carers", this perhaps accounts for the higher estimate found in the census. The Clarke study also only investigates mental healthcare and, therefore, to reflect the wide range of alcohol-related conditions the census data will be used to estimate lost employment opportunities for carers. Average caring hours per annum multiplied by the average UK earnings rate of £12 per hour (April 2008 prices) (ONS, 2009) results in an estimated annual cost of lost employment opportunity, per carer of £12,289. This estimate, however, makes the assumption that without the burden of care activities, individuals would chose employment. In many cases carers may be both employed and undertake care responsibilities and, therefore, may be unlikely to replace care hours with employment hours, like for like.

The 2004 Alcohol Harm Reduction Strategy for England (AHRSE) estimates that about 8 million people are affected, at various levels, by family member's alcohol misuse (Alcohol Concern, 2011). Cost cannot be applied to this estimate due to ambiguous nature of exactly how these individuals are impacted.

Financial concerns and worries regarding the health of family member's alcohol-misuse can often lead to anxiety, worry, depression, helplessness, anger and guilt. As the costs discussed in this section are the burden of individuals they may not carry as much weight as costs borne by society (such as the discussed costs of crime) in the development of policy. This section has discussed some of the 'private costs' of alcohol-misuse and has presented some quantification of the issue. Much more research is needed in this area to understand the burden of alcohol-misuse on families and individuals.

6.5.2 The economic cost of alcohol-related mortality

Many attempts have been made; however, there is no agreed method of putting a monetary value on human life (Cabinet Office, 2003). Past attempts include valuing the lost productive output, outlined in the previous section, and valuing the psychological effects on others (family, friends etc).

The psychological effects of premature death can be estimated by the *"Willingness-To-Pay"* (WTP) approach. An important paper, by Schelling (1968) is *"The Life You Save May Be Your Own"*, which discusses the problem of placing a value on a reduced probability of death. He outlines, in particular, the higher value we place on upon the possibility of saving the lives of identifiable individuals (Colman, 2006), illustrating this with the following example:

"Let a six-year old girl with brown hair need thousands of dollars for an operation that will prolong her life until Christmas, and the post office will be swamped with nickels and dimes to save her. But let it be reported that without sales tax the hospital facilities of Massachusetts will deteriorate and cause a barely perceptible increase in preventable deaths – not many will drop a tear or reach for their chequebooks" (Schelling, 1984)

The WTP approach determines the value of human life by methods such as; asking people the monetary value they would pay to increase good health outcomes or to reduce poor health outcomes; or analysing purchasing choices, for example, we can assume that by purchasing a smoke detector a consumer considers the increased safety to outweigh the cost and vice versa.

Through the WTP approach the Department for Transport estimated the value of the prevention of casualties outlined in Figure 6.2 (Department for Transport, 2007).

Average value of prevention per casualty by severity and element of cost				
2005	£ June 2005			
Injury severity	Lost output	Human costs	Medical and ambulance	TOTAL
Fatal	490,960	936,380	840	1,428,180
Serious	18,920	130,110	11,460	160,480
Slight	2,000	9,530	850	12,370
Average, all casualties	9,580	33,360	1,980	44,920

Figure 6.2: Average value of prevention per casualty by severity and element of cost (DfT, 2007)

There has been much discussion about the cost of human life and this study will not attempt to quantify this cost. The DfT will also not be used as it is felt that there is inefficient evidence and research to support the use of this statistic.

Chapter 7: The economic cost of alcohol-related healthcare (Analysis)

Objectives of chapter seven:

- To present a estimated cost of alcohol-related healthcare in County Durham and Darlington based on past studies and identified improvements

Learning from chapter seven:

- (See summary table below)

Summary of costs:

England, 2008/09	Estimates
Inpatient stays	£820,722,669
Outpatient visits	£198,269,353
GP-consultations	£102,100,000
Practice Nurse (PN) consultations	£9,500,000
Accident and Emergency (A&E) episodes	£401,064,648
Emergency ambulance/paramedic journeys	£299,406,723
Alcohol dependency-prescribed drugs	£2,100,000
Specialist alcohol treatment services	£55,300,000
Other healthcare costs	£54,400,000
TOTAL	£1,942,863,394

County Durham and Darlington, 2008/09	Estimate
Inpatient stays	£16,008,702
Outpatient visits	£2,953,174
GP-consultations	£4,777,049
Practice Nurse (PN) consultations	£504,351
Accident and Emergency (A&E) episodes	£3,330,218
Emergency ambulance/paramedic journeys	£4,101,984
Alcohol dependency-prescribed drugs	£41,439
Specialist alcohol treatment services	£2,982,000
Other healthcare costs	£753,771
TOTAL	£35,452,688

7.1 Introduction

The total cost of alcohol-related healthcare is the sum of the estimated alcohol-related costs for nine healthcare areas. These are:

- The cost of inpatient stays
- The cost of outpatient visits
- The cost of GP-consultations
- The cost of Practice Nurse (PN) consultations
- The cost of Accident and Emergency (A&E) episodes
- The cost of emergency ambulance/paramedic journeys
- The cost of alcohol dependency-prescribed drugs
- The cost of specialist alcohol treatment services
- Other healthcare costs

This chapter considers separately each of the healthcare areas that have resulted in the above cost estimates. The methodologies for each of the nine healthcare areas applied in this dissertation's analysis are based upon three key past studies.

7.2 Summary of past estimates

This chapter begins by introducing the three key studies which the analysis in this dissertation is based upon. The three studies are:

1. Health Improvement Analytical Team (HIAT): *The cost of alcohol harm to the NHS in England - An update to the Cabinet Office (2003) study* (Department of Health, 2008)
2. York Health Economics Consortium (YHEC): *The societal cost of alcohol misuse in Scotland for 2007* (Beale et al., 2009)
3. Balance (North East of England's Alcohol office): *The cost of alcohol to the North East Economy* (Balance, 2010)

7.2.1 Health Improvement Analytical Team (HIAT) (2008)

This study is an update of a previous paper by Cabinet Office (2003) which quantifies the annual cost of alcohol misuse to the NHS in England. The study was published in 2008 and remains the most up-to-date national cost estimate. An important feature of this study is that the methodologies for the nine healthcare areas are compliant with local data restraints i.e. the methodologies can be replicated at a local level using local data; however, few PCTs seem to have exploited this opportunity.

This study presents a substantially higher cost estimate than the 2003 study, between 61% and 95% greater. The study states this increase is due to increased unit costs, increasing numbers of alcohol-related admissions and increasing availability of accurate data allowing for a newer methodology to be applied. The study does make significant logical improvements to the previous methodology and utilises more specific and accurate data, suggesting that this estimate is much closer to the true economic impact of alcohol-misuse for England.

7.2.2 York Health Economics Consortium (YHEC) (2009)

In 2001 the Scottish Executive published a document estimating the economic cost of alcohol misuse in Scotland. This study was subsequently repeated in 2004 and 2008 with new data but with minimal revisions to the original methodology. The research, by the YHEC, was commissioned by the Scottish Government to review the existing literature surrounding costing studies and to provide an updated and robust methodology and estimated cost. The resulting study takes a very considered approach and, compared to the HIAT, presents a more conservative cost estimate.

7.2.3 Balance (2010)

The study by Balance is discussed as it is currently the best attempt at estimating the local economic impact of alcohol misuse for County Durham, Darlington and other North East PCTs. This study does not present a new methodology but follows the HIAT methodology. It is a valuable study as it provides an example of a local application of a national methodology, a guide for potential local data sources and a benchmark for the estimates made in this document, ensuring continuous improvement.

Based on the above studies this chapter now presents the methodologies, results and limitation of each of the nine analysed healthcare cost areas.

7.3 The cost of inpatient stays

The cost of inpatient stays is the first of the nine healthcare areas to be analysed. This section begins by providing background information regarding Alcohol Attributable Fractions (AAFs) and inpatient coding as these areas are key to the calculation of alcohol-attributable inpatient activity and costs. To ensure the best methodology is applied; approaches from, and improvement to the past studies are discussed. The results and limitations of this analysis are then presented.

7.3.1 Key background information for calculating inpatient costs

Most commonly, the cost of inpatient stays is calculated by applying Alcohol-Attributable Fractions (AAFs) to alcohol-related episodes of inpatient care (resulting in an estimate of alcohol-related inpatient stays) and applying a cost to these episodes of care.

To understand this methodology this section present information regarding

- The backgrounds to AAFs used in this analysis
- The method by which inpatients episodes are coded which allows for this type of analysis

7.3.1.1 Alcohol-Attributable Fractions

AAFs refer to the proportion of cases of a condition or injury that would not have occurred in the absence of alcohol (NWPHO, 2008). Alcohol poisoning, for example, has an AAF of 1.00 as all cases can be attributed to alcohol consumption, whereas, drowning has an AAF of 0.34 as only this proportion can be attributed to alcohol consumption.

AAFs are important as they form the basis for many of the significant international studies into the societal costs of alcohol misuse (e.g. Schultz et al., 1990; English et al., 1995; Single et al., 1996). In these studies AAF are applied to hospital episode and mortality data to provide an understanding of the scale of the impact of alcohol misuse, and provide a basis for an economic cost estimates. When applied in this manner the resulting estimated alcohol-attributable admissions and costs present a strong case for preventative action and are particularly valuable to local and national alcohol strategies supporting activities such as prioritisation, resource allocation and the monitoring of outcomes.

In 2008, the North West Public Health Observatory (NWPHO, 2008) published *“Alcohol Attributable Fractions for England”*; providing AAFs for 47 conditions and injuries; 13 alcohol-specific (wholly attributable to alcohol) and 34 partly attributable (see Appendix 7).

- Wholly attributable conditions are those in which alcohol is responsible in all cases i.e. no case would exist in the absence of alcohol
- Partly attributable conditions are those in which alcohol is responsible in some (but not all) cases

The significance of the NWPHO document is that it brings together the relative risks of conditions from a variety of secondary data sources, and then applies the age-specific distribution of alcohol consumption for adults in England, resulting in AAFs reflective of and applicable to the English population. These AAFs are used as standard practice when estimating the cost of alcohol misuse in England and are applied by NWPHO to produce the annual Local Alcohol Profiles for England (LAPE) (NWPHO, 2011). The limitations of the NWPHO analysis include the uncertainty surrounding the quality of the secondary data used to obtain relative risks and drinking behaviours and it is acknowledged within the document that methodologies for calculating confidence intervals must be developed (NWPHO, 2008). The AAFs presented by the NWPHO are recognised as the best ‘England specific’ estimates of the impact of alcohol misuse on health and are, therefore, applied in this dissertation’s methodology.

7.3.1.2 Inpatient coding

The 47 conditions outlined by the NWPFO are identified by ICD (Internationally Classification of Disease) codes. An inpatient stay can be assigned up to 14 diagnosis codes (ICD-10 codes); each code representing a health condition. The first code/condition is referred to as the primary diagnosis i.e. the reason for the admission, whilst codes/conditions in other positions are considered secondary diagnoses i.e. contributing causes. To illustrate:

Example of inpatient coding

Diagnosis	Code	Condition
Primary Diagnosis	F603	Emotionally unstable personality disorder
Secondary Diagnoses	F101	Mental and behavioural disorders due to use of alcohol-harmful use
	J459	Asthma

Figure 7.1: Example of inpatient coding (Tees Esk and Wear Valley NHS Foundation Trust, 2010)

In this example the reason for admission to hospital is the patient threatening suicide which is coded as “F603: Emotionally unstable personality disorder”. Heavy alcohol consumption contributed to this admission which is coded as “F101: Mental and behavioural disorders due to use of alcohol-harmful use”. The patient is also taking medication for asthma (“J459: Asthma”); a co-morbidity that should always be recorded.

There are 47 codes (or groups of codes) that are considered alcohol-related with varying AAFs (see Appendix 7). An inpatient stay can contain any number of alcohol-related codes and these codes can appear in any diagnosis position. Past methodologies have attributed the cost of an inpatient stay with multiple alcohol-related codes by the code with the highest AAF.

7.3.2 Past methodologies and improvements

Two key improvements will be made here compared to past studies:

- The use of local data
- The provision of upper and lower cost estimates

These are discussed below.

7.3.2.1 The use of local data

All three past studies apply AAF to alcohol-related inpatient episodes to calculate the number of alcohol-attributable inpatient stays. The methodologies applied to calculate the costs of these episodes, however, vary between each.

Every inpatient episode is assigned a HRG (Healthcare Resource Group) code based upon information about the particular episode of care including; diagnosis codes, procedure codes, information about the admissions and information about the patient. The HRG code indicates the price that is paid for that episode of care i.e. the tariff. The HIAT methodology applies the AAFs to the HRG codes of alcohol-related inpatient episodes resulting in an alcohol-attributable cost. To illustrate, using a hypothetical example:

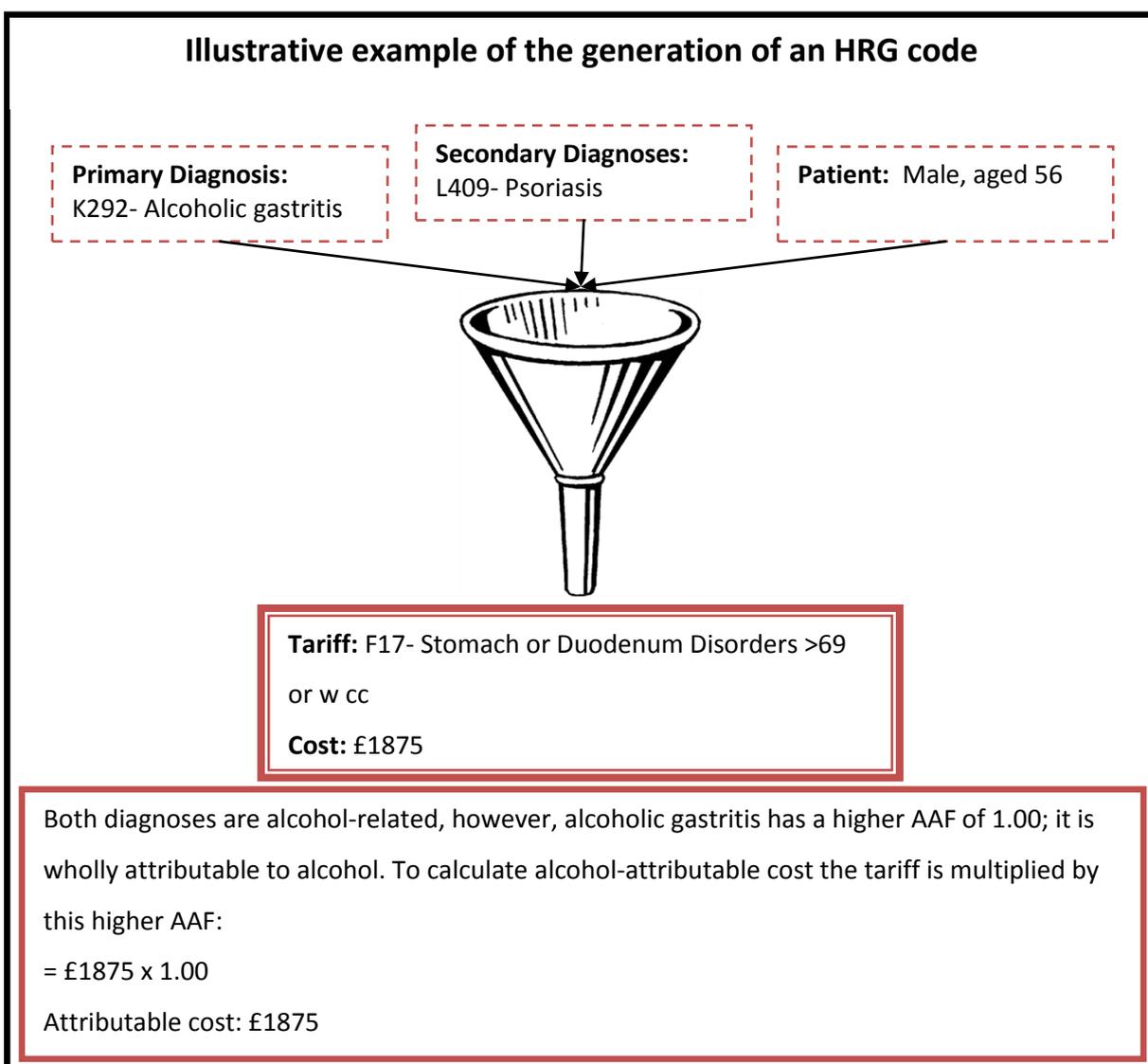


Figure 7.2: Illustrative example of the generation of an HRG code

In comparison the YHEC study estimates cost based on the length of inpatient episodes, measured in 'bed days'. The YHEC methodology applies the AAFs to the number of bed days of alcohol-related inpatient episodes. The alcohol-attributable bed days of these episodes are totalled and an average cost per bed day is applied. The length of stay can indicate of the cost of an inpatient episode i.e. the more complex the care received, the greater the length of stay and the higher the cost, however, the costs associated with healthcare are based on a complex set of factors (indicated above) and, therefore, estimates based on length of stay only can result in costs which differ greatly from the actual price/tariff.

Finally, the Balance study applies an average cost to episodes by type of admission. The NWPHO groups the 47 alcohol-related conditions into 10 groups. The Balance methodology has acquired average costs for each the 10 condition groups and applies these average costs to the number of alcohol-attributable admissions in each group. Once again, the limitation of this methodology is the application of average costs which, as discussed, can differ greatly from actual costs. Further to this, the application of average national costs lacks the local variations in costs, discussed below.

Whilst the HIAT methodology offers the most accurate approach to estimating the costs of inpatient stays, the application of the national tariff associated with the HRG codes has limitations. The national tariffs represent the average costs of specified episodes of care; however, naturally, variations exist between healthcare providers. Overhead costs for providers in the North East, for example, are generally less compared to providers in London and in some instances this lower cost is reflected in the price/tariff. Local costs may also vary as commissioners negotiate local tariff for certain services. A key improvement to past methodologies is the use of PCT data which outlines actual costs of episodes i.e. what the PCT has paid to healthcare providers, to which AAF are applied.

A further benefit of the application of local data is the opportunity to break down costs by, for example, the two PCT areas (County Durham and Darlington), by district and even by GP practice. This is particular benefit considering the proposed large scale structural changes to move towards GP led commissioning. At a GP practice level costs can be built up to represent any configuration of organisation they may arise.

7.3.2.2 The provision of upper and lower cost estimates

The HIAT and Balance study provide a single cost figure, whereas, the YHEC study provides four cost figures:

- Wholly-attributable condition in a primary diagnosis position
- All alcohol-related conditions in a primary diagnosis position
- Wholly-attributable condition in any diagnosis position
- All alcohol-related conditions in any diagnosis position

Secondary diagnosis codes/conditions are considered to have contributed to the hospital admission; therefore, disregarding these diagnoses may underestimate the extent of the issue. However, attributing the cost of an episode to alcohol misuse when the alcohol-related diagnosis is not considered the primary diagnosis may lead to an overestimate of cost (YHEC, 2010). The methodology used in the HIAT estimate does not account for this and presents a single upper cost estimate based on all alcohol-attributable costs from diagnosis codes in any position. A key improvement, to past English studies, using the more considered YHEC study as an example, is the provision of lower and upper cost estimates based on primary diagnosis analysis and all diagnosis analysis, respectively (YHEC, 2010).

7.3.3 Methodology and results

7.3.3.1 The lower estimate

To calculate the lower estimate, data regarding inpatient stays with alcohol-related primary diagnoses was obtained from NHS County Durham and Darlington executive information system, MIDAS. The data used is non-identifiable, however, it provides key information including the age and gender of the patient, their GP practice and cost of the episode. For each episode the appropriate fraction was applied providing estimates of alcohol-related admissions and cost.

- There are an estimated 790 hospital admissions in 2008/9 with a primary diagnosis wholly attributable to alcohol, resulting in a cost of £1.48 million
- There are an estimated 1,851 hospital admissions with a primary diagnosis partly attributable to alcohol, resulting in a cost of £2.59 million
- **Overall, this results in an estimated 2,641 alcohol-attributable admission at a cost of £4.07 million**

Figures 7.3 and 7.4 present the result of this analysis by wholly and partly attributable conditions (detailed tables regarding admissions and costs by primary diagnosis code can be found in Appendix 8 and 9.)

Number and cost of hospital episodes wholly attributable to alcohol misuse

2008/09

(by primary diagnosis only)

ICD-10 Code	ICD-10 Name	Attributable Admissions	Attributable Cost
K70	Alcoholic liver disease	238	£771,891
F10	Mental and behavioural disorders due to the use of alcohol	463	£581,405
K86.0	Chronic pancreatitis (alcohol induced)	42	£76,015
K29.2	Alcoholic gastritis	30	£34,485
I42.6	Alcoholic cardiomyopathy	*	£7,138
T51.0	Ethanol poisoning	10	£4,918
G62.1	Alcoholic polyneuropathy	*	£2,355
T51.9	Toxic effect of alcohol, unspecified	*	£398
TOTAL		790	£1,478,604

*denotes a figure less than 5

Figure 7.3: Number and costs of hospital episodes wholly attributable to alcohol misuse 2008/09 (by primary diagnosis only)

Number and cost of hospital episodes partly attributable to alcohol misuse

2008/09

(by primary diagnosis only)

ICD-10 Code	ICD-10 Name	Attributable Admissions	Attributable Cost
I47-I48	Cardiac arrhythmias	405.9	£604,789
L40 ¹	Psoriasis	189.8	£246,495
G40-G41	Epilepsy and Status epilepticus	197.4	£226,224
K85, K86.1	Acute and chronic pancreatitis	84.8	£201,571
C50	Malignant neoplasm of breast	251.6	£185,190
²	Haemorrhagic stroke	44.7	£179,631
C00-C14	Malignant neoplasm of lip, oral cavity and pharynx	121.0	£177,480
C15	Malignant neoplasm of oesophagus	102.5	£121,423
K73, K74	Chronic hepatitis, not elsewhere classified and Fibrosis and cirrhosis of liver	50.3	£119,037
I10-I15	Hypertensive diseases	68.2	£106,119
³	Ischaemic stroke	25.9	£93,983
C18	Malignant neoplasm of colon	57.2	£61,633
C20	Malignant neoplasm of rectum	45.7	£60,149
O03	Spontaneous abortion	109.7	£59,186
I85	Oesophageal varices	43.6	£51,883
C32	Malignant neoplasm of larynx	14.9	£37,748
C22	Malignant neoplasm of liver and intrahepatic bile ducts	12.4	£34,395
K22.6	Gastro-oesophageal laceration-haemorrhage syndrome	24.4	£24,476
I47-I48	Cardiac arrhythmias	405.91	£604,789
⁴	Intentional self-harm/Event of undetermined intent	*	£0.00
TOTAL		1850.9	£2,591,411

¹ excluding cirrhosis L40.5, ² I60-I62, I69.0-I69.2, ³ I63-I66, I69.3, I69.4, ⁴ X60-X84, Y10-Y33

*denotes a figure less than 5

Figure 7.4: Number and costs of hospital episodes partly attributable to alcohol misuse 2008/09 (by primary diagnosis only)

7.3.3.2 The upper estimate

The NWPHO groups the alcohol-attributable diagnosis codes into 10 disease groups and provides admissions data for each group. These groups are as follows:

- Alcohol specific (Mental and Behavioural)
- Alcohol specific (Acute)
- Accidents & Injury (Acute)
- Violence (Acute)
- Alcohol specific (Chronic)
- Digestive (Chronic)
- Cancer (Chronic)
- Hypertensive diseases (Chronic)
- Cardiac arrhythmias (Chronic)
- Other diseases (Chronic)

This admission data is based on all inpatient stays with an alcohol-attributable diagnosis code in any position. Details of the diagnosis code included in each disease group can be found in Appendix 10.

Past studies of local costs of alcohol misuse have applied average national costs to the NWPHO admission data to calculate total inpatient cost. To improve upon this methodology the average local costs of the 10 condition groups have been calculated based upon the primary diagnosis analysis outlined above. The primary diagnosis analysis provides sufficient data to estimate local averages costs for 5 of the 10 conditions categories, these are:

- Alcohol specific (Mental and Behavioural)
- Alcohol specific (Chronic)
- Cancer (Chronic)
- Cardiac arrhythmias (Chronic)
- Other diseases (Chronic)

Local average cost were applied (where applicable) to the NWPPO admissions data. The results are as follows:

- **There are an estimated 3,975 admissions with an alcohol-related diagnosis in any position wholly attributable to alcohol resulting in a cost of £5.74 million**
- **There are an estimated 11,538 admissions with an alcohol-related diagnosis in any position partly attributable to alcohol resulting in a cost of £22.20 million**
- **Overall this results in an estimated 15,513 alcohol-related admissions at a cost of £27.95 million**
- **The mid-point of the costs estimates is £16.01 million**

7.3.4 Limitations

The analysis has been limited to using estimated cost averages to calculate the upper cost estimate. These averages are based on the primary diagnosis analysis and, therefore, do not truly represent the costs of admissions with codes/conditions in a secondary diagnosis position. The use of highly aggregated data also prevents more detailed analysis regarding, for example high spend areas by condition, age and gender. Whilst the analysis has been benchmarked against other studies for accuracy, ideally, an analysis of all diagnoses in any position would have been undertaken.

Another limitation has been the quality of the data used in the primary diagnosis analysis in which 5% of the data did not specify a cost. For admissions without a specified cost, a national tariff was applied based on the HRG code attached to the admission. The national tariff does not reflect local variation and, therefore, may distort the total cost figure, although the difference will be insignificant.

7.4 The cost of outpatient visits

Unlike inpatient stays, only a small number of outpatient visits are coded, meaning the methodology used to calculate inpatient costs cannot be replicated. Past studies present two logical methodologies which will be calculated to produce upper and lower cost estimates. The improvements, methodologies, results and limitations of each are presented below.

7.4.1 Past methodologies and improvements

The two key improvements to past methodologies are:

- The provision of upper and lower cost estimates based on the methodologies from two national studies
- Updated and gender specific estimates of drinking behaviours for County Durham and Darlington

The Birmingham Untreated Heavy Drinkers project recruited 500 untreated heavy drinkers in 1997, and has tracked them (through interviews, questionnaires etc) to a final 'Wave Four report' (Dalton et al., 2004). The 2004 report discusses the heavy drinker's use of hospital-based services, including outpatient attendance finding that the group are twice as likely to use outpatient (and A&E) services. The HIAT methodology doubles the average annual use of outpatient services for men and women to represent heavy drinker's use of outpatient services. The excess (compared to average use) was considered to be alcohol-attributable. The excess use was multiplied by estimates of male and female heavy drinkers and summed resulting in an estimate of alcohol-attributable outpatient visits. To calculate cost, a national average cost of an adult outpatient appointment was applied.

This methodology may underestimate the impact of alcohol misuse on outpatient services due to the assumption that only heavy drinkers create alcohol-attributable attendances. In England heavy or higher-risk drinkers are defined as those drinking on average over 50 units a week for men and 35 for women; around 5-8% of the population. There are, however, a further 20% of the population classed as "increasing risk" that are at an increased risk of hospital admissions. Even at lower levels individuals are still at risk of alcohol-attributable hospital use, for example, as a result of a binge drinking.

A second concern of this methodology is the calculation of alcohol-attributable outpatient use. Average outpatient use of the general population is influenced by a number of factors and varies by locality. Basing heavy drinker's outpatient use on the general population's outpatient use is, therefore, not a particularly robust methodology and is a particularly an issue at a local level due to local variations. By following both this methodology and the YHEC methodology it is hoped that a more accurate mid-point estimate can be obtained.

The same issues of outpatient coding exist in Scotland. The YHEC methodology, therefore, estimates alcohol-attributable outpatient visits by calculating the percentage of inpatient stays attributable to

alcohol (based on the inpatient analysis) and applying this to total outpatient visits, as it is assumed outpatient activity will follow a similar pattern to inpatient activity. As with the HIAT methodology an average cost per visit is then applied.

The Balance methodology follows the HIAT methodology of heavy drinker’s excess usage. This methodology is limited to using national average outpatient data and an improvement to this will be the application of local outpatient data. The second improvement will be an estimate of higher-risk drinker’s by gender. This is an important improvement as male and female use of outpatient services varies greatly.

7.4.2 Methodology and results

7.4.2.1 Estimate by the HIAT methodology

Average outpatient visits by gender are calculated by dividing total male and female outpatient appointment by total male and female population estimates (see limitations). This results in an average of 1.08 attendances for men and 1.41 attendances for women. If heavy drinker use these services twice as much (i.e. 2.16 and 2.82 attendance for males and females, respectively) the excess 1.08 and 1.41 attendances can be assumed to be attributable to alcohol.

The most recent data regarding local drinking behaviour is a synthetic estimate from 2005 and is not gender specific. The first improvement was to update this estimate, to 2008 values, based on national trends, followed by an estimate of drinking behaviour by gender based on national distribution, adjusted to reflect the local gender ratio. Figure 7.5 provides estimates of drinking behaviour in County Durham and Darlington for 2008 (Appendix 12 provides figure for County Durham and Darlington independently).

Estimated drinking behaviours for County Durham and Darlington, for 2008

	Safe level	Increasing Risk	Higher Risk
Male	166,086	56,358	18,265
Female	200,102	43,164	13,026
Total	366,188	99,521	31,291

Figure 7.5: Estimated drinking behaviours for County Durham and Darlington, for 2008

From Figure 7.5 the estimated numbers of male and female higher risk drinkers in County Durham and Darlington are 18,265 and 13,026 respectively. Applying the excess usage figures from above results in an estimated 36,128.6 outpatient visits attributable to alcohol.

PSSRU (2007) cites a national average cost of £85.00 for an adult outpatient visit, this is based on 2006/07 prices. The Balance study inflates this figure to a 2008/09 price of £89.66 per visit.

- **In 2008/09 there were an estimated 38,035 excess outpatient visits attributable to alcohol at a cost of £3.41 million, using the HIAT methodology**

7.4.2.2 Limitations of the application of the HIAT methodology

MIDAS, the PCT's executive information system, provides a total population figure for County Durham and Darlington based on GP list size. The difference between the GP list size and the estimated total population from the Office for National Statistics (ONS) is 31,937 patients, a 5% variance.

GP practice lists are often inaccurate as patients register at new practices and do not de-register from their former practice. At a national level total GP registered patients and estimated residential populations have consistently varied by around 5% (IC, 2010) and, therefore, this analysis will use ONS population estimates for accuracy. ONS population estimates are also used in the national studies allowing the results to be comparable and can be applied to all analyses throughout this report.

7.4.2.3 Estimate by the YEHC methodology

From the inpatient analysis and total inpatient admissions (HES Online) it is estimated that between 1.27% and 7.46% of inpatient stays can be attributed to alcohol, based on primary diagnosis and all diagnosis analysis respectively. These percentages were applied to total outpatient visits and the average cost used in the HIAT methodology was applied. The results of this analysis are as follows:

- **Based on 1.27% of total outpatient visits, in 2008/09 there were an estimated 9,583 alcohol-related outpatient visits at a cost of £0.86 million**
- **Based on 7.46% of total outpatient visits, in 2008/09 there were an estimated 56,292 alcohol-related outpatient visits at a cost of £5.05 million**
- **The mid-point of the cost estimates is £2.95 million**

7.4.2.4 Limitations of the application of the YHEC methodology

It is uncertain whether outpatient visits are impacted at the same level as inpatient stays, although, with the lack of outpatient coding it is a logical assumption.

7.5 The cost of GP-consultations

In England, GP consultations are not coded and, therefore, the methodology used to calculate inpatient stays cannot be replicated.

7.5.1 Past methodologies and improvements

The HIAT methodology obtained an estimate, through the authors of the Birmingham Untreated Heavy Drinkers project that between 22% and 35% of heavy drinkers GP visits could be attributed to alcohol. An arithmetic average of these estimates is 28.5%. The average annual number of GP appointments is obtained from the General Lifestyle Survey and is multiplied by the number of heavy drinkers and alcohol-attributable percentage. An average cost per GP appointment is then applied.

This methodology may be an underestimate of the impact alcohol misuse on GP appointments as it, again, focuses on only heavy drinkers. The reliability of the estimate is also questionable due to the anecdotal nature of the evidence of heavy drinker's use of GP services. An interesting observation is that heavy drinker use of outpatient services was seen to be in excess of that of average use, whereas, use of GP services are seen to be in line with the average use from which a proportion is alcohol-attributable.

In Scotland a representative sample of GP practices code their consultations using Read codes. Due to this, a process similar to the inpatient analysis is undertaken in the YHEC study. This methodology is not able to be replicated in this study, as in England no such coding exists. Interestingly although the number of Read codes per consultation is unlimited on average each consultation will contain only one or two codes. The YHEC analysis of GP consultations, therefore, focuses solely on the primary diagnoses of each consultation. Whilst it is considered that this is a more accurate methodology than presented by the HIAT study, it seems to ignore the potential upper limit of alcohol-misuse seen in the inpatient analysis, where the recording of secondary diagnosis codes is common.

The Balance methodology follows the HIAT methodology of heavy drinker's use of GP services. It is, again, improved upon by local estimates of GP service use and estimates of male and female higher risk drinkers.

7.5.2 Methodology and results

7.5.2.1 Estimate by the HIAT methodology

The GLS provides national average annual GP consultations for males and females at four and five consultations respectively. Average GP consultations also vary with age and, therefore, the age distribution of the local population will impact these averages. Using the GLS estimates of average GP consultations by age and gender and the ONS population estimates, adjusted average GP consultations for County Durham and Darlington are calculated at 4.07 and 5.03 for males and females respectively. Applying the average number of male and female GP consultations to the estimated number of male and female higher risk drinkers, results in a total of 139,851 GP consultation, 28.5% of which can be assumed to be attributed to alcohol.

PSSRU (2007) identifies a cost of £34.00 per 11-minute GP consultation session (standard consultation). This cost is for 2005/06 and has been adjusted in the Balance study to a £37.50 per 11-minute consultation for 2008/09.

- **It is estimated that 39,857 GP consultations can be attributed to alcohol at a cost of £1.49 million**

7.5.2.2 Limitations of the application of the HIAT methodology

The GLS presents average GP consultations to the nearest whole consultation limiting the accuracy of the estimate. There is also no data concerning regional variations of GP service use.

7.5.2.3 Estimate by the YHEC methodology

It is reasonable to assume that GP services will be impacted by alcohol misuse at a similar level to other healthcare services. Based on the inpatient analysis between 1.27% and 7.46% of healthcare can be attributed to alcohol misuse. An improvement on past studies will be an estimate of GP consultations attributable to alcohol based on these percentages.

To apply the lower and upper estimates, an estimate of total GP consultations for County Durham and Darlington must be calculated. Using the local average GP consultations, calculated above, and the local population estimates a total of 2,919,357 GP consultations, in 2008/09.

Using the results of the inpatient analysis the upper and lower percentages are applied to the estimate of total GP consultations. The estimated and adjusted cost per consultation (see above) is then applied.

- **Applying the lower estimate of alcohol misuse results in an estimated 37,063 GP consultations attributable to alcohol at a cost of £1.39 million**
- **Applying the upper estimate of alcohol misuse results in an estimated 217,713 GP consultations attributable to alcohol at a cost of £8.16 million**
- **The mid-point of the cost estimates is £4.78 million**

7.5.2.4 Limitations of the application of the YHEC methodology

Regarding the YHEC methodology a significant limitation of the analysis is the lack local GP consultation data. The estimated total GP consultation is based on national averages multiplied by estimated populations, a total GP consultation figure would have been more appropriate for this estimate.

In the outpatient analysis it was highlighted that the estimated PCT's population from National Statistics Online did not match the GP practice's patient list available from MIDAS, County Durham and Darlington's executive information system. As above, this analysis uses ONS population estimates for accuracy. ONS population estimates are also used in the national studies allowing the results to be comparable and can be applied to all analyses throughout this report.

7.6 The cost of Practice Nurse (PN) consultations

7.6.1 Past methodologies and improvements

The cost of PN consultations are calculated by the same methodologies use to calculate GP consultations. The limitations and improvements, therefore, are the same. The HIAT methodology is used in the Balance local estimate is improvement by the application of male and female estimates of risky-drinking behaviour, whilst the YHEC methodology cannot be replicated, however, upper and lower estimates can be provided based on the inpatient methodology.

7.6.2 Methodology and results

7.6.2.1 Estimate by the HIAT methodology

This methodology assumes PN consultations will be impacted at the same rate as GP appointment and, therefore, 28.5% of PN consultations will be attributed to alcohol.

The GLS provides national average annual PN consultations for males and females at two consultations for both genders. Average PN consultations also vary with age and, therefore, the age distribution of the local population will impact these averages. Using the GLS estimates of average PN consultations by age and gender and the ONS population estimates, adjusted average PN consultations for County Durham and Darlington are calculated at 2.08 and 2.04 for males and females respectively. Applying the average number of male and female PN consultations to the estimated number of male and female higher risk drinkers, results in a total of 64,544 PN consultation, 28.5% of which can be assumed to be attributed to alcohol.

PSSRU (2007) identifies a cost of £9 per PN consultation session (standard consultation). This cost is for 2005/06 and has been adjusted in the Balance study to a £9.49 per consultation for 2008/09.

- **It is estimated that 18,395 PN consultations can be attributed to alcohol at a cost of £174,570**

7.6.2.2 Limitations of the application of the HIAT methodology

Assuming PN alcohol-attributable activity is at the same levels as for GPs may be misguided. Anecdotal evidence from a GP in County Durham suggests PNs will have very little activity considered alcohol-specific, for example alcohol treatment, however, will be involved much more in screening and conditions with an underlying cause of alcohol. More robust evidence is needed to understand the part GP and PNs play in managing alcohol misuse and its wider effects.

7.6.2.3 Estimate by the YHEC methodology

To apply the lower and upper estimates, an estimate of total PN consultations for County Durham and Darlington must be calculated. Using the local average PN consultations and the local population estimates, there was an estimated a total of 1,217,938 PN consultations, in 2008/09.

Using the results of the inpatient analysis the upper and lower percentages are applied to the estimate of total PN consultations. The estimated and adjusted cost per consultation (see above) is then applied.

- **Applying the lower estimate of alcohol misuse results in an estimated 15,463 PN consultations attributable to alcohol at a cost of £146,740**
- **Applying the upper estimate of alcohol misuse results in an estimated 90,828 PN consultations attributable to alcohol at a cost of £861,961**
- **The mid-point of the cost estimates is £504,351**

7.6.2.4 Limitations of the application of the YHEC methodology

Basing PN consultations on the inpatient analysis could be considered inappropriate due the differing nature of the services offered i.e. primary vs. secondary care services. However, Due to limited sources of evidence, this is the best methodology currently available.

7.7 The cost of Accident and Emergency (A&E) episodes

7.7.1 Past methodologies and improvements

All three past studies follow the same methodology by which a percentage of total A&E attendances are attributed to alcohol based on a handful of published studies which observed/surveyed A&E use. The HIAT methodology attributes 35% of A&E episodes to alcohol misuse based on a MORI poll of Accident and Emergency staff, asking them what percentage of visits they thought were alcohol-related. The YHEC study presents the available literature regarding alcohol-attributable A&E attendances and presents a mid-point estimate (see Figure 7.6 for a summary of the literature).

The percentage of A&E attendances that are alcohol-related (literature review)

Reference	Percentage of A&E attendances that are alcohol-related
Charalambous, 2002	2%
Durnford et al., 2008	2.9%
Quality Improvement Scotland, 2006	11%
Scottish Government, 2008	25%
Department of Health, 2008	35%
Charalambous, 2002	40%

Figure 7.6: Literature regarding the % of A&E attendances that are alcohol-related (YHEC, 2010)

There are likely to large differences between estimates of alcohol-attributable A&E episode due to a variety of factors. The proximity of the A&E department to town and city centres is often an influential factor on alcohol-related A&E episodes i.e. as the accessibility increases so does the percentage of alcohol-attributable attendances.

7.7.2 Methodology and results

Although the estimates of alcohol-attributable A&E attendances vary greatly it is arguably incorrect to disregard any one study. In County Durham and Darlington, in 2008, there were 162,648 A&E attendances. Using the above percentage estimates and an average cost per attendance of £97.50 the following costs were estimated:

Estimated costs of alcohol-attributable A&E attendances

Reference	% of A&E attendances that are alcohol-attributable	No. of alcohol-attributable A&E attendances	Cost
Charalambous, 2002	2%	3,253	£317,164
Durnford et al., 2008	2.90%	4,717	£459,887
Quality Improvement Scotland, 2006	11%	17,891	£1,744,400
Scottish Government, 2008	25%	40,662	£3,964,545
Department of Health, 2008	35%	56,927	£5,550,363
Charalambous, 2002	40%	65,059	£6,343,272

Figure 7.7: Estimated costs of alcohol-attributable A&E attendances

- Taking a mid-point of the above it is estimated that **34,156 A&E episodes were alcohol-attributable in 2008/09 resulting in a cost of £3.33 million**

7.7.3 Limitations

The methodology of attributing a proportion of A&E attendances to alcohol is logical; there are limitations of the methodologies used in the literature estimating the percentage of A&E alcohol-attributable episodes. Many of these studies are based in one or two localities and do not account for possible variations such as proximity to town and city centres as mentioned above. They can also be considered less robust as the percentage estimates subjective to the staff surveyed or the opinion of the observer within the A&E departments.

In County Durham and Darlington the A&E departments are beginning to ask about alcohol consumption as standard, however, the results of this are not available for this analysis.

7.8 The cost of emergency ambulance/paramedic journeys

7.8.1 Past methodologies and improvements

All three methodologies assume emergency ambulance/paramedic journey will be impacted at the same rate as A&E services and, therefore the above methodology is applied.

7.8.2 Methodology and results

Emergency ambulance/paramedic journey activity is obtained, at a North East Level, for 2008/09 from the NHS information website. PSSRU (2007) estimate a national average cost of £6.70 per minute of an emergency ambulance journey, and £6.80 per minute of a paramedic unit's journey. Both costs take account of equipment / vehicle costs, building costs, salaries / wages and overheads. Taking an arithmetic average of these costs and applying the average journey time of 44.4 minutes yields an average cost of £299.70 per journey in 2006/07 prices. Inflating this to 2008/09 prices results in a cost of £316.13 per ambulance journey. This price is applied to the North East activity and distributed between the localities based on overall PCT expenditure for 2008/09. The estimated total cost of emergency ambulance/paramedic journeys in County Durham and Darlington, for 2008/09, is £19.53 million. The estimated alcohol-attributable percentages are then applied:

Estimated costs of alcohol-attributable ambulance and paramedic journeys

Reference	%of emergency ambulance/paramedic journeys that are alcohol-attributable	Cost
Charalambous, 2002	2%	£390,665
Durnford et al., 2008	2.90%	£566,464
Quality Improvement Scotland, 2006	11%	£2,148,658
Scottish Government, 2008a	25%	£4,883,314
Department of Health, 2008	35%	£6,836,640
Charalambous, 2002	40%	£7,813,303

Figure 7.8: Estimated costs of alcohol-attributable ambulance and paramedic journeys

- **Taking a mid-point of the above it is estimated that alcohol-attributable emergency ambulance/paramedic journeys result in a cost to County Durham and Darlington of £4.10 million**

From NHS County Durham and Darlington's annual accounts for 2008/09 the North East Ambulance Service invoiced the PCT to the sum of £20.85 million.

7.9 The cost of alcohol dependency-prescribed drugs

To obtain a cost for alcohol dependency drugs, the national cost is broken down based on weighting by dependent population and then inflating to 2008/09 prices, resulting in:

- **An estimated economic cost of £41,439 to County Durham and Darlington for 2008/09**

7.10 The cost of specialist alcohol treatment services

The economic cost of specialist alcohol treatment services was obtained directly from the alcohol service lead in the PCT responsible for the contracts. Specialist alcohol treatment services in Durham and Darlington are provided by the Community Alcohol Service (CAS) which is described in detail earlier in chapter 4.

- **The economic cost of specialist alcohol services in County Durham and Darlington is £2.98 million**

7.11 Other healthcare costs

The HIAT methodology considers the following other areas that contributed to the overall costs to the NHS

- Counselling sessions
- Visits from a community psychiatric nurse
- Sessions with a health visitor
- Cost of 'other professionals'

The economic cost for County Durham and Darlington has been obtained by breaking down the national cost based on weighting by higher risk population and then inflating to 2008/09 prices.

- **This results in £753,771 of alcohol-attributable 'other costs' in County Durham and Darlington, for 2008/09**

7.12 Summary of upper and lower cost estimates

Figure 7.9 presents the summary of estimated lower, upper and mid-point costs for the nine healthcare areas for County Durham and Darlington.

Estimated lower, upper and mid-point costs for the nine healthcare areas for County Durham and Darlington

	Estimates		
	Lower est.	Upper est.	Mid-point
Inpatient stays	£4,070,015	£27,947,389	£16,008,702
Outpatient visits	£859,222	£5,047,126	£2,953,174
GP-consultations	£1,389,877	£8,164,221	£4,777,049
Practice Nurse (PN) consultations	£146,740	£861,961	£504,351
Accident and Emergency (A&E) episodes	£317,164	£6,343,272	£3,330,218
Emergency ambulance/paramedic journeys	£390,665	£7,813,303	£4,101,984
Alcohol dependency-prescribed drugs	£41,439	£41,439	£41,439
Specialist alcohol treatment services	£2,982,000	£2,982,000	£2,982,000
Other healthcare costs	£753,771	£753,771	£753,771
TOTAL	£10,950,893	£59,954,482	£35,452,688

Figure 7.9: Estimated lower, upper and mid-point costs for the nine healthcare areas for County Durham and Darlington

The methodologies are applied to England data. Figure 7.10 presents the summary of estimated lower, upper and mid-point costs for the nine healthcare areas for England.

Estimated lower, upper and mid-point costs for the nine healthcare areas for England

	Estimates		
	Lower est.	Upper est.	Mid-point
Inpatient stays	£451,145,339	£1,190,300,000	£820,722,669
Outpatient visits	£80,114,235	£316,424,471	£198,269,353
GP-consultations	£102,100,000	£102,100,000	£102,100,000
Practice Nurse (PN) consultations	£9,500,000	£9,500,000	£9,500,000
Accident and Emergency (A&E) episodes	£38,196,633	£763,932,663	£401,064,648
Emergency ambulance/paramedic journeys	£28,514,926	£570,298,520	£299,406,723
Alcohol dependency-prescribed drugs	£2,100,000	£2,100,000	£2,100,000
Specialist alcohol treatment services	£55,300,000	£55,300,000	£55,300,000
Other healthcare costs	£54,400,000	£54,400,000	£54,400,000
TOTAL	£821,371,133	£3,064,355,654	£1,942,863,394

Figure 7.10: Estimated lower, upper and mid-point costs for the nine healthcare areas for England

Chapter 8: The unavoidable costs of alcohol misuse

Objectives of chapter eight:

- To apply the methodology from Jarl et al. (2010) to estimate the societal avoidable and unavoidable costs of inpatient care due to liver cirrhosis, accounting for the time characteristics of risk decline for County Durham and Darlington and England

Learning from chapter eight:

- In County Durham and Darlington, the estimated costs of alcohol-attributable liver cirrhosis, over a ten year period are £5.07 million for males and £2.19 million for females, however, potentially 65% and 71% of these costs can be avoided, for males and females respectively.
- In England the estimated total costs of alcohol-attributable liver cirrhosis, over a 10 year period are £455.46 million for males and £232.51 million for women, however, it is estimated that, for males and females respectively, potentially, 64% and 69% of these costs can be avoided

8.1 Introduction

The previous chapters estimate the costs of alcohol (COA) consumption. COA studies have an important role in economic evaluations; however they present only part of the picture of alcohol-misuse. COA studies provide an understanding of the implication of past and present alcohol consumption, however, to complete our knowledge efforts must be made to understand future costs.

COA studies are limited to assuming that no costs exist in the absence of alcohol. Individuals are, however, at continued risk of alcohol-related chronic conditions even after a reduction in consumption or abstinence and, thus, costs will remain even in the absence of alcohol due to this prior consumption. It can be noted at this point, that the presented lag structure for liver cirrhosis is, however, *“surprisingly short and that changes in alcohol consumption have an immediate and substantial effect on mortality rates”* (Jarl et al., 2010).

Avoidable cost estimates are a relatively new area of research with three reputable studies identified by Jarl et al. (2010) (Rehm et al., 2008; Collins et al., 2008; and Meier et al., 2008) with their study creating a fourth. Avoidable costs estimate should be of great interest to policy makers as they provide a basis for the prioritisation, evaluation and development of policy interventions (Jarl et al.,

2010). They also provide knowledge for the design of future interventions, identifying areas of research and development “*where potential costs saving are significant*” (Jarl et al., 2010).

The unavoidable costs of alcohol misuse consist of costs relating to existing alcohol-related conditions, the costs of new cases due to prior consumption and costs related to continued (irreducible) consumption (Jarl et al., 2010). It can be argued, however, that there is no such thing as “irreducible” consumption if the correct interventions are implemented and, therefore, to understand the potential cost savings of implementing effective interventions these costs are excluded from this analysis.

As in Jarl et al. (2010) this study will focus on the avoidable and unavoidable costs associated with liver cirrhosis. The ICD-10 codes used are K70- alcoholic liver disease, K73- Chronic hepatitis not elsewhere classified and K74- Fibrosis and cirrhosis of liver.

Previous studies to the avoidable cost studies outlined above have assumed either all alcohol-related costs of chronic conditions cease immediately or follow a linear rate of decline following abstinence. A significant component of the Jarl et al. study is, therefore, the development of a methodology for handling the time characteristic of risk decline following a consumption change with regards to liver cirrhosis. The importance of this development is discussed later in this chapter.

The aim of this analysis is, therefore, to apply the methodology from Jarl et al. (2010) to estimate the societal avoidable and unavoidable costs of inpatient care due to liver cirrhosis, accounting for the time characteristics of risk decline for County Durham and Darlington and England.

8.2 Methodology

This dissertation is based on a hypothetical situation in which alcohol consumption ceases overnight, which excludes “irreducible” costs, to identify only costs associated with prior consumption. It assumes that the age and gender characteristics of the population and the distribution of alcohol consumption are constant over the ten year period. Unlike Jarl et al. (2010) this study only focuses on the adult population (those 16-years-old and over) of locations analysed.

There is no identified research at an individual level regarding how the risk of liver cirrhosis changes over time and therefore, the lag structure used in Jarl et al., and in this study, is based on aggregated time series analysis (see Figure 8.1). Due to this, a limitation of the analysis is the lack of age and

gender specific lag structures which would almost certainly have a significant effect on the final cost estimates.

Weights of the lag structure

Year	Weight	Proportion per lag	Cumulative proportion
0	1.00	0.33	0.33
1	0.59	0.19	0.52
2	0.37	0.12	0.64
3	0.26	0.08	0.72
4	0.20	0.06	0.79
5	0.16	0.05	0.84
6	0.14	0.05	0.89
7	0.13	0.04	0.93
8	0.12	0.04	0.97
9	0.11	0.03	1.00

Figure 8.1: Weights of the lag structure (Jarl et al., 2010)

Relative Risks (RRs) for codes K73 and K74 by current drinking behaviour are obtained from the NWPHO (NWPHO, 2008) (see Appendix 14). The RRs are the same for males and females. The above lag structure is applied to these RRs, resulting in the following table (Figure 8.2) which outlines the RRs of liver cirrhosis for men and women following abstention with a 10 year lag period.

The Relative Risks of liver cirrhosis following abstinence with a 10 year lag period

Year	Abstinence*	Safe*	Increasing risk*	Hazardous*	Harmful*
-1	1.00	1.95	2.90	7.13	26.53
0	1.00	1.64	2.27	5.11	18.11
1	1.00	1.46	1.91	3.94	13.25
2	1.00	1.34	1.68	3.21	10.19
3	1.00	1.27	1.53	2.72	8.15
4	1.00	1.20	1.40	2.29	6.36
5	1.00	1.15	1.30	1.98	5.08
6	1.00	1.10	1.21	1.67	3.81
7	1.00	1.07	1.13	1.43	2.79
8	1.00	1.03	1.06	1.18	1.77
9	1.00	1.00	1.00	1.00	1.00

Figure 8.2: The Relative Risks of liver cirrhosis following abstinence with a 10 year lag period

*Abstinence- 0g/day, Safe- 1 to 19g/day, Increasing risk- 20 to 39 g/day, Hazardous- 40 to 74 g/day and Harmful- 75 or more g/day

‘Year -1’ refers to the current situation with ‘year 0’ representing the immediate effect of abstinence. From the above tables it is observed that the short-term effect of abstinence is stronger than the longer-term effect, however, it is shorter lived. To illustrate, 33% of the total reduction in the risk of liver cirrhosis is seen in year 0 with only 3% occurring in year 9.

The prevalence of the drinking behaviours is also obtained from NWPHO (see Appendix 13) and based on this and the above data Alcohol Attributable Fractions (AAFs) are calculated using the formula outlined in Figure 8.3. A worked example, for 16 to 24-year-old males, can be found in Appendix 15.

Formula used for the calculation of alcohol-attributable fractions*

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

* Where AAF is “Alcohol Attributable Fraction”, i is the drinking categories (see Appendix 13), P is the prevalence rate and RR is the relative risk of the i :th category

Figure 8.3: Formula used for the calculation of alcohol-attributable fractions (Jarl et al., 2010)

The AAFs are based on national drinking prevalence’s, as outlined in by NWPFO (2008). National drinking prevalence’s are used to enable the resulting AAFs to be applicable to any location in England. Whilst local AAFs could have been calculated, the data is less robust at this level. The resulting AAFs would not be significantly different to those calculated. The full set of AAF can be found in Appendix 16.

AAFs are then applied to the levels of inpatient activity observed in the COA study (chapter 7) (see Appendix 17). As in the Jarl et al. study the total number of liver cirrhosis episodes i.e. the number of episode to which the AAF is applied, is adjusted each year to reflect the year-on-year reduction in the number of alcohol-related episodes, to illustrate:

In County Durham and Darlington, 11 inpatient episodes with a primary diagnosis code of K74 were recorded for males aged 35-44, therefore in ‘year -1’:

Year	AAF	Cases	Alcohol-attributable	Cases avoided
-1	0.74	11	8	0

In ‘year 0’, 11 cases are expected (based on ‘year -1’); however, the AAF is reduced resulting in:

Year	AAF	Cases	Alcohol-attributable	Cases avoided
0	0.66	11	7	1

In ‘year 1’, 10 cases are expected (based on ‘year -1’ minus the avoided case in ‘year 0’). The AAF is reduced again resulting in:

Year	AAF	Cases	Alcohol-attributable	Cases avoided
1	0.58	10	6	2

This methodology is completed up to ‘year 9’ for each gender and age-group, for codes K73 and K74. ICD-10 code K70 refers to alcoholic liver disease and, therefore, AAFs do not apply to this code as it is wholly-attributable to alcohol. In this case the rate of decline resulting from the K73 and K74 analysis will be applied to the number of K70 episodes observed in the COA study (chapter 7).

Applying this rate of decline has been chosen for two significant reasons; the rate of decline from the K73/K74 analysis is reflective of the prior drinking behaviour of the English population, and applying this methodology allows for comparison to results from Jarl et al..

To estimate the avoidable and unavoidable costs for England, AAFs are aggregated (using population estimates) to provide a single set of AAFs for males and a single set of AAFs for females. These are then applied to inpatient data freely available through HES Online (HES, 2011).

8.3 Results

Figures 8.4 and 8.5 present the estimated alcohol-attributable cases of K70, K73 and K74 for men and women in County Durham and Darlington, with a 10 year lag period.

An average cost per case has been applied based on the findings from the COA study (chapter 7) and, to ensure accuracy, has been benchmarked against the national cost estimates for these types of episodes (“Digestive (chronic)” and “Alcohol specific (chronic)”). A discount rate of 3.5% is applied as recommended by HM Treasury.

An estimated total cost for inpatient care of alcohol-attributable liver cirrhosis for the 10 year period can be calculated by adding the avoidable and unavoidable costs from ‘year 0’ onwards. This results in estimated costs of £5.07 million for males and £2.19 million for females. Over the 10 year period it is estimated that, potentially 65% and 71% of these costs could be avoided, for males and females respectively.

Avoidable liver-cirrhosis cases and costs, males (County Durham and Darlington)

Year	Alcohol-attributable	Cases avoided	Cost	Cost avoided	Cost: Discounted	Avoided cost: discounted
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-1	185	0	£589,570	£0	£589,570	£0
0	164	21	£522,095	£67,475	£522,095	£67,475
1	132	53	£421,434	£168,136	£407,183	£162,450
2	100	85	£319,408	£270,162	£298,171	£252,199
3	74	111	£235,042	£354,528	£211,994	£319,764
4	52	133	£166,666	£422,904	£145,240	£368,536
5	37	148	£117,782	£471,788	£99,169	£397,233
6	24	160	£77,933	£511,637	£63,398	£416,217
7	15	170	£47,585	£541,985	£37,402	£425,995
8	6	178	£20,122	£569,448	£15,281	£432,445
9	0	185	£0	£589,570	£0	£432,586
Tot.	605	1,243	£1,928,066	£3,967,632	£1,799,932	£3,274,900

Figure 8.4: Avoidable and unavoidable liver-cirrhosis cases and costs, males (County Durham and Darlington)

Avoidable liver-cirrhosis cases and costs, females (County Durham and Darlington)

Year	Alcohol-attributable	Cases avoided	Cost	Cost avoided	Cost-Discounted	Avoided cost-discounted
-1	103	0	£254,985	£0	£254,985	£0
0	84	19	£207,631	£47,354	£175,832	£79,153
1	62	41	£153,245	£101,740	£148,063	£98,299
2	45	59	£110,314	£144,672	£102,979	£135,052
3	33	71	£81,222	£173,763	£73,258	£156,724
4	24	79	£59,129	£195,856	£51,528	£170,677
5	18	86	£43,752	£211,233	£36,838	£177,852
6	12	91	£29,872	£225,113	£24,301	£183,129
7	8	96	£18,776	£236,209	£14,758	£185,658
8	3	100	£8,034	£246,952	£6,101	£187,538
9	0	103	£0	£254,985	£0	£187,091
Tot.	289	746	£711,976	£1,837,876	£633,658	£1,561,175

Figure 8.5: Avoidable and unavoidable liver-cirrhosis cases and costs, females (County Durham and Darlington)

Figures 8.6 and 8.7 present the estimated alcohol-attributable cases of K70, K73 and K74 for men and women in England, with a 10 year lag period.

An average cost per case has been applied based on the national cost estimates for these types of episodes (*“Digestive (chronic)”* and *“Alcohol specific (chronic)”*, see chapter 7). A discount rate of 3.5% is applied as recommended by HM Treasury.

The estimated total costs for inpatient care of alcohol-attributable liver cirrhosis for the 10 year period (avoidable and unavoidable costs) are £455.46 million for males and £232.51 million for females. Over the 10 year period it is estimated that, for males and females respectively, potentially, 64% and 69% of these costs can be avoided.

Avoidable liver-cirrhosis cases and costs, males (England)

Y	Alcohol-attrib.	Cases avoided	Cost	Cost avoided	Cost-discounted	Cost avoided-discounted
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-1	22,793	0	£52,913,452	£0	£52,913,452	£0
0	20,322	2,470	£47,178,411	£5,735,041	£47,178,411	£5,735,041
1	16,534	6,259	£38,382,751	£14,530,700	£37,084,784	£14,039,324
2	12,602	10,190	£29,256,375	£23,657,077	£27,311,139	£22,084,134
3	9,299	13,494	£21,586,929	£31,326,523	£19,470,173	£28,254,729
4	6,606	16,187	£15,336,149	£37,577,303	£13,364,568	£32,746,448
5	4,675	18,118	£10,853,062	£42,060,390	£9,137,987	£35,413,720
6	3,104	19,689	£7,204,805	£45,708,647	£5,861,113	£37,184,014
7	1,902	20,891	£4,414,478	£48,498,974	£3,469,740	£38,119,755
8	808	21,985	£1,875,611	£51,037,840	£1,424,361	£38,758,726
9	0	22,793	£0	£52,913,452	£0	£38,824,238
T*	75,851	15,2076	£176,088,570	£353,045,946	£164,302,275	£291,160,129

Figure 8.6: Avoidable and unavoidable liver-cirrhosis cases and costs for males, 10 years (England)

Avoidable liver-cirrhosis cases and costs, females (England)

Y	Alcohol-attrib.	Cases avoided	Cost	Cost avoided	Cost-discounted	Cost avoided-discounted
-1	11,733	0	£27,012,042	£0	£27,012,042	£0
0	9,715	2,018	£22,366,508	£4,645,534	£22,366,508	£4,645,534
1	7,281	4,452	£16,762,062	£10,249,980	£16,195,229	£9,903,362
2	5,285	6,448	£12,167,516	£14,844,526	£11,358,507	£13,857,523
3	3,902	7,831	£8,982,512	£18,029,530	£8,101,711	£16,261,603
4	2,847	8,885	£6,555,485	£20,456,557	£5,712,726	£17,826,708
5	2,109	9,623	£4,856,617	£22,155,425	£4,089,141	£18,654,274
6	1,445	10,287	£3,327,479	£23,684,563	£2,706,906	£19,267,407
7	911	10,822	£2,096,780	£24,915,262	£1,648,050	£19,583,171
8	391	11,341	£900,729	£26,111,313	£684,024	£19,829,233
9	0	11,733	£0	£27,012,042	£0	£19,819,572
T*	33,886	83,441	£78,015,687	£192,104,731	£72,862,802	£159,648,386

Figure 8.7: Avoidable and unavoidable liver-cirrhosis cases for females, 10 years (England)

8.4 Discussion

The costs of K70 inpatient activity account for 94% and 86% of the estimated total costs of liver cirrhosis over the 10 year period for males and females respectively. Unlike Jarl et al. this analysis

has not applied AAFs to K70 activity as this code represents a condition wholly attributable to alcohol. It is, therefore, unsurprising that a large proportion of total costs are due to K70 activity.

The rate of decline applied to K70 activity is of significant importance considering these high costs. Two methodologies were considered; applying the rate of decline from the K73/K74 analysis or applying the lag structure (Figure 8.1) directly. The total costs for males and females (in County Durham and Darlington and England) of liver cirrhosis over the 10 year period are the same when applying either approach, however, the proportions of these costs which are avoidable/unavoidable differ greatly. Applying the lag structure directly to K70 activity results in 74% of the total costs, for males and females, potentially avoidable; a much greater proportion than results presented in this dissertation. In the absence of the K73/K74 analysis the application of the lag-structure would be a reasonable approach, however, this method does not account for the prior drinking behaviour of the English population and, therefore, the chosen approach is the application of the K73/K74 analysis' rate of decline.

Figure 8.8 presents the proportions of total costs which are considered avoidable from the Jarl et al. study and from this dissertation.

Comparison of proportions of total costs which are considered avoidable

	Sweden (Jarl et al., 2010)	County Durham and Darlington (dissertation)	England (dissertation)
Males	71%	65%	64%
Females	72%	71%	69%

Figure 8.8: Proportions of total costs which are considered avoidable from the Jarl et al. study and from this dissertation

The estimated proportions of avoidable costs found in this dissertation's analysis are lower than the proportions observed in Jarl et al., particularly for males. The three key reasons for this difference are the RRs applied in this dissertation (taken from the NWPHO), the greater proportion of the population falling into higher consuming drinking categories and, to some extent, the higher discount rate applied.

The drinking categories used by Jarl et al. (2010) and those presented by the NWPHO (2008) are roughly comparable, however, the NWPHO presents an extra category of "increasing" (risk) drinking

behaviour, and the RR for “harmful” drinking behaviour is significantly higher than the RR applied the Jarl et al. study. To illustrate, the size of the “bubbles” presented in Figure 8.9 is in proportion to the RRs of liver cirrhosis for each drinking category applied in the two studies.

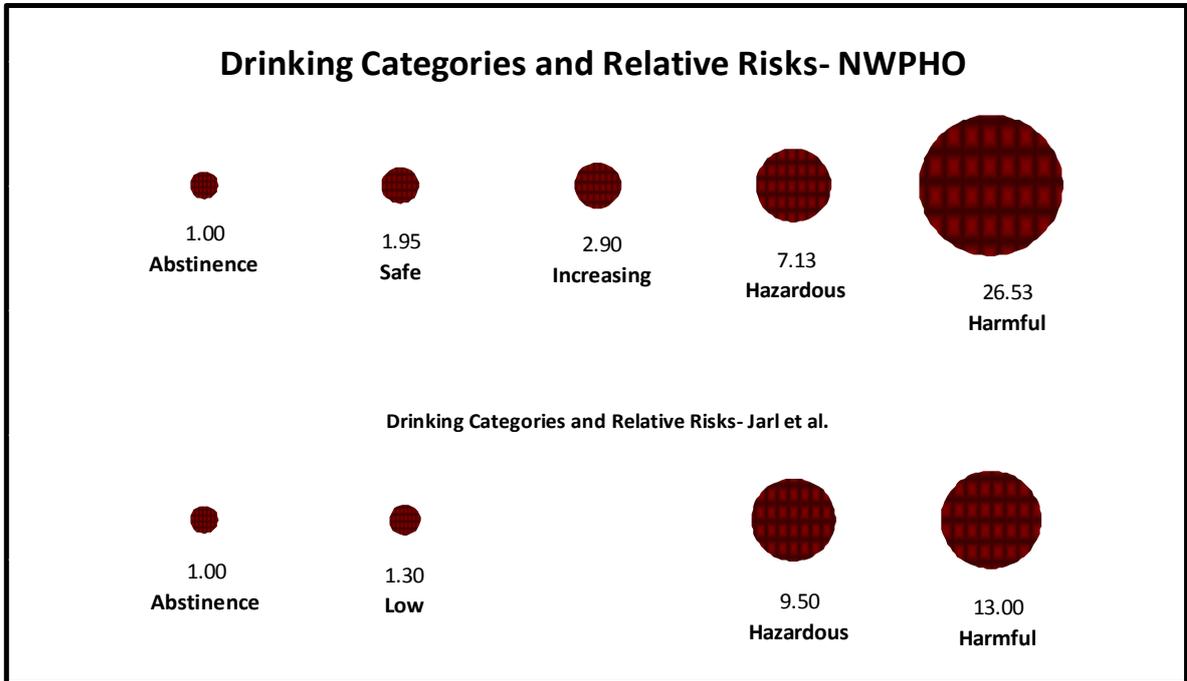


Figure 8.9: Comparable drinking categories from Jarl et al. and NPHO

The RRs have a direct effect on the resulting rates of decline and, thus, the higher RR of “hazardous” drinking behaviour, applied in this dissertation, is of significance. To illustrate, Figure 8.10 presents the rate of decline based on “harmful” prior drinking behaviour, whilst Figure 8.11 presents the rate of decline for “safe” prior drinking behaviour. The area below the line represents unavoidable cases/costs and the area above the line represents avoidable cases/costs.

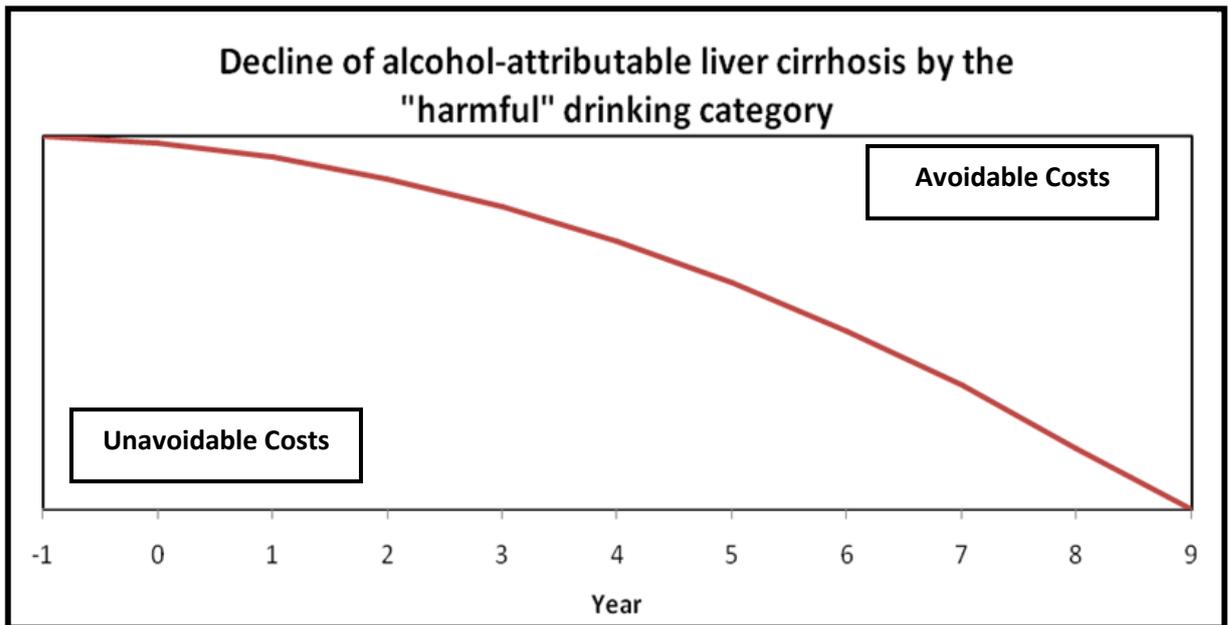


Figure 8.10: Decline of alcohol-attributable liver cirrhosis (“harmful” prior drinking behaviour)

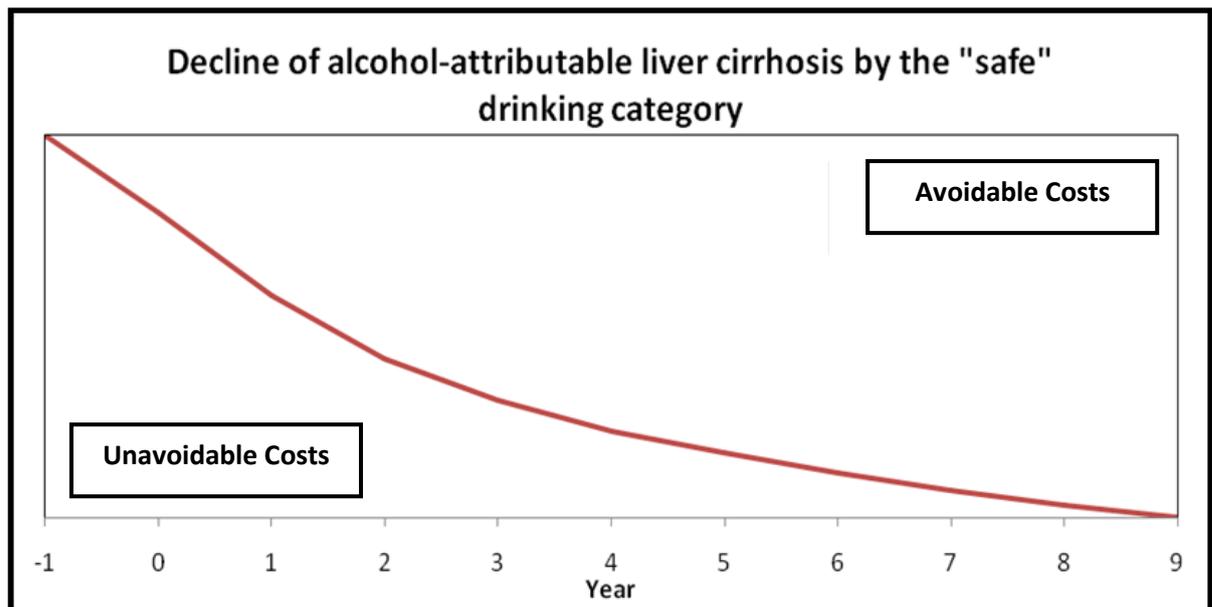


Figure 8.11: Decline of alcohol-attributable liver cirrhosis (“safe” prior drinking behaviour)

From Figures 8.10 and 8.11 we observe that, as prior alcohol consumption increases, the proportion of total cost which is avoidable decreases. The significantly higher RR of the NWPHO “harmful” drinking category, in particular, has a great effect on potential avoidable costs, as shown by Figure 8.10.

The inclusion of this drinking category would have minimal effect if few individuals consumed at this level, however, a significant proportion of the English, male population (6%) fall into this drinking

category (NWPHO, 2008). Although avoidable costs for females are only slightly lower than those observed by Jarl et al., it must be noted that a limitation of this analysis is the application of 2005 drinking prevalence data (from NWPHO, 2008). Between 2005 and 2008 average weekly consumption for females in England rose from 6.5 to 8.6 units (IC, 2010) and it has been well documented that the gap between male and female consumption is closing because of this increase. Due to a lack of current data the proportion of avoidable costs from the analysis in this dissertation may be an overestimate for females.

Finally, Jarl et al. (2010) use a discount rate of 3% compared to a rate of 3.5% used in this analysis (based on HM Treasury recommendations). Higher discount rates do result in a lower proportion of avoidable costs, however; applying a 3% discount rate to this dissertation's analysis results in a less than 0.5% increase in the proportion of costs which are avoidable. It can, therefore, be concluded that the higher proportion of unavoidable costs observed in this dissertation can be attributed to a combination of the higher RR applied and the higher prevalence of risky/harmful drinking behaviour in the English population.

A strength of the Jarl et al. study is, as previously mentioned, the inclusion of the time characteristics of risk decline. Previous studies that have assumed a linear risk decline will, due to discounting, find unavoidable costs greater than avoidable costs i.e. they underestimate the potential avoidable costs associated with consumption changes.

The implementation of a 10 year lag period is based on assumptions made in previous studies (Jarl et al., 2010). It has been stated earlier in this document, however, that whilst the risk of liver cirrhosis quickly declines in the short term, the risk does not die out in a human lifetime i.e. alcohol consuming individual are at continued risk of liver cirrhosis until death despite abstinence. An analysis undertaken by Jarl et al. and a recommendation for further analysis is to extrapolate the lag structure to reflect average remaining life years i.e. if the average age of develop liver cirrhosis is 62 and life expectancy is 80 the lag structure would be extrapolated to an 18 year period. The result of the analysis from Jarl et al. (2010) show that although total costs are higher as a result of an increase lag time, the proportion of cost which is avoidable differs very little from the 10 year lag structure.

8.5 Conclusions

Essentially this analysis shows that even with total abstinence the population of England, or of a locality within, would continue to be subject to costs of alcohol-attributable liver cirrhosis due to prior consumption. In England this figure is to the sum of £237.17 million and in County Durham and Darlington is £2.43 million. Although these costs seem large the costs avoided are greater at £450.81 million and £4.84 million for England and County Durham and Darlington respectively. To add, in the absence of alcohol a significant proportion of the costs associated with alcohol misuse, discussed in the previous chapter would disappear overnight. These include acute conditions such as alcohol poisoning and injuries due to intoxication. This is further discussed in the following chapter.

It is recognised that total abstinence, as assumed in this analysis, is highly unlikely. This analysis presents the potential avoidable costs and provides a basis for policy makers as a means of designing, evaluating and developing policy intervention.

A full analysis of avoidable and unavoidable costs requires further research into the lag structures associated with other alcohol-attributable chronic conditions and, as mentioned, a severe lack of research exists in this area. Jarl et al. suggests that, in the absence of data from epidemiological studies, approaches used by Norström (1987) and Skog (1984), studies which determined the lag structure applied in Jarl et al. and this dissertation's analysis, could be utilised.

Chapter 9: Discussions

Objectives of chapter nine:

- To discuss, interpret and explain the result of the COI and avoidable cost analyses
- To justify approaches taken and outline the limitations of the analyses
- To evaluate discussions in previous chapters and outline recommendations for future COI and avoidable cost studies

Learning from chapter nine:

- Previous COI studies may have overestimated the economic cost of alcohol misuse, although, the overall societal harms remain consistent with previous studies
- Further unavoidable costs to those outlined in chapter 8 include; costs due to a poor knowledge of causality and the potential costs of withdrawal and of the substitution effect
- A number of limitations of this dissertation have been outlined with recommendations for future COI and avoidable cost studies

9.1 The economic cost of alcohol misuse

9.1.1 Interpretation of results and justification of the methodology

The first objective of the analysis was “to evaluate past studies to identify, develop and apply best practice, to estimate the economic cost of alcohol-misuse for England and for County Durham and Darlington” (see chapter 1). Figure 9.1 summarises the economic costs of alcohol-misuse to County Durham and Darlington and England.

**The economic costs of alcohol misuse
County Durham and Darlington and England**

	County Durham and Darlington	England
Crime	£81,557,914	£9,830,475,213
Workplace and wider economy	£90,505,000	£6,021,556,908
Healthcare	£35,452,688	£1,942,863,394
TOTAL	£207,515,602	£17,794,895,514

Figure 9.1: The economic costs of alcohol misuse to County Durham and Darlington and England

Whilst the achievement of this objective is outlined in the above, the identification, development and application of best practice resulted in significantly different costs to those previously estimated, which is not evident in the above Figure. Figure 9.2 compares the new estimates of the cost of alcohol misuse to the previous local estimate (Balance, 2010).

Comparison of cost estimates for County Durham and Darlington

	Previous est.	New est.	Difference	Diff. (%)
Crime	£100,380,000	£81,557,914	-£18,822,086	19%
Workplace and wider economy	£90,510,000	£90,505,000	-£5,000	0%
Healthcare	£52,160,000	£35,452,688	-£16,707,312	32%
Overall	£243,045,000	£207,515,602	-£35,529,398	15%

Figure 9.2: Comparison of previous and new estimated costs of alcohol misuse for County Durham and Darlington

From Figure 9.2 we see that the total economic cost of alcohol-misuse, for County Durham and Darlington, is estimated to be £207.52 million; a 15% decrease on the previous local estimate (Balance, 2010). This is equivalent to an annual cost of £418 per head of adult (aged 16+) population (based on ONS mid-year population estimate 2008).

Comparison of cost estimates for England

	Previous est.	New est.	Difference	Difference (%)
Crime	£11,976,300,000	£9,830,475,213	-£2,145,824,787	18%
Workplace and wider economy	£5,807,723,124	£6,021,556,908	£213,833,784	-4%
Healthcare	£2,704,100,000	£1,942,863,394	-£761,236,607	28%
Overall	£20,488,123,124	£17,794,895,514	-£2,693,227,610	13%

Figure 9.3: Comparison of previous and new estimated costs of alcohol misuse for England

From Figure 9.3 we see that the total economic cost of alcohol-misuse, for England, is estimated to be £17.79 billion; a 13% decrease on the sum of the three previous estimates (Crime: Home Office, 2010) (Health: Department of Health, 2008) (Workplace: Cabinet Office, 2001). This is equivalent to an annual cost of £426 per head of adult (aged 16+) population (based on ONS mid-year population estimate 2008).

Applying the ONS population estimate for Scotland (ONS, 2008) to the total cost found in the YHEC study, results in a cost per head of adult population of £841. This cost is significantly higher, however, costs included in the YHEC study but not estimated in this dissertation (“*intangible social*” or “*human*” costs and the cost of alcohol-related social services) make up 43% of Scottish cost. If the cost estimated in this dissertation represents 57% of the potential cost (based on the above information), the total cost of alcohol misuse in County Durham and Darlington would be £364.06 million; an annual cost per head of adult population of £733.

The above analysis is encouraging, as an objective of this dissertation was to be more reflective of the considered YHEC approach and, based on the above, the results seem comparable. It was expected that the Scottish cost per head would be higher as drinking behaviour in Scotland is worse with 30% of men and 20% of women considered to be increasing or higher risk drinkers compared to 26% and 18% for England respectively.

The lower cost per head for County Durham and Darlington compared to England is predominantly due to lower alcohol-related crime experienced in County Durham and Darlington. To illustrate, Figure 9.4 compares the proportion of the English population who live in County Durham and Darlington (ONS, 2010) to the proportions of the English costs of alcohol misuse that can be attributed to County Durham and Darlington.

Proportions of national alcohol-related costs attributable to County Durham and Darlington compared to the proportion of adult population

	County Durham and Darlington	England	%
Crime	£81,557,914	£9,830,475,213	0.83%
Workplace and wider economy	£90,505,000	£6,021,556,908	1.50%
Healthcare	£35,452,688	£1,942,863,394	1.82%
TOTAL	£207,515,602	£17,794,895,514	1.17%
Population	497,000	41,798,300	1.19%

Figure 9.4: Proportions of national alcohol-related costs attributable to County Durham and Darlington compared to the proportion of adult population

If alcohol-related harm was consistent throughout England we could assume that the proportions of costs attributable to County Durham and Darlington would be roughly equal to the proportion of the adult population who reside in this locality (assuming consistent unit costs of services), however, whilst 1.19% of the English population live in County Durham and Darlington only 1.17% of total alcohol-attributable costs for England can be attributed to County Durham and Darlington. From Figure 9.4 we see that the proportions of alcohol-related workplace and wider economy costs and alcohol-related healthcare costs are significantly higher (1.50% and 1.82% respectively, compared to 1.19%), indicating relatively higher alcohol-related harms for these measures. The proportion of the English cost of alcohol-related crime that is attributable to County Durham and Darlington is, on the other hand, significantly lower at 0.83%, thus, indicating relatively lower alcohol-related criminal activity and resulting in the lower proportion of total alcohol-attributable cost. These results are reflective of the findings of NWPFO's local-alcohol profiles outlined in chapter 3.

This analysis partly evidences the achievement of the second objective of this dissertation's analysis which was to "provide a methodology applicable to any English locality and to provide valuable knowledge for local policy development and evaluation". Figure 9.4 evidences a methodology applicable to any English locality which does not simply break down national costs proportionately allowing for the identification of specific areas of alcohol-related harm.

Sections 9.1.1 to 9.1.3 justify the methodologies of the three components of total cost and outline any limitations of the analysis.

9.1.1.1 Workplace and wider economy costs

No new methodologies for calculating workplace and wider economy costs have been identified and, therefore, costs presented are reflective of past studies findings based on alcohol-related absenteeism, unemployment and mortality. The 4% increase seen between the past national study and this dissertation's estimate is solely because of inflating past results to reflect current prices.

New analysis included in this dissertation is the estimate of alcohol-attributable IB based on research by the DWP. This cost is not included in overall costs to avoid double counting; however, analysis and resulting estimate has been included for three key reasons. Firstly, this dissertation aims to provide a comprehensive evaluation of the economic costs of alcohol-misuse and is keen to reflect new research and analysis. Secondly, this estimate is useful when considering the costs of alcohol-misuse from the perspective of the Government budget as the value of alcohol-related IB is

considered a cost rather than a redistribution of wealth. Thirdly, from a societal perspective the payment of alcohol-attributable IB represents an opportunity cost i.e. the foregone benefit of an alternative use of this money.

The DWP estimates that 159,000 individuals in receipt of DWP benefits are dependent drinkers, however, in these cases unemployment cannot be attributed to alcohol due to ambiguity regarding causality. The estimated expenditure, therefore, reflects only claimants of IB citing “alcohol use” as the reason. Causality is discussed later in this chapter.

Intangible wider economy costs associated with premature mortality are not included in this estimate but would be a significant addition to future studies. This is also discussed later in this chapter.

9.1.1.2 Healthcare costs

The estimated cost of alcohol-related healthcare is subject to the largest percentage change with a 32% decrease in County Durham and Darlington. Nationally the percentage change is 28%. The national change is less as not all of the improved methodologies, particularly revaluations of the costs of GP and PN appointments, applied to local data could be applied nationally due to data limitations. The decreases for both studies are predominantly due to the more considered methodologies applied to A&E and Ambulance services and, most significantly, inpatient stays. The new methodology for inpatient stays calculates lower and upper estimates based on primary and all diagnosis codes and takes a mid-point, whereas, the previous methodology presents only the upper cost estimate. It is interesting that the lower and upper limits of healthcare cost have not been previously applied, especially considering that the previous methodologies for “crime” and “the workplace and wider economy” both account for the range of the impact of alcohol-misuse.

The estimated cost of alcohol-related healthcare in this dissertation reflects a lower estimate than in previous studies of alcohol-related healthcare activity. The methods by which episodes of care are coded may lead to an overestimate and provides support for the more considered approach applied. Current guidance shows that epilepsy, for example, is a condition which must be coded “*where it affects the management of the patient*” (NHS Connecting for Health, 2010). It is therefore assumed, that under any circumstances this condition will be coded (NHS Connecting for Health, 2010). Essentially, epilepsy, which is partly-attributable to alcohol, may be coded in a large number of episodes despite having no responsibility for the occurrence of many of those episodes. This is the case for a number of the alcohol-attributable conditions.

It is felt, based on above discussions, that previous studies have exaggerated alcohol-related healthcare costs by presenting single cost estimate based on maximum values and have not attempted to correct for episodes of care with tenuous associations with alcohol-misuse. Whilst the potential health harms of alcohol misuse are no less than previous studies the estimate presented in this dissertation is considered a more accurate reflection of the true costs. It must be highlighted that even with a larger percentage decrease, alcohol-related health harms remain relatively much higher in County Durham and Darlington compared nationally as evidenced in Figure 9.4.

A significant difficulty encountered in this dissertation, regarding healthcare costs, is the limited availability of robust data. The substantial coding system supporting inpatient activity allows for robust analysis and confidence in results, however, in other healthcare areas, such as A&E and outpatient appointments, significant assumption have been made due to a severe lack of evidence. Standard practices, such as recording A&E attendee's alcohol consumption prior to attendance, are being introduced that will support future COI studies. It is recommended that, following the Scottish example, a sample of GP practices should also begin to code appointments to allow for an understanding of the impact of alcohol and ill-health generally in the primary care setting.

9.1.1.3 Crime costs

The estimated cost of alcohol-related crime has the second largest percentage change with an 18% and 19% decrease in value for England and County Durham and Darlington respectively. The revised costs of alcohol-related offences are due to double-counting of *"health service"* and *"lost productivity"* costs, and inappropriate assignment of some costs to unreported crimes.

The cost of *"healthcare"* removed from the cost of *"alcohol-related offences"* in chapter 5 is £1.44 billion, for England. It is removed to avoid double-counting with the separate analysis of alcohol-related healthcare costs in chapter 7. From the analysis in chapter 7, however, alcohol-related acute conditions (of which a percentage will be as a result of crime), are estimated to cost only around £0.11 billion i.e. the cost removed from chapter 5 does not simply transfer to a cost of the same value in chapter 7. This is due to differing methodologies used to calculate the cost of healthcare as a result of alcohol-related crime. The methodology of Dubourg et al., which results in health service costs of £1.44 billion, applies a unit cost of healthcare to all crimes with potential healthcare outcomes. In contrast; the methodology in chapter 7 only records a cost when a patient actually accesses healthcare services. The assumption that all crimes with possible healthcare needs actually

result in the use of healthcare services has potentially led to a significant overestimate of healthcare service costs as a consequence of crime, especially considering 91% of these costs refer to “less serious wounding” crimes which, it can be argued, in the majority of cases, may not ever enter the healthcare system; preferring to “self-treat”. It is recommended that the unit costs of crime, outlined in Dubourg et al., are applied with caution in further studies as, for the reasons indicated, these costs may be exaggerated.

The methodology applied to alcohol-related crime aims to provide a more accurate overall estimate; however, whilst the costs of the crimes are lower, the analysis is based upon the same number and types of crimes and the same number of victims; therefore, the scale and severity of alcohol harm remains large.

Costs deducted from unreported crimes, were removed on the basis that, as the CJS services (such as “jury services” and “prison services”) are not utilised in these cases, no costs are incurred. It can be argued, however, that as the crimes have been committed, these are potential costs to society that could be included in a COI study.

9.1.2 Suggestions for further improvements

9.1.2.1 Valuing indirect costs

Costs included in COI studies can broadly be divided into direct and indirect costs. A criticism of the previous English studies is that the methodologies used to calculate indirect costs are inconsistent throughout the analyses. This section discusses:

1. Direct and indirect costs
2. Methodologies for estimating indirect costs
3. The methodologies applied in this study
4. Recommendations for future indirect cost estimates

Direct costs measure the cost of resources used for treating a particular illness, whereas indirect costs measure the value of other resources lost due to a particular illness (RTI International, 2006). The cost of treating a patient with alcoholic liver disease is a direct cost as it is the price paid by society for healthcare services. An individual’s lost economic contribution as a result of alcohol-attributable unemployment is an indirect cost as it is a quantifiable loss of economic activity.

Indirect costs can be significantly greater than direct costs as they are the loss of output/well-being resulting from morbidity and mortality. Whilst indirect costs are commonly included in COI studies, their inclusion is often controversial because they, at least implicitly, place a monetary value on life (RTI International, 2006). These costs can be particularly controversial as, sometimes being based upon lost potential productivity from employment, they often place a lesser value on the elderly and unemployed (RTI International, 2006). The RTI guide to COI studies (RTI International, 2006) outlines three main approaches to estimating indirect costs. These are; the human capital method, the friction cost method and the willingness to pay (WTP) method.

The human capital approach uses the loss of gross career earnings of a patient due to illness as an estimate of lost production/output (Hodgson and Mainers, 1982; Rice et al., 1990 and Rice 1967).

The human capital approach is applied in the original Cabinet Office (2003) COI study, upon which the local estimate in this dissertation is based. It calculates the number of potential years of life lost due to premature mortality from alcohol-misuse and multiplies this by an estimate of an individual's average annual economic contribution to society. Future year's earnings are subject to discounting, and often an annual growth rate in earnings is applied (RTI International, 2006). A criticism of this methodology is that, typically, COI studies attribute costs to a given year, for example, this dissertation has calculated costs for the year 2008/09; yet the costs calculated for lost productivity often represent many years of lost economic contribution (assuming that not all alcohol-related deaths occur exactly 1 year before life expectancy/retirement age). In other words, the cost of all potential years of lost productivity, from an individual dying prematurely from alcohol-misuse, are attributed to the year of death, this is consistent with the human capital methodology as what is lost (the cost) at the point of death is a capital stock that had it not been lost would have contributed future output .

Assuming, over the last few decades, alcohol-related deaths had remained constant both in terms of numbers and characteristics, the cost calculated in the Cabinet Office study would not vary greatly from the actual annual cost of lost productivity. In reality, however, this is not the case as alcohol-related mortality has been rising year-on-year (see chapter 3). To overcome this criticism would require a complex and large amount of analysis of alcohol-related deaths over the last 60 to 80 years (dependent on the criteria used) and, therefore, whilst the methodology applied may not be entirely accurate it is certainly the more rational option.

A further criticism of the human capital approach is that it may overvalue indirect costs. Some argue that the costs of lost productivity are invalid once a new, “*replacement*” employee becomes as productive as the former employee. The friction method attempts to overcome this by measuring only the lost productivity during the time it takes to hire and train a new employee; this time is known as the “friction period” (Koopmanschap and van Ineveld, 1992; Koopmanschap et al., 1995; and Johannesson and Karlsson, 1997). Despite some valid arguments, the difficulties in valuing the friction period mean this method is very rarely applied (RTI International, 2006).

Willingness to pay (WTP) has been discussed previously in chapter 6. WTP quantifies the value an individual places on a reduction in the probability of illness or mortality (RTI International, 2006; Hodgson and Mainers, 1982 and Rice et al., 1990). Human capital approaches are often criticised from an ethical perspective for placing different values on individuals based on their characteristics (age, productivity etc.). The WTP approach attempts to overcome this by arriving at a value for a representative individual (a ‘statistical life’, a value for an individual life that will be lost but where *ex ante* the individual is unknown). Estimated costs of studies applying WTP methodologies are often higher than in the human capital approach (RTI International, 2006). Hirth et al. provide a review of a number of studies which estimate the value of a quality adjusted life year (QALY) by a variety of methods. The results of which are presented in Figure 9.5.

The value of a QALY by varying methodologies

Method	Median value
Human capital	\$24,777
WTP- Revealed preference (e.g. seatbelts, smoke detectors)	\$93,402
WTP- Contingent valuation	\$161,305
WTP - Revealed preference (higher wages for higher risk professions)	\$428,286

Figure 9.5: The value of a QALY by varying methodologies (Hirth et al., 2000)

Generally, the guidance surrounding COI studies advises that the methods chosen should be made clear, to support future discussion, comparison and evaluation. Methodologies applied are not immediately clear in the Cabinet Office studies and, thus, it is also not immediately clear that the methodologies used to value indirect costs are consistent. The “*workplace and wider economy*” cost estimate applies a human capital approach and, although discussed, it clearly states that an “*intangible social cost*” or “*human cost*” will not be included. In contrast, the cost estimate of

“alcohol-related crime” includes both a human capital approach (the costs of *“lost output”*) and a WTP approach (the cost of *“physical and emotional impact on [the] direct victim”*).

Methodologies applied in this study reflect those applied in the Cabinet Office studies and, thus, regarding inconsistencies, the same criticism can, to some degree, be made of this dissertation. It is felt, however, that the clarity regarding the methodologies applied in this analysis is an improvement.

As discussed, the quantification of intangible costs makes-up a large portion of estimated costs. 50% of alcohol-related crimes, for example, are due to the intangible cost of the *“physical and emotional impact on [the] direct victim”*. It is felt that for COI studies to progress they must begin to quantify the intangible costs of illness and, therefore, the decision was taken in this dissertation to continue to include this cost within the cost of crime, however, it was felt that the calculation of intangible costs within the workplace required further consideration.

Unlike many other COI studies the YHEC study places a value on the *“Intangible social costs (human costs) associated with premature death”*. It is recommended that future studies use this approach as a foundation for estimation and to help improve future estimates.

9.1.2.2 Other costs not estimated

This section discusses three significant cost areas that are not estimated in this dissertation.

1. Costs borne by family members
2. Social care costs
3. Benefits

Chapter 6 of this dissertation outlines literature regarding costs borne by members of a drug user’s family which could provide a basis for further analysis, although, it would require research to understand alcohol-specific costs. This methodology also does not account for the *“human costs”* to family members of alcohol-misusers. Much literature exists discussing the harms to family members; however, it rarely considers premature mortality. Methodologies would, therefore, need to quantify the cost of the reduced quality of life associated with these experiences. It is argued a methodology regarding reduced quality of life must also be applied to the alcohol-misusers themselves whose quality of life prior to death may also be reduced. A recommendation has already been made

regarding the inclusion of “human costs” in future studies. The implication of this will be a much higher estimate of the wider societal costs of alcohol misuse.

A further cost which is not included in this dissertation is the social care cost associated with alcohol misuse. The YHEC study quantifies costs of; children and families; criminal justice social work; Children’s Hearing System; and care homes, to establish a total social care cost. The social care costs of the YHEC study represent almost 6.5% of the total cost to Scotland. It is recommended that this cost be calculated in further English studies to ensure a reliable estimate is used in future work.

This dissertation outlines the total cost, rather than the net-cost, of alcohol misuse. Net-effect requires the inclusion of the benefits of alcohol-misuse such as avoided future medical costs as a result of alcohol-related mortality. Strictly, COI studies are not economic evaluations as they lack this comparison of costs and benefits; and for this reason, whilst they are popular with policy makers looking to prioritise; their value is limited regarding resource allocation. Quantified benefits, outlined in this dissertation, are purely tangible benefits and definitely do not represent the total benefits of alcohol consumption. If quantified, it is almost certainly the intangible benefits of alcohol consumption (discussed in chapter 4) which will result in the highest value. The Government argue that they do not want to restrict choice through invasive policy intervention as this would impact on the pleasure/satisfaction gained through moderate consumption. Quantifying the intangible benefits of alcohol consumption is, therefore, a valuable analysis, as it would allow for judgment regarding the strength of this argument.

9.1.3 Issues to consider for future studies

9.1.3.1 Perspectives of cost

COI studies can be conducted from a number of perspectives. Choice of perspective is important as it determines which costs are, and which are not, included in the analysis. This study has chosen to measure the costs to society as it is important to understand a complete analysis of all opportunity costs associated with alcohol-misuse as a basis for cost-effectiveness/benefit analysis of possible interventions (RTI International, 2006). This approach is recommended by Gold et al. (1996). Other perspectives include, although are not limited to; the healthcare system, the alcohol industry, and the government budget. Costs included are dependent on the perspective chosen and this is apparent in this analysis and previous discussions in which the amalgamation of cost estimates to form a societal perspective, from; the healthcare system perspective, the criminal justice and licensing system perspective; and the workplace and the wider economy perspective, resulted in a

combination of results derived using different methodologies and some double counting of costs. The societal perspective, however, presents the most comprehensive evaluation as it attempts to include costs from the perspectives of all the individual members of society. The relatively large range of costs covered in this dissertation naturally results in a higher cost estimate than COI studies conducted from other, more limited, perspectives. A significant benefit of conducting a COI study from a societal perspective is that the costs can often easily be broken down to reflect the perspective of a particular segment.

Figure 9.6 outlines the costs of alcohol-misuse in County Durham and Darlington broadly split between costs to the Government and Public Sector organisations and costs to individuals and businesses.

Total cost of alcohol misuse in County Durham and Darlington by Government/public sector costs and individual/business costs		
	Government	Wider society
Crime Costs:		
Alcohol-related offences	£9,825,701	£69,147,064
Alcohol-specific offences		
Drink driving offences	£758,249	
Alcohol-related PNDs	-£3,100	
Licensing costs	£290,000	
Cost to licensees		£1,540,000
Workplace and wider economy costs:		
Employee Absenteeism		£23,210,000
Unemployment	*1	£29,695,000
Incapacity benefit	£2,880,923	
Mortality	*1	£37,600,000
Healthcare costs:		
Inpatient stays	£16,008,702	
Outpatient visits	£2,953,174	
GP-consultations	£4,777,049	
Practice Nurse (PN) consultations	£504,351	
Accident and Emergency (A&E) episodes	£3,330,218	
Emergency ambulance/paramedic journeys	£4,101,984	
Alcohol dependency-prescribed drugs	£41,439	
Specialist alcohol treatment services	£2,982,000	
Other healthcare costs	£753,771	
TOTAL	£49,204,461	£161,192,064
	(23%)	(77%)

*1 Lost output from unemployment and premature mortality includes lost tax contributions

Figure 9.6: Total cost of alcohol misuse in County Durham and Darlington by Government/public sector costs and individual/business costs

Figure 9.6 shows that the majority of the costs of alcohol-misuse fall upon individuals and businesses, rather than Government and public sector bodies. This is to be expected due to previous discussions regarding the higher values placed on intangible costs. If all benefits, including intangible benefits, were valued it is expected that the distribution of benefits would be similar. This is based on previous discussions which outlined the relative affordability of alcohol and, thus, an assumed high value consumer surplus.

“Alcohol-related offences” is the only sub-category to be split between the Government and public sector organisations and individuals and businesses; at 12% and 88% respectively (see Figure 9.7). The percentage of “Alcohol-related offences” costs borne by the Government/public sector is half that of the original estimate (24%) (Dubourg et al., 2005) due to, the removal of some of the costs of health services and a lower valuation of the victim services and CJS costs (discussed previously). The larger health service cost removed from the cost of “alcohol-related offences” than is estimated within “alcohol-related healthcare” costs, is partly responsible for the overall higher proportion of costs borne by individuals and businesses, compared to previous studies (this is discussed previously in this chapter).

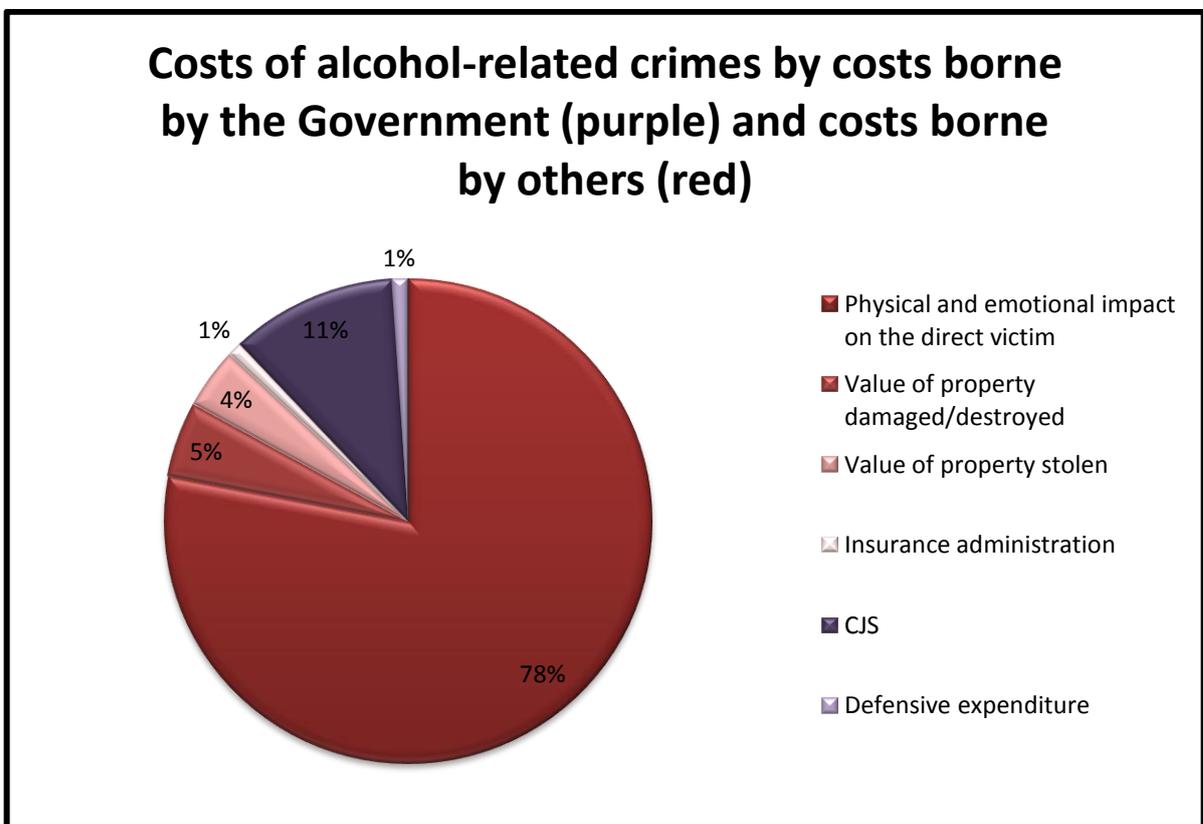


Figure 9.7: Costs of alcohol-related crimes by costs borne by the Government/public sector and costs borne by individuals/businesses

It can be argued that all costs are ultimately borne by individuals regardless of monies managed by the Government/public sector. The division of costs outlined in Figure 9.6 is designed, however, to understand the societal costs of alcohol-misuse from the perspective of the Government/public sector budget. As the Government ultimately has responsibility for implementing policy and the drafting of laws, it is important to understand the costs of alcohol-misuse from the public sector budget perspective to begin to understand some of the motivations for prioritisation, interventions and change. This analysis is important to begin to understand the Government's hypothetical "bottom line" or net income figure regarding alcohol-consumption. For England, the cost borne by the Government/public sector bodies is £3.61 billion. A provisional estimate of benefits to the Government/public sector is £14.6 (i.e. the amount collected in duties and tax from alcohol) and, thus, the estimated net effect of alcohol to the Government/public sector bodies is £11.00 billion. This value represents income from alcohol tax and duties minus the expenditure on alcohol-related healthcare, crime and unemployment. This estimate does not claim to cover all costs and benefits but presents the beginnings of a larger evaluation of net public sector costs of alcohol-consumption. In particular, limitations of this estimate include; the lack of social care costs and; the lack of costs and benefits of premature mortality (both discussed previously).

Whilst a positive economic net-effect may imply a low priority issue, based on discussions throughout this dissertation it is argued that; the overall cost of alcohol is considerable and, therefore, the Government should be concerned with all societal economic costs and benefits not just those impacting their "bottom line". Also, the issue of alcohol-misuse extends beyond the economic impact i.e. the intangible harms to individuals and society are great and the Government should clearly have a social welfare function that extends beyond the public sector balance sheet.

It is felt that, rather than implying a lower priority, high levels of societal alcohol-related harm, yet a positive economic net-effect (to the Government), provides justification for increased expenditure on resources to decrease the adverse impacts of alcohol-misuse. Recommendations for policy action are considered in the final chapter.

9.1.4 Implications

When benchmarked, costs estimated in COI studies can highlight areas which future interventions may wish to target. From this dissertation, it is recommended that future interventions in County Durham and Darlington must evidence their impact on alcohol-related health harms due to the

significantly worse outcomes experienced in County Durham and Darlington compared to national outcomes.

Interventions to impact alcohol-related health can be broadly divided into preventative initiatives and treatment initiatives. Even considering the relatively lower unit costs of healthcare in County Durham and Darlington compared to nationally, the costs of current levels of treatment are clearly unsustainable needs to be addressed as a priority. The options are, therefore, to improve efficiencies of current treatment/develop new better value-for-money treatments, or prevent harmful drinking behaviours, thus, preventing associated costs. Preventative initiatives are preferable because:

1. It is not certain that new or improved treatments can be developed in the foreseeable future
2. Not all costs can be avoided because;
 - a. of the large amount and variety of alcohol-related conditions, which means finding efficient treatments for all is unlikely
 - b. there will be a continued cost incurred for any treatment required
3. Preventative initiatives to reduce harmful drinking behaviour are likely to impact on all outcome measures i.e. health, crime and workplace/wider economy

Evidence of positive health outcomes as a result of interventions can be measured broadly, i.e. as a reduction in alcohol-related healthcare costs, and can also be measured in terms of specific conditions. From the primary diagnosis analysis three conditions; alcoholic liver disease (19%), cardiac arrhythmias (15%) and mental and behaviour disorders due to the use of alcohol (14%); make up just under half of all inpatient costs and, therefore, it seems logical for interventions to particularly evidence impacts on the costs of these three conditions. This includes avoidable and unavoidable costs detailed in later sections.

With GPs soon to take over commissioning responsibilities a strength of the analysis in this study is its ability to be flexible to changing organisational structures. The current proposed consortia arrangement for County Durham and Darlington is a single commissioning organisation for the two localities covering the same population as the current PCT, thus, the costs presented in this dissertation are applicable to the new proposed commissioning organisation.

Comparing costs between specified localities enables commissioners to target interventions in areas with higher levels of harm. Whilst costs are available at a GP practice level the populations of practices are often too small to make useful comparisons. A more practical comparison is costs per

head of populations of the 5 former PCT areas and Darlington; segmentation often applied in commissioning practices in the PCT. Relative costs are presented in Figure 9.8.

Relative costs of the former PCTs and Darlington

Locality	Relative cost
Sedgefield	1.00
Darlington	1.01
Durham Dales	1.04
Derwentside	1.24
Durham and Chester-le-Street	1.29
Easington	1.31

Figure 9.8: Relative costs of the former PCTs and Darlington

From Figure 9.8 we see a clear divide between the six localities in County Durham and Darlington. Based on this information interventions should look to particularly target the areas of Derwentside, Durham and Chester-le-Street and Easington.

9.1.5 Conclusions

In conclusion, based on the analysis in this dissertation, previous COI studies may have overestimated the economic costs of alcohol-misuse. Costs of alcohol-misuse, however, are expected to be greater than those presented in this dissertation as it is recommended that further COI studies attempt to value indirect costs on both lost productivity (by the human capital method) and human costs (by WTP methods), although caution must be taken not to double-count costs. It is, thus, further recommended that the intangible benefits of alcohol consumption are quantified and any methods used are clearly stated to enable evaluation and comparison. This section has also drawn attention to varying perspectives of alcohol-related costs, finding that individuals and business bear the largest proportion of cost. The net-impact presented should be approached with caution as it recognises there are many potential flaws, but it is presented as an initial step to a larger economic evaluation. Most importantly, this analysis recognises that the economic costs of alcohol-misuse are only part of larger discussions and policy decisions should be made from a societal perspective in the interest of the population concerned. Local implications include the recommendation that future interventions should; ideally be preventative, evidence their impact on alcohol-related health harms (specifically alcoholic liver disease, cardiac arrhythmias and mental and

behaviour disorders due to alcohol misuse); and particularly target the areas of Derwentside, Durham and Chester-le-Street and Easington.

9.2 The avoidable and unavoidable costs of alcohol-misuse

The avoidable cost analysis builds upon learning and findings from the COI study. The analysis outlines the potential benefits of a reduction in alcohol consumption whilst showing that, even with abstinence, not all costs are avoidable because of the previous levels of consumption of alcohol by some individuals.

The analysis cannot evaluate all avoidable costs due to data limitations, in particular, the absence of information on the lag structure of diseases other than liver cirrhosis. It is felt, however, the methodology in chapter 8 presents a sufficient approach for future analyses of chronic health conditions, once data is identified or developed. Beyond chronic health conditions, however, the analysis of avoidable costs becomes more complex. Three key complexities are discussed in this dissertation, these are; causality, withdrawal costs and substitutability/complementarity.

An understanding of the role of alcohol as a causal factor for the adverse outcomes discussed in this dissertation is essential for both COI and avoidable costs studies (NIDA, 2011). This dissertation has relied on secondary research which has quantified the extent to which alcohol has caused the consequences discussed. Despite concerns outlined below, this dissertation utilises sources of data standard to past COI studies increasing the comparability with other studies. It is further argued that; provided the limitations of the research are made clear i.e. an acknowledgement of whether the research is based on association or causality, adjustments and qualifying statements can be made when prioritising, evaluating and comparing results, and that an estimate based on association is better than no estimate at all.

Researchers have outlined three fundamental requirements before a causal relationship can be ascertained, these are;

1. Strong and consistent correlation or covariance between phenomena;
2. A coherent logic to the causal linkage, including correct temporal ordering; and
3. Elimination of alternative possible causes

(NIDA, 2011; (Berry, 1984 and Austin and Werner 1974))

The first two requirements are relatively simple; however, the third requirement is more difficult (NIDA, 2011). The complexity with this final requirement is, what NIDA (2011) have described as, the “counterfactual” i.e. the probability of an individual experiencing the same consequence in the absence/non-existence of alcohol. To illustrate; it is argued that an individual’s personality and external environmental factors contribute to alcohol-related disorder (discussed in chapter 2, Figure 2.8). The counterfactual answers the question; in the same situation, but in the absence/non-existence of alcohol, what is the probability of an individual exhibiting disorderly behaviour?

Regarding health, one can be certain that in the absence/non-existence of alcohol, alcohol-specific conditions would, eventually, cease to exist. The case for this is well evidenced and supported and one can have confidence in the AAFs applied to alcohol-related health conditions and the resulting analyses, of both cost and avoidable cost. Alcohol-related mental-health conditions are potentially an exception, as it is more difficult to eliminate other potential causes and, therefore, to be confident whether alcohol-misuse is a cause or consequence.

The crime, workplace and wider economy literature seems less robust referring to “*the presence of alcohol*” rather than an evaluation of alcohol as a causal factor. In these categories the first two requirements are often met i.e. there is a statistical link and logical link between alcohol and crime, for example, however, as with mental-health conditions; the studies fail to adequately eliminate other potential causes. The nature and number of contributing factors to, for example, alcohol-related disorder (see Figure 2.8) makes the process of quantifying to what extent alcohol consumption has caused the disorderly occurrence, extremely complicated.

The concerns around estimating avoidable costs of alcohol-related crime differ from concerns regarding health. Unavoidable health costs, outlined in chapter 8, relate to the continued heightened risk of alcohol-related conditions despite abstinence. Regarding ongoing risk, it can be argued that avoidable/unavoidable cost analysis is not applicable to alcohol-related crime as it can be assumed that in the absence/non-existence of alcohol, 100% of alcohol-attributable crime would be avoided. Whilst this statement is true, due to the uncertainty of causality, the unavoidable costs outlined by COI studies may be over-estimated if the relationship between alcohol and crime is an association only. Misguided estimates of avoidable costs and expected benefits could potentially lead to inappropriate allocation of resources.

Alcohol-related mental-health issues are arguably the most complex cost as neither, a definitive answer regarding causality or research regarding ongoing increased risk after abstinence, exists and, further, there is the issue of ongoing costs of current cases of alcohol-related mental health. There is also a lack of understanding of the relationship between alcohol consumption, mental-health and crime. If it is assumed alcohol-related mental health issues contribute to more serious crimes, such as homicide and sexual abuse, and alcohol-related mental health continues to incur costs after abstinence (either due to increased risk or ongoing costs) it can be argued that a proportion of crime, typically the most costly, will also result in unavoidable costs.

Linked to ongoing costs of alcohol-related mental health are the costs of alcohol withdrawal. Consequences of withdrawal include both psychological and physical symptoms of varying severity. In the hypothetical scenario presented in chapter 8 it can be assumed that there will be a significant unavoidable cost of alcohol withdrawal. Costs are likely to include; healthcare costs (both borne by the NHS and by individuals choosing to self-treat) and workplace costs such as reduced productivity and absenteeism. There are also severe mental-health conditions, such as delirium tremens (a state of confusion and hallucinations), associated with alcohol withdrawal which will incur both immediate and ongoing costs. In reality it is unlikely that alcohol will cease to exist and, thus, a further consideration is the cost of relapse or the cost of preventing relapse. Estimates of unavoidable withdrawal costs could potentially be based on expected requirements of individuals based on estimates of drinking prevalence. This methodology would require research into the costs associated with withdrawal according to prior drinking behaviour.

An overall reduction in societal harm as a result of reduced alcohol-consumption is based on the assumption that that in the absence of alcohol consumption, money previously spent on alcohol would not be spent on other products and services with equally or more harmful outcomes. In particular, studies over the last few decades have discussed the economic relationships between alcohol and illegal drugs (mainly cannabis). Most studies have concluded that consumption of alcohol and cannabis are not independent of each other, however, research is inconclusive as to the nature of the relationship.

It is argued that alcohol and illegal substance consumption satisfies the same need and, thus, if the consumption of one is restricted, consumption of the other will increase as consumers switch to the “substitute” product. The historic example of this relationship was seen in 1920, in the USA, in the introduction of prohibition. It is argued that prohibition led to the first *“large scale marketing of*

marijuana for recreational use” (Brecher and the Editors of Consumer Reports 1972) evidenced by the “*sudden appearance of marijuana “tea pads” in New York in 1920*” (DiNardo and Lemieux, 2001). Others argue that the relationship between these products is one of complementarity i.e. as the price of one good increases the consumption of the other decreases. This may due to the heightened euphoric experience of co-consumption, or the consumption of one product to negate the negative impacts of the consumption of the other (Moore et al., 2010). Recent literature, of which there is a fair amount, is divided; some studies evidencing a complementary relationship, others evidencing a substitute relationship and some finding conflicting evidence within the same study. A recent study by Moore (2010), attempts to assess the available evidence to provide a more definitive answer to the relationship between alcohol and illicit substances. He concludes that a significant minority of the population, particularly those engaging in risky drinking behaviour, are likely to complement alcohol consumption with other illicit substance and also, in the absence or restriction (through, for example, higher prices) of alcohol, are likely to substitute alcohol consumption with the consumption of other intoxicating products. Whilst this conclusion provides insufficient evidence to effectively evaluate potential policies, it suggests that policies are unlikely to be able to completely eradicate the societal harms of intoxication due consumer’s ability to choose from multiple, relatively easily available, product options.

Substitution is a risk to the potential success of harm minimisation strategies, particularly due to the lack of a clear understanding restricting the reliability of predictions of unavoidable harms.

Chapter 10: Conclusions and recommendations

Objectives of chapter ten:

- To provide a summary and assessment of the results and lessons from this dissertation
- To provide recommendations for future studies
- To provide recommendations for the management of alcohol-misuse

10.1 Summary of costs

The cost of alcohol-misuse:

- The estimated economic cost of alcohol-misuse in County Durham and Darlington is:
£207.52 million
- The estimated economic cost of alcohol-misuse in England is: £17.79 billion
(For a break down of costs see Figures 10.1 and 10.2.)

Estimates of avoidable/unavoidable costs of liver cirrhosis:

- In County Durham and Darlington, the estimated costs of alcohol-attributable liver cirrhosis, over a ten year period are £5.07 million for males and £2.19 million for females, however, potentially 65% and 71% of these costs can be avoided, for males and females respectively
- In England the estimated total costs of alcohol-attributable liver cirrhosis, over a 10 year period are £455.46 million for males and £232.51 million for females, however, it is estimated that, for males and females respectively, potentially, 64% and 69% of these costs can be avoided

County Durham and Darlington: Costs	
Crime Costs:	Estimate:
Alcohol-related offences	£78,972,765
Alcohol-specific offences	N/A
Drink driving offences	£758,249
Alcohol-related PNDs	-£3,100
Licensing costs	£290,000
Cost to licensees	£1,540,000
SUB-TOTAL	£81,557,914
Workplace and wider economy costs:	
Employee Absenteeism	£23,210,000
Unemployment	£29,695,000
Mortality	£37,600,000
SUB-TOTAL	£90,505,000
Healthcare costs:	
Inpatient stays	£16,008,702
Outpatient visits	£2,953,174
GP-consultations	£4,777,049
Practice Nurse (PN) consultations	£504,351
Accident and Emergency (A&E) episodes	£3,330,218
Emergency ambulance/paramedic journeys	£4,101,984
Alcohol dependency-prescribed drugs	£41,439
Specialist alcohol treatment services	£2,982,000
Other healthcare costs	£753,771
SUB-TOTAL	£35,452,688
TOTAL	£207,515,602

Figure 10.1: The economic costs of alcohol-misuse for County Durham and Darlington

England: Costs

Crime Costs:	Estimate:
Alcohol-related offences	£9,385,241,199
Alcohol-specific offences	£200,000,000
Drink driving offences	£92,662,425
Alcohol-related PNDs	-£368,411
Licensing costs	£24,440,000
Cost to licensees	£128,500,000
SUB-TOTAL	£9,830,475,213
Workplace and wider economy costs:	
Employee Absenteeism	£1,499,769,797
Unemployment	£2,153,721,146
Mortality	£2,368,065,965
SUB-TOTAL	£6,021,556,908
Healthcare costs (from the HIAT study):	
Inpatient stays	£820,722,669
Outpatient visits	£198,269,353
GP-consultations	£102,100,000
Practice Nurse (PN) consultations	£9,500,000
Accident and Emergency (A&E) episodes	£401,064,648
Emergency ambulance/paramedic journeys	£299,406,723
Alcohol dependency-prescribed drugs	£2,100,000
Specialist alcohol treatment services	£55,300,000
Other healthcare costs	£54,400,000
SUB-TOTAL	£1,942,863,394
TOTAL	£17,794,895,514

Figure 10.2: The economic costs of alcohol-misuse for England

England: Benefits	
Benefits- quantified	Estimate
Tax and duty revenue	£14,600,000,000
Benefits- not quantified	
Employment	
Occupation of commercial premises	
Individual's pleasure/satisfaction	
TOTAL	£14,600,000,000

Figure 10.3: The economic benefits of alcohol consumption for England

10.2 Learning from the dissertation

This dissertation has discussed the costs and avoidable costs of alcohol misuse in England and also in County Durham and Darlington. Whilst providing knowledge for local decision making, this dissertation aims to contribute to wider discussions in public health policy regarding the management of alcohol consumption.

The COI portion of this dissertation has evaluated past studies and identified, developed and applied best practice, to reach an estimate of the cost of alcohol-misuse for England and for County Durham and Darlington. As an estimate of cost, this analysis provides the foundations for future cost-effectiveness studies. It also provides a baseline for monitoring the economic consequences of future interventions and, as discussed in chapter 9, enables some prioritisation of resource allocation. The application of more considered methodologies has resulted in a relatively conservative estimate of the economic impact of alcohol-consumption. It is stressed, however, that the burden of the societal harms of alcohol-misuse are consistent with previous studies and are of continued concern.

The avoidable costs portion of this dissertation contributes to discussions through the application of identified best practice methodologies to English health data, both national and local. It also outlines further unavoidable costs of alcohol-misuse not widely discussed in current literature. This research is in its infancy but already provides valuable knowledge regarding potential unavoidable costs due to prior drinking behaviours. This is considered critical knowledge for the development of robust cost-effectiveness evaluations and the development and prioritisation of interventions.

10.3 Recommendations for further research

A significant outcome of this dissertation is the identification and recommendation of valuable potential future research. Seven recommendations are outlined below:

Recommendations for further research

1. Implement coding systems to support the analysis of healthcare services
2. Estimate the economic costs of alcohol-related social care and quantify intangible human costs based on best practice
3. Quantify the societal benefits of alcohol consumption
4. Identify and/or develop lag structure for alcohol-related chronic conditions and conduct further research regarding the unavoidable and ongoing costs of alcohol-related mental health conditions
5. Identify and/or develop robust evidence or causality regarding the relationship of alcohol and crime and alcohol and the workplace
6. Estimate the potential economic costs of withdrawal symptoms
7. Further research to estimate the unavoidable societal harms and economic costs as a result of the substitute effect

Figure 10.4: Recommendation for further research

10.4 Recommendations for the management of alcohol misuse

The societal harms of alcohol misuse are increasing, for example, alcohol-related hospital admissions exceeding 1 million in 2009/10 (HSJ, 2011). The comparative failure of a strategy of a former Government to improve a situation is often the grounds on which a new Government proposes change and it can be argued that discussions in this dissertation justifies the Government's proposed "radical changes". It is questionable however, whether the new approach will be radically, or even marginally, different. The Government *is* making large structural changes; however, the management of public health issues seems rather similar to current and past arrangements. Like the aspirations of the current government, the previous government implemented no "invasive" interventions; preferring instead to "inform and support people to make healthier and more responsible choices" a phrase that seems to be used in both government's strategies.

Structural change leading to the division of the alcohol pathway (discussed in chapter 2) will disrupt services both operationally and strategically. NHS County Durham and Darlington has previously experienced large structural change, when in 2005 five smaller PCTs were amalgamated to become County Durham PCT. It has, arguably, taken years for the organisation to perform effectively and

efficiently following such large scale upheaval. In comparison the NHS reforms are significantly greater not least because the change is on a national scale and timescales are relatively short. Based on this evidence and current trends, it is argued alcohol-harms will continue to increase, and may potentially be exaggerated due to unchanged alcohol policy and the disruption of structural change.

Due to the scale and increasing nature of alcohol-related harms it is increasingly important to ensure the most effective policy interventions are implemented. This dissertation has identified, developed and applied best practice to estimate the costs and avoidable costs of alcohol misuse on the overarching principle that *“policies that affect population health should be based on best available evidence”* (Aldridge et al., 2011). This dissertation’s estimate of current costs is significantly lower than past estimates yet the methodologies applied a relatively similar; this difference can be attributed to this dissertation’s more considered approach. Whilst this dissertation does not aim to devalue the scale and severity of alcohol-related harms it is argued that policy must be based on this best evidence if it is to prioritise effectively and realise maximum resource utilisation.

Estimates of the economic and avoidable costs of alcohol misuse are important as they provide the foundation for the evaluation of interventions which facilitate prioritisation, appraisal and ongoing improvement within the public services (Aldridge et al., 2011). A key recommendation is, therefore, the application of findings from this dissertation to such evaluations. The application of the best available evidence and resulting robust policy evaluations provides justification for the implementation of the most effective and appropriate interventions, thus, reducing the influence alcohol industry to push through, arguable, less favourable policy decisions. Whilst some may wish for the industry’s involvement in policy development to be restricted, this dissertation recommends that the Government continue to engage the industry as there are significant benefits of this relationship. Aldridge et al. argues, however, that *“for too long, policy proposals have been made without the evidence base needed to facilitate sensible discussion and debate [and there is] a reluctance to evaluate policies that are ideologically driven on the basis that the findings prove contradictory to their approach”*. This recommendation is, therefore, made on the basis of equal influence of industry and public health representatives both through strong leadership and co-ordination from the Government and the continued development and implementation of unbiased, evidence based recommendations.

It is due to the provision of robust evidence that this dissertation recommends that a range of policy interventions are implemented and are not limited to those considered least invasive. It is thought

that maximum effectiveness can be realised from a strategically planned approach of a range of complementary interventions. In particular, the evidence in the literature supports the implementation of a minimum price per unit of 50p as the strength of the evidence and potential beneficiaries far outweigh any criticisms and those potentially penalised by minimum pricing.

Local estimates are important for local policy development, implementation and monitoring. Local need can be estimated through comparisons with national data, however, as evidenced in this dissertation, lower costs are not always reflective of less harms. It is, therefore, important to also understand costs relative to local expenditure to gain a fuller picture of need.

Alcohol consumption is a central part of British culture and is often synonymous with enjoyment and celebration; however, increasing excess consumption has also led to worrying levels of societal harm. The effective management of alcohol misuse is complex but increasingly important and it is hoped that the discussions and conclusions of this dissertation contribute positively to future action.

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Appendix

Appendix 1: Social and economic benefits of a minimum price per unit of 50p (in England)

- Reduce consumption per drinker by 6.9% on average. This would lead to 97,900 fewer hospital admissions and 10,300 fewer violent crimes per year.
- Reduce consumption per 11-18 year old drinker by 7.3%. This would lead to 500 fewer hospital admissions and 2,200 fewer violent crimes per year for that age category.
- Reduce consumption per 18-24 year old hazardous drinker by 3%. This would lead to 300 fewer hospital admissions and 1,600 fewer violent crimes per year for that age category. Hazardous drinkers are defined in the research as drinkers with an increased risk of psychological and physical consequences due to alcohol intake of between 21 and 50 units per week for men and between 14 and 35 units per week for women.
- Reduce consumption of harmful drinkers by 10.3%. This would lead to 63,200 fewer hospital admissions and 4,500 fewer violent crimes per year for that age category. Harmful drinkers are defined in the research as drinkers with an intake that is likely to be adversely affecting health and/or other negative consequences due to an alcohol intake of more than 50 units per week for men and more than 35 units per week for women.
- Reduce consumption of moderate drinkers by 3.5%. This would lead to 10,000 fewer hospital admissions and 1,100 fewer violent crimes per year for that category. Moderate drinkers are defined in the research as drinkers with an intake of alcohol less likely to damage health and/or associated with negative consequences; this is up to 21 units per week for men and 14 units per week for women.
- Total healthcare costs saved in England would be £66 million in the first year and £1.37 billion over ten years.
- Total crime costs saved in England would be £49.6 million in the first year and £413 million over ten years.
- Total absence (from the workplace) costs saved in England would be £28.6 million in the first year and £238 million over ten years.
- Total unemployment costs saved in England would be £649 million in the first year and £5.4 billion over ten years.

Appendix 2: Further descriptions of tiered service model (drugsalcohol.info, 2011)

Tier	Interventions include:	Detail
1	<p>Alcohol advice and information; targeted screening and assessment for those drinking in excess of DH guidelines on sensible drinking and for those who may need alcohol treatment;</p> <p>Provision of simple brief interventions for hazardous and harmful drinkers;</p> <p>Referral of those requiring more than simple brief interventions for specialised alcohol treatment;</p> <p>Partnership or ‘shared care’ with specialised alcohol treatment services, e.g. to provide specific alcohol treatment interventions within the context of their generic services.</p>	<p>Can be delivered by a very wide range of agencies and in a range of settings, the main focus of which is not alcohol treatment.</p> <p>For example: Primary healthcare services; acute hospitals, e.g. A&E departments; psychiatric services; social services departments; homelessness services; antenatal clinics; general hospital wards; police settings, e.g. custody cells; probation services; the prison service; education and vocational services; and occupational health services.</p> <p>Such interventions can also be provided in highly specialist non-alcohol-specific residential or inpatient services, which have service users with high levels of alcohol-related morbidity who may require care plans and support to facilitate their access to alcohol-specific provision. Examples include: specialist liver disease units; specialist psychiatric wards; forensic units; residential provision for the homeless; and domestic abuse services.</p>
2	<p>Open access facilities and outreach targeting alcohol misusers, which provide:</p> <p>Alcohol-specific information, advice and support extended brief</p>	<p>May be delivered by the following agencies, if they have the necessary competence, and in the following settings: specialist alcohol services;</p>

	<p>interventions and brief treatment to reduce alcohol-related harm;</p> <p>Alcohol-specific assessment and referral of those requiring more structured alcohol treatment;</p> <p>Partnership or shared care with staff from tier 3 and tier 4 provision, or joint care of individuals attending other services providing tier 1 interventions;</p> <p>Mutual aid groups, e.g. Alcoholics Anonymous;</p> <p>Triage assessment, which may be provided as part of locally agreed arrangements.</p>	<p>primary healthcare services;</p> <p>acute hospitals, e.g. A&E and liver units;</p> <p>psychiatric services;</p> <p>social services;</p> <p>domestic abuse agencies;</p> <p>homelessness services;</p> <p>antenatal clinics;</p> <p>probation services;</p> <p>the prison service;</p> <p>occupational health services.</p>
<p>3</p>	<p>Comprehensive substance misuse assessment</p> <p>Care planning and review for all those in structured treatment, often with regular key working sessions as standard practice;</p> <p>Community care assessment and case management of alcohol misusers;</p>	<p>Tier 3 interventions are normally delivered in specialised alcohol treatment services with their own premises in the community (or sometimes on hospital sites). Other delivery may be by outreach (peripatetic work in generic services or other agencies, or domiciliary or home visits).</p> <p>Tier 3 interventions may be delivered alongside tier 2 interventions. Some of the tier 3 work is based in primary care settings (shared care</p>

	<p>A range of evidence-based prescribing interventions, in the context of a package of care, including community-based medically assisted alcohol withdrawal (detoxification) and prescribing interventions to reduce risk of relapse;</p> <p>A range of structured evidence-based psychosocial therapies and support within a care plan to address alcohol misuse and to address co-existing conditions, such as depression and anxiety, when appropriate;</p> <p>Structured day programmes and care-planned day care (e.g. interventions targeting specific groups);</p> <p>Liaison services, e.g. for acute medical and psychiatric health services (such as pregnancy, mental health or hepatitis services) and social care services (such as child care and housing services and other generic services as appropriate).</p>	<p>schemes and GP-led prescribing services), but alcohol specialist-led services are required within the local systems for the provision of care for severe or complex needs and to support primary care.</p> <p>The work in community settings can be delivered by statutory, voluntary or independent services providing care-planned, structured alcohol treatment.</p>
<p>4</p>	<p>Comprehensive substance misuse assessment, including complex cases when appropriate;</p> <p>Care planning and review for all inpatient and residential structured</p>	<p>Specialised statutory, independent or voluntary sector inpatient facilities for medically assisted alcohol withdrawal (detoxification), stabilisation and assessment of complex cases.</p> <p>Residential rehabilitation units for alcohol misuse.</p>

<p>treatment;</p> <p>A range of evidence-based prescribing interventions, in the context of a package of care, including medically assisted alcohol withdrawal (detoxification) in inpatient or residential care and prescribing interventions to reduce risk of relapse;</p> <p>A range of structured evidence-based psychosocial therapies and support to address alcohol misuse;</p> <p>Provision of information, advice and training and shared care to others delivering tier 1 and tier 2 and support for tier 3 services as appropriate.</p>	<p>Dedicated specialised inpatient alcohol units are ideal for inpatient alcohol assessment, medically assisted alcohol withdrawal (detoxification) and stabilisation. Inpatient provision in the context of general psychiatric wards may only be ideal for some patients with co-morbid severe mental illness, but many such patients might benefit from a dedicated addiction specialist inpatient unit.</p> <p>Those with complex alcohol and other needs requiring inpatient interventions may require hospitalisation for their other needs (e.g. pregnancy, liver problems) and this may be best provided for in the context of those hospital services (with specialised alcohol liaison support).</p>
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Appendix 3: Multipliers, Attributable-fractions and unit costs of alcohol-related crimes (Department of Health, 2008)

Offence	Multiplier	AAF	Unit cost of crime (£)
Death by dangerous driving	1.0	1	1,458,975
More serious wounding	1.8	0.26	21,442
Less serious wounding	7.7	0.26	8,056
Assault on a constable	7.7	0.19	1,440
Assault without injury	7.7	0.19	1,440
Criminal damage	4.3	0.37	866
Theft from a person	4.6	0.07	844
Robbery	3.7	0.07	7,282
Robbery (business)	3.7	0.07	5,000
Burglary in a dwelling	2.2	0.07	3,268
Burglary not in a dwelling	2.1	0.07	2,700
Theft of a pedal cycle	3.6	0.07	634
Theft from vehicle	2.8	0.34	858
Aggravated vehicle taking	1.2	0.34	4,138
Theft of vehicle	1.2	0.34	4,138
Other theft	2.7	0.07	634
Theft from shops	100.0	0.07	100
Violent disorder	1.8	0.21	10,407
Total sexual offence	5.2	0.21	31,438
Homicide	1.0	0.21	1,458,975

Appendix 4: Excess CJS costs (regarding unreported cases) included in the estimated cost of alcohol-related crime

Where U = unreported alcohol-related offences, CJS = Criminal Justice System costs, P = Police costs and VS = victim support costs

Offence	Total	Reported	Unreported	AAF	(U)	(CJS) (£)	(P) (£)	U * (CJS - P) (£)	(VS) (£)	U * VS (£)
Death by dangerous driving	462	462	0	1	0	144239	14901	0	2102	0
More serious wounding	31106	17281	13825	0.26	3595	14345	5917	30294446	7	25162
Less serious wounding	3753465	487463	3266002	0.26	849161	978	412	480624854	7	5944124
Assault on a constable	167483	21751	145732	0.19	27689	255	119	3765715	6	166134
Assault without injury	1594416	207067	1387349	0.19	263596	255	119	35849098	6	1581578
Criminal damage	5095977	1185111	3910866	0.37	1447020	126	76	72351021	2	2894041
Theft from a person	528379	114865	413514	0.07	28946	217	134	2402516	1	28946
Robbery	375069	101370	273699	0.07	19159	2601	878	33010836	16	306543
Robbery (business)	34976	9453	25523	0.07	1787			0	0	0
Burglary in a dwelling	643027	292285	350742	0.07	24552	1137	576	13773638	11	270071
Burglary not in a dwelling	692494	329759	362735	0.07	25391			0	0	0
Theft of a pedal cycle	397912	110531	287381	0.07	20117	301	191	2212834	1	20117
Theft from vehicle	1407456	502663	904793	0.34	307630	50	31	5844963	1	307630
Aggravated vehicle taking	13103	10919	2184	0.34	743	199	81	87622	1	743
Theft of vehicle	218989	182491	36498	0.34	12409	199	81	1464300	1	12409
Other theft	1449257	536762	912495	0.07	63875	301	191	7026212	1	63875
Theft from shops	29430400	294304	29136096	0.07	2039527			0	0	0
Violent disorder	3139	1744	1395	0.21	293	1928	756	343337	9	2637
Total sexual offence	299218	57542	241676	0.21	50752	3298	1524	90033977	32	1624063
Homicide	1414	1414	0	0.21	0	144239	14901	0	2102	0
TOTAL								779,085,370		13,248,071

Appendix 4: Excess Victim Support costs (regarding unreported cases) included in the estimated cost of alcohol-related crime

Offence	total	reported	unreported	AAF	Total unreported alcohol-related offences (U)	victim support costs (VS) (£)	U * VS (£)
Death by dangerous driving	462	462	0	1	0	2102	0
More serious wounding	31106	17281	13825	0.26	3594.5	7	25161.5
Less serious wounding	3753465	487463	3266002	0.26	849160.52	7	5944123.64
Assault on a constable	167483	21751	145732	0.19	27689.08	6	166134.48
Assault without injury	1594416	207067	1387349	0.19	263596.31	6	1581577.86
Criminal damage	5095977	1185111	3910866	0.37	1447020.42	2	2894040.84
Theft from a person	528379	114865	413514	0.07	28945.98	1	28945.98
Robbery	375069	101370	273699	0.07	19158.93	16	306542.88
Robbery (business)	34976	9453	25523	0.07	1786.61	0	0
Burglary in a dwelling	643027	292285	350742	0.07	24551.94	11	270071.34
Burglary not in a dwelling	692494	329759	362735	0.07	25391.45	0	0
Theft of a pedal cycle	397912	110531	287381	0.07	20116.67	1	20116.67
Theft from vehicle	1407456	502663	904793	0.34	307629.62	1	307629.62
Aggravated vehicle taking	13103	10919	2184	0.34	742.56	1	742.56
Theft of vehicle	218989	182491	36498	0.34	12409.32	1	12409.32

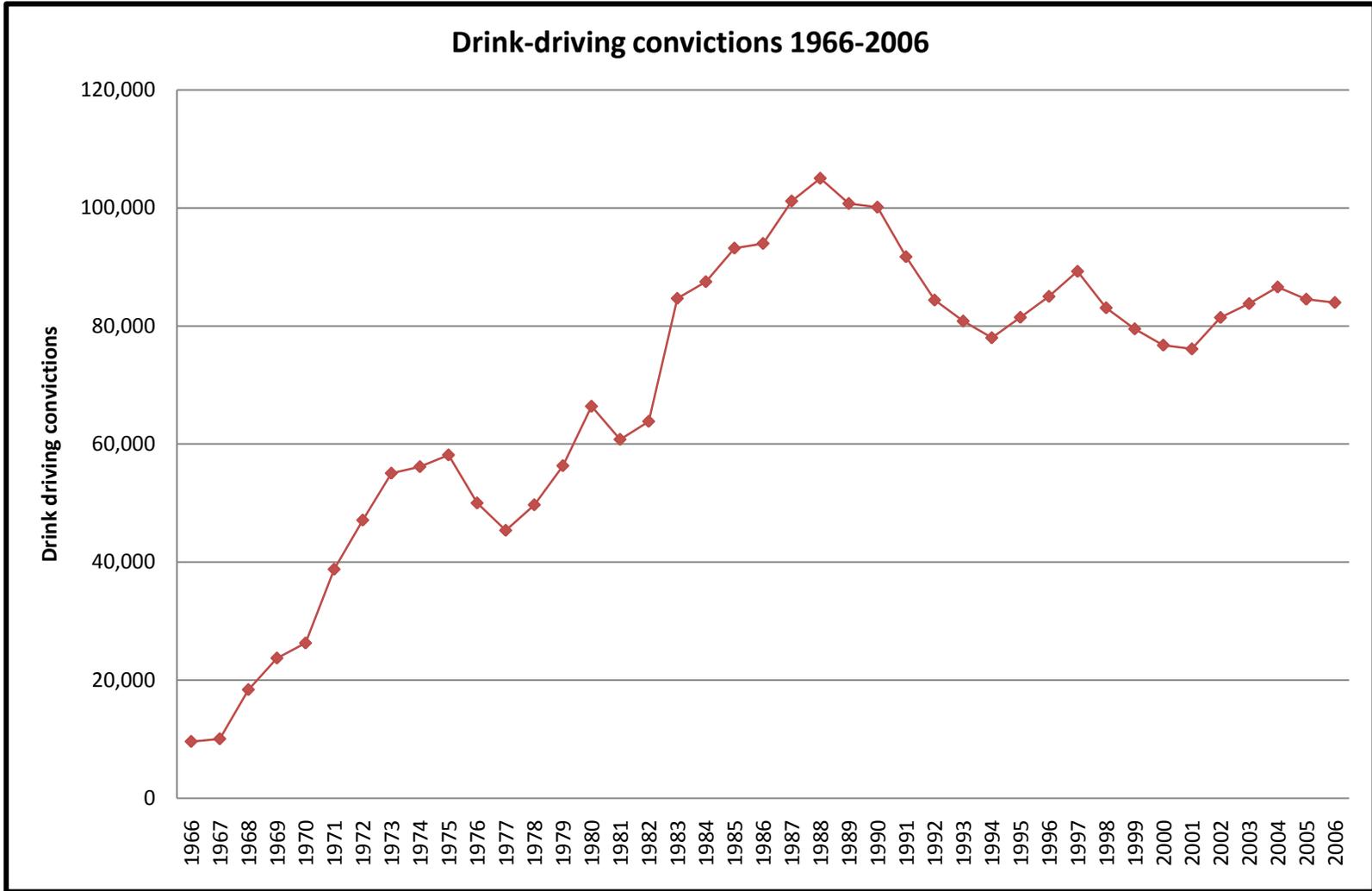
Other theft	1449257	536762	912495	0.07	63874.65	1	63874.65
Theft from shops	29430400	294304	29136096	0.07	2039526.72	0	0
Violent disorder	3139	1744	1395	0.21	292.95	9	2636.55
Total sexual offence	299218	57542	241676	0.21	50751.96	32	1624062.72
Homicide	1414	1414	0	0.21	0	2102	0
TOTAL							13,248,071

Appendix 5: Excess health service and lost output costs included in the estimated cost of alcohol-related crime

Offence	Total alcohol-related offences (O)	Health service unit cost (HS) (£)	O * HS (£)	Lost output unit cost (LO) (£)	O * LO (£)
Death by dangerous driving	462	770	355,740	451110	208412820
More serious wounding	8088	1348	10,902,031	1166	9430095
Less serious wounding	975901	1348	1,315,514,413	1166	1137900449
Assault on a constable	31822	123	3,914,078	269	8560056
Assault without injury	302939	123	37,261,502	269	81490602
Criminal damage	1885511	0	-	6	11313069
Theft from a person	36987	0	-	10	369865
Robbery	26255	483	12,681,083	1011	26543633
Robbery (business)	2448	0	-	0	0
Burglary in a dwelling	45012	0	-	64	2880761
Burglary not in a dwelling	48475	0	-	0	0
Theft of a pedal cycle	27854	0	-	3	83562
Theft from vehicle	478535	0	-	20	9570701
Aggravated vehicle taking	4455	0	-	47	209386
Theft of vehicle	74456	0	-	47	3499444
Other theft	101448	0	-	3	304344
Theft from shops	2060128	0	-	0	0

Violent disorder	659	1347	887,929	1648	1086345
Total sexual offence	62836	916	57,557,574	4430	278362505
Homicide	297	770	228,644	451110	133952603
TOTAL			1,439,302,994		1,913,970,241

Appendix 6: Drink-driving convictions 1966-2006 (Drink driving website, 2011)



Appendix 7: Attributable fractions for alcohol-related diagnosis codes (NWPFO, 2010)

		Alcohol Attributable Fractions															
		0-15		16-24		25-34		35-44		45-54		55-64		65-74		75+	
ICD-10 Code	ICD-10 Name	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
E24.4	Alcohol-induced pseudo-Cushing's syndrome	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
F10	Mental and behavioural disorders due to the use of alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
G31.2	Degeneration of the nervous system due to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
G62.1	Alcoholic polyneuropathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
G72.1	Alcoholic myopathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
I42.6	Alcoholic cardiomyopathy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
K29.2	Alcoholic gastritis	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
K70	Alcoholic liver disease	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
K86.0	Chronic pancreatitis (alcohol induced)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
T51.0	Ethanol poisoning	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
T51.1	Methanol poisoning	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
T51.9	Toxic effect of alcohol, unspecified	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
X45	Accidental poisoning by and exposure to alcohol	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C00-C14	Malignant neoplasm of lip, oral cavity and pharynx	0.00	0.00	0.50	0.40	0.50	0.35	0.49	0.36	0.53	0.35	0.50	0.33	0.44	0.26	0.36	0.20
C15	Malignant neoplasm of oesophagus	0.00	0.00	0.32	0.23	0.31	0.20	0.30	0.20	0.34	0.20	0.32	0.18	0.26	0.14	0.20	0.10
C18	Malignant neoplasm of colon	0.00	0.00	0.05	0.03	0.05	0.03	0.04	0.03	0.05	0.03	0.05	0.03	0.04	0.02	0.03	0.01
C20	Malignant neoplasm of rectum	0.00	0.00	0.08	0.06	0.08	0.05	0.08	0.05	0.09	0.05	0.08	0.05	0.07	0.03	0.05	0.03
C22	Malignant neoplasm of liver and intrahepatic bile ducts	0.00	0.00	0.16	0.11	0.15	0.10	0.15	0.10	0.17	0.10	0.16	0.09	0.13	0.07	0.10	0.05
C32	Malignant neoplasm of larynx	0.00	0.00	0.34	0.25	0.33	0.21	0.32	0.22	0.36	0.21	0.34	0.20	0.28	0.15	0.22	0.11
C50	Malignant neoplasm of breast	0.00	0.00	0.00	0.09	0.00	0.08	0.00	0.09	0.00	0.09	0.00	0.08	0.00	0.06	0.00	0.04
G40-G41	Epilepsy and Status epilepticus	0.00	0.00	0.56	0.64	0.58	0.59	0.58	0.61	0.61	0.61	0.61	0.57	0.51	0.45	0.42	0.35
I10-I15	Hypertensive diseases	0.00	0.00	0.34	0.24	0.33	0.19	0.32	0.20	0.37	0.20	0.34	0.18	0.27	0.13	0.20	0.09
I47-I48	Cardiac arrhythmias	0.00	0.00	0.35	0.36	0.36	0.35	0.37	0.35	0.38	0.35	0.37	0.33	0.34	0.27	0.30	0.22

I50-I51	Heart failure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I60-I62, I69.0-I69.2	Haemorrhagic stroke	0.00	0.00	0.31	0.20	0.30	0.15	0.27	0.15	0.34	0.15	0.30	0.13	0.24	0.10	0.16	0.06
I63-I66, I69.3, I69.4	Ischaemic stroke	0.00	0.00	0.16	0.03	0.13	0.00	0.08	0.00	0.18	0.00	0.12	0.00	0.06	0.00	0.00	0.00
I85	Oesophageal varices	0.00	0.00	0.77	0.67	0.76	0.59	0.74	0.60	0.79	0.59	0.77	0.57	0.71	0.48	0.61	0.38
K22.6	Gastro-oesophageal laceration-haemorrhage syndrome	0.00	0.00	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
K73, K74	Chronic hepatitis, not elsewhere classified and Fibrosis and cirrhosis of liver	0.00	0.00	0.77	0.67	0.76	0.59	0.74	0.60	0.79	0.59	0.77	0.57	0.71	0.48	0.61	0.38
K85, K86.1	Acute and chronic pancreatitis	0.00	0.00	0.27	0.19	0.27	0.16	0.26	0.16	0.30	0.16	0.27	0.14	0.22	0.10	0.16	0.07
L40*	Psoriasis	0.00	0.00	0.34	0.33	0.34	0.33	0.35	0.33	0.36	0.32	0.35	0.31	0.33	0.26	0.30	0.22
O03	Spontaneous abortion	0.00	0.00	0.00	0.23	0.00	0.21	0.00	0.22	0.00	0.21	0.00	0.20	0.00	0.15	0.00	0.12
**	Pedestrian traffic accidents	0.00	0.00	0.35	0.16	0.45	0.19	0.46	0.21	0.46	0.21	0.23	0.03	0.23	0.03	0.23	0.03
***	Road traffic accidents (driver/rider)	0.00	0.00	0.21	0.09	0.33	0.15	0.24	0.12	0.24	0.12	0.09	0.03	0.09	0.03	0.09	0.03
V90-V94	Water transport accidents	0.00	0.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
V95-V97	Air/space transport accidents	0.00	0.00	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
W00-W19	Fall injuries	0.00	0.00	0.22	0.14	0.22	0.14	0.22	0.14	0.22	0.14	0.22	0.14	0.12	0.04	0.12	0.04
W24-W31	Work/machine injuries	0.00	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
W32-W34	Firearm injuries	0.00	0.00	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
W65-W74	Drowning	0.00	0.00	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
W78-W79	Inhalation of gastric contents/Inhalation and ingestion of food causing obstruction of the respiratory tract	0.00	0.00	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
X00-X09	Fire injuries	0.00	0.00	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
X31	Accidental excessive cold	0.00	0.00	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
X60-X84, Y10-Y33	Intentional self-harm/Event of undetermined intent	0.00	0.00	0.34	0.35	0.34	0.33	0.35	0.34	0.37	0.34	0.36	0.32	0.31	0.25	0.27	0.20
X85-Y09	Assault	0.00	0.00	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27

* Excluding cirrhosis L40.5

** V02-V04 [.1, .9], V06.1, V09.2, V09.3

*** V12-V14 [.3 -.9], V19.4-V19.6, V19.9, V20-V28 [.3 -.9], V29-V79 [.4 -.9], V80.3-V80.5, V81.1, V82.1, V82.9, V83.0-V86 [.0 -.3], V87.0-V87.9, V89.2, V89.3, V89.9

Appendix 8: Alcohol-attributable admissions by primary diagnosis for County Durham and Darlington, 2008/09

ICD Code		ICD-10 Name		Alcohol attributable admissions															
				0-15		16-24		25-34		35-44		45-54		55-64		65-74		75+	
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
E24.4	Alcohol-induced pseudo-Cushing's syndrome	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
F10	Mental and behavioural disorders due to the use of alcohol	20.00	29.00	45.00	14.00	46.00	20.00	83.00	29.00	56.00	37.00	45.00	11.00	10.00	6.00	7.00	5.00		
G31.2	Degeneration of the nervous system due to alcohol	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
G62.1	Alcoholic polyneuropathy	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
G72.1	Alcoholic myopathy	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
I42.6	Alcoholic cardiomyopathy	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
K29.2	Alcoholic gastritis	*	*	*	*	*	*	6.00	*	*	*	*	*	*	*	*	*		
K70	Alcoholic liver disease	*	*	*	*	10.00	6.00	21.00	20.00	39.00	31.00	69.00	10.00	18.00	5.00	*	*		
K86.0	Chronic pancreatitis (alcohol induced)	*	*	*	*	10.00	*	11.00	*	9.00	*	*	*	*	*	*	*		
T51.0	Ethanol poisoning	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
T51.1	Methanol poisoning	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
T51.9	Toxic effect of alcohol, unspecified	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
X45	Accidental poisoning by and exposure to alcohol	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
C00-C14	Malignant neoplasm of lip, oral cavity and pharynx	*	*	*	*	*	*	9.80	7.92	24.91	5.25	22.50	16.50	24.64	*	*	*		
C15	Malignant neoplasm of oesophagus	*	*	*	*	*	*	0.30	*	7.14	*	48.64	*	22.62	*	9.40	*		
C18	Malignant neoplasm of colon	*	*	*	*	*	*	*	*	*	*	20.65	5.31	13.04	*	*	*		
C20	Malignant neoplasm of rectum	*	*	*	*	*	*	*	*	5.76	*	16.00	*	8.75	*	*	*		
C22	Malignant neoplasm of liver and intrahepatic bile ducts	*	*	*	*	*	*	*	*	*	*	6.24	*	*	*	*	*		

C32	Malignant neoplasm of larynx	*	*	*	*	*	*	*	*	*	*	*	*	5.32	*	*	*	
C50	Malignant neoplasm of breast	*	*	*	0.63	*	5.68	*	54.00	*	79.65	*	75.44	*	27.84	*	8.40	
G40-G41	Epilepsy and Status epilepticus	*	*	17.92	16.00	17.98	17.70	19.14	17.69	17.69	15.86	10.98	10.26	10.71	9.45	7.98	8.05	
I10-I15	Hypertensive diseases	*	*	*	*	*	*	8.64	5.40	9.62	*	11.22	*	9.18	*	8.20	*	
I47-I48	Cardiac arrhythmias	*	*	7.70	6.48	7.56	5.25	13.69	8.05	45.60	10.85	59.94	26.07	58.14	45.90	53.70	56.98	
I50-I51	Heart failure	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
¹	Haemorrhagic stroke	*	*	*	*	*	*	*	*	*	*	*	7.80	*	6.24	*	5.92	*
²	Ischaemic stroke	*	*	*	*	*	*	*	*	6.12	*	8.76	*	9.42	*	*	*	
I85	Oesophageal varices	*	*	*	*	*	*	*	*	*	*	*	8.47	*	13.49	*	6.10	*
K22.6	Gastro-oesophageal laceration-haemorrhage syndrome	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
K73, K74	Chronic hepatitis, not elsewhere classified and Fibrosis and cirrhosis of liver	*	*	*	*	*	*	8.88	*	5.53	*	*	8.55	*	9.12	*	*	
K85, K86.1	Acute and chronic pancreatitis	*	*	*	*	7.29	*	17.42	*	13.50	5.44	10.26	*	8.36	*	*	*	
L40 ³	Psoriasis	*	*	*	8.58	12.24	6.93	14.35	27.06	24.48	26.56	14.35	18.91	20.79	5.46	5.70	*	
O03	Spontaneous abortion	*	*	*	33.35	*	46.20	*	29.04	*	*	*	*	*	*	*	*	
⁴	Pedestrian traffic accidents	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
⁵	Road traffic accidents (driver/rider)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
V90-V94	Water transport accidents	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
V95-V97	Air/space transport accidents	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
W00-W19	Fall injuries	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
W24-W31	Work/machine injuries	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
W32-W34	Firearm injuries	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
W65-W74	Drowning	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
W78-W79	Inhalation of gastric contents/Inhalation and ingestion of food causing obstruction of the respiratory tract	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
X00-X09	Fire injuries	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
X31	Accidental excessive cold	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

X60-X84, Y10-Y33	Intentional self-harm/Event of undetermined intent	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
X85-Y09	Assault	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NA	TOTAL	23.00	33.00	90.55	87.61	126.7	120.5	224.0	214.2	288.5	229.9	376.4	207.5	247.9	138.7	129.4	102.6
						1	1	2	1	6	4	1	6	6	5	1	9

¹ I60-I62, I69.0-I69.2

² I63-I66, I69.3, I69.4

³ excluding cirrhosis L40.5

⁴ V02-V04 [.1, .9], V06.1, V09.2, V09.3

⁵ V12-V14 [.3 -.9], V19.4-V19.6, V19.9, V20-V28 [.3 -.9], V29-V79 [.4 -.9], V80.3-V80.5, V81.1, V82.1, V82.9, V83.0-V86 [.0 -.3], V87.0-V87.9, V89.2, V89.3, V89.9

* Denotes value less than 5

Appendix 9: Alcohol-attributable costs by primary diagnosis for County Durham and Darlington, 2008/09

		Alcohol Attributable Costs (£)															
		0-15		16-24		25-34		35-44		45-54		55-64		65-74		75+	
ICD Code	ICD Name	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
E24.4	Alcohol-induced pseudo-Cushing's syndrome	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F10	Mental and behavioural disorders due to the use of alcohol	15118.26	21601.17	45161.58	13471.92	58749.45	24844.05	111055.94	39192.40	78617.41	48188.17	58281.06	15052.97	22219.30	9145.00	14012.93	6693.05
G31.2	Degeneration of the nervous system due to alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G62.1	Alcoholic polyneuropathy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2355.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G72.1	Alcoholic myopathy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I42.6	Alcoholic cardiomyopathy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7138.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K29.2	Alcoholic gastritis	0.00	0.00	1720.00	0.00	4005.00	3595.00	5160.00	5470.00	5470.00	860.00	4610.00	2735.00	860.00	0.00	0.00	0.00
K70	Alcoholic liver disease	0.00	0.00	10907.60	6257.50	29680.40	24506.60	60665.70	60072.20	121226.40	87296.20	273082.80	21404.10	55852.20	17491.10	0.00	3448.50
K86.0	Chronic pancreatitis (alcohol induced)	0.00	0.00	2613.60	435.60	17310.70	871.20	22445.60	0.00	13620.20	0.00	11212.30	435.60	7069.70	0.00	0.00	0.00
T51.0	Ethanol poisoning	1596.00	2128.00	398.00	0.00	0.00	796.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T51.1	Methanol poisoning	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T51.9	Toxic effect of alcohol, unspecified	0.00	0.00	0.00	0.00	398.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
X45	Accidental poisoning by and exposure to alcohol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C00-C14	Malignant neoplasm of lip, oral cavity and pharynx	0.00	0.00	0.00	0.00	710.50	276.15	20772.57	10376.63	34599.75	4138.35	33949.98	20090.14	33831.49	4908.80	11996.64	1828.80
C15	Malignant neoplasm of oesophagus	0.00	0.00	0.00	0.00	0.00	0.00	724.20	0.00	5265.58	2680.80	53247.61	5659.93	27313.78	6592.77	14351.03	5587.10
C18	Malignant neoplasm of colon	0.00	0.00	0.00	0.00	622.45	375.09	1585.13	810.87	4522.80	1012.78	16212.49	5163.39	14765.08	6277.22	6849.71	3435.98
C20	Malignant neoplasm of rectum	0.00	0.00	0.00	0.00	0.00	0.00	1584.56	100.30	6855.86	1743.52	17277.52	3783.00	13961.39	2944.65	8437.82	3460.41
C22	Malignant neoplasm of liver and intrahepatic bile ducts	0.00	0.00	0.00	0.00	0.00	0.00	361.52	0.00	409.72	0.00	17207.57	3189.88	8840.30	598.91	3168.77	617.98
C32	Malignant neoplasm of larynx	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5498.28	0.00	7171.96	1511.60	11854.92	2267.40	7266.38	2177.56
C50	Malignant neoplasm of breast	0.00	0.00	0.00	562.14	0.00	2389.83	0.00	33673.88	0.00	56549.07	0.00	56222.85	0.00	24772.96	0.00	11019.41

G40-G41	Epilepsy and Status epilepticus	0.00	0.00	17853.36	15968.00	22640.39	12241.32	16743.72	11188.01	20993.76	14938.90	13906.78	9924.84	19970.07	13905.45	15711.78	20237.35
I10-I15	Hypertensive diseases	0.00	0.00	788.12	616.80	1363.56	1318.79	13504.64	6673.00	11748.98	2122.00	17527.34	2858.76	21110.76	10261.16	10157.00	6067.89
I47-I48	Cardiac arrhythmias	0.00	0.00	14162.30	9478.84	8103.10	6307.62	17618.66	12306.04	49221.78	25176.24	72765.45	36617.92	87311.48	63537.48	101711.54	100470.28
I50-I51	Heart failure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
¹	Haemorrhagic stroke	0.00	0.00	3200.75	1465.00	9922.80	656.70	14963.17	7900.80	16205.08	17000.55	33499.89	8260.98	20044.80	9402.50	21608.64	15499.26
²	Ischaemic stroke	0.00	0.00	656.32	0.00	1209.52	0.00	3011.68	0.00	20222.82	0.00	31970.04	0.00	36913.02	0.00	0.00	0.00
I85	Oesophageal varices	0.00	0.00	0.00	0.00	3055.58	0.00	2537.24	270.60	2492.29	4742.89	7923.69	5755.86	12756.07	2636.83	6925.39	2786.88
K22.6	Gastro-oesophageal laceration-haemorrhage syndrome	0.00	0.00	2316.63	461.54	3130.20	1043.40	782.55	521.70	1472.51	886.89	2696.86	2294.07	2310.52	1660.51	1064.08	3834.73
K73, K74	Chronic hepatitis, not elsewhere classified and Fibrosis and cirrhosis of liver	0.00	0.00	0.00	0.00	0.00	1728.11	29073.64	21402.60	5379.19	2107.48	6295.06	14509.86	2949.84	20277.50	10034.87	5279.23
K85, K86.1	Acute and chronic pancreatitis	0.00	0.00	3481.43	3925.23	10616.27	2976.86	34560.24	8756.02	27838.44	11784.91	29424.57	10397.34	29197.23	8709.18	11726.35	8176.45
L40 ³	Psoriasis	0.00	0.00	5290.51	10175.88	14320.80	8218.98	18213.65	32546.58	29738.52	32135.68	18475.45	28528.68	26856.72	9163.44	12829.80	0.00
O03	Spontaneous abortion	0.00	0.00	0.00	17132.09	0.00	24890.04	0.00	16852.88	0.00	196.98	0.00	0.00	0.00	0.00	0.00	113.76
⁴	Pedestrian traffic accidents	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
⁵	Road traffic accidents (driver/rider)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
V90-V94	Water transport accidents	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
V95-V97	Air/space transport accidents	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W00-W19	Fall injuries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W24-W31	Work/machine injuries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W32-W34	Firearm injuries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W65-W74	Drowning	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W78-W79	Inhalation of gastric contents/Inhalation and ingestion of food causing obstruction of the respiratory tract	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
X00-X09	Fire injuries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

X31	Accidental excessive cold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
X60-X84, Y10-Y33	Intentional self-harm/Event of undetermined intent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
X85-Y09	Assault	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	TOTAL	16714.26	23729.17	108550.19	79950.54	185838.71	117035.75	375364.41	268114.50	470892.36	313561.41	726738.41	254396.77	455988.66	214552.87	257852.72	200734.61

¹ I60-I62, I69.0-I69.2

² I63-I66, I69.3, I69.4

³ excluding cirrhosis L40.5

⁴ V02-V04 [.1, .9], V06.1, V09.2, V09.3

⁵ V12-V14 [.3 -.9], V19.4-V19.6, V19.9, V20-V28 [.3 -.9], V29-V79 [.4 -.9], V80.3-V80.5, V81.1, V82.1, V82.9, V83.0-V86 [.0 -.3], V87.0-V87.9, V89.2, V89.3, V89.9

Appendix 10: 10 condition grouping for alcohol-related diagnosis codes (NWPFO, 2010)

Condition groupings	Diagnosis codes	ICD10 category names
Alcohol specific (Chronic)	E24.4	Alcohol-induced pseudo-Cushing's syndrome
	G31.2	Degeneration of nervous system due to alcohol
	G62.1	Alcoholic polyneuropathy
	G72.1	Alcoholic myopathy
	I42.6	Alcoholic cardiomyopathy
	K29.2	Alcoholic gastritis
	K70	Alcoholic liver disease
	K86.0	Chronic pancreatitis (alcohol induced)
Alcohol specific (Mental/Behavioural)	F10	Mental and behavioural disorders due to use of alcohol
Alcohol specific (Acute)	T51.0	Ethanol poisoning
	T51.1	Methanol poisoning
	T51.9	Toxic effect of alcohol, unspecified
	X45	Accidental poisoning by and exposure to alcohol
Accidents & Injury (Acute)	W00-W19	Fall injuries
	W24-W31	Work/machine injuries
	W32-W34	Firearm injuries
	W65-W74	Drowning

	W78-W79	Inhalation of gastric contents/Inhalation and ingestion of food causing obstruction of the respiratory tract
	X00-X09	Fire injuries
	X31	Accidental excessive cold
	V02-V04 (.1, .9), V06.1, V09.2, V09.3	Pedestrian traffic accidents
	¹	Road traffic accidents (driver/rider)
	V90-V94	Water transport accidents
	V95-V97	Air/space transport accidents
Violence (Acute)	X60-X84, Y10-Y33	Intentional self-harm/Event of undetermined intent
	X85-Y09	Assault
Digestive (Chronic)	K22.6	Gastro-oesophageal laceration-haemorrhage syndrome
	K73, K74	Chronic hepatitis, not elsewhere classified and Fibrosis and cirrhosis of liver
	K85, K86.1	Acute and chronic pancreatitis
	I85	Oesophageal varices
Cancer (Chronic)	C00-C14	Malignant neoplasm of lip, oral cavity and pharynx
	C15	Malignant neoplasm of oesophagus
	C32	Malignant neoplasm of larynx
	C18	Malignant neoplasm of colon
	C20	Malignant neoplasm of rectum
	C22	Malignant neoplasm of liver and intrahepatic bile ducts
	C50	Malignant neoplasm of breast

Hypertensive diseases (Chronic)	I10-I15	Hypertensive diseases
Cardiac arrhythmias (Chronic)	I47-I48	Cardiac arrhythmias
Other diseases (Chronic)	G40-G41	Epilepsy and Status epilepticus
	I60-I62, I69.0-I69.2	Haemorrhagic stroke
	I63-I66, I69.3, I69.4	Ischaemic stroke
	L40 excluding cirrhosis L40.5	Psoriasis
	O03	Spontaneous abortion

¹ V12-V14 (.3 -.9), V19.4-V19.6, V19.9, V20-V28 (.3 -.9), V29-V79 (.4 -.9), V80.3-V80.5, V81.1, V82.1, V82.9, V83.0-V86 (.0 -.3), V87.0-V87.9, V89.2, V89.3, V89.9

Appendix 11: Average costs of the NWPHO 10 condition groups, national averages vs. averages based on local primary diagnosis analysis

Condition	Average cost per admissions		Difference (national to local)	
	Local	National	Cost	%
Alcohol specific (Mental and Behavioural)	£1,255.73	£1,599	-£343	-21%
- Alcohol specific (Acute)	-	£509	-	-
- Accidents & Injury (Acute)	-	£2,411	-	-
- Violence (Acute)	-	£874	-	-
- Alcohol specific (Chronic)	£2,822.42	£2,370	£452	19%
- Digestive (Chronic)	£1,954.25	£1,960	-£6	0%
- Cancer (Chronic)	£1,120.01	£1,375	-£255	-19%
- Hypertensive diseases (Chronic)	-	£1,975	-	-
- Cardiac arrhythmias (Chronic)	-	£2,436	-	-
- Other diseases (Chronic)	£1,419.24	£1,778	-£359	-20%

Appendix 12: Estimated drinking behaviour in County Durham and Darlington for 2008

County Durham:

	Safe level	Increasing Risk	Higher Risk
Male	139,209.7	47,1324.5	15,4988.5
Female	167,243.2	35,992.8	11,0229.7
Total	306,452.9	83,1252.5	26,5218.2

Darlington:

	Safe level	Increasing Risk	Higher Risk
Male	139,209.7	47,1324.5	15,4988.5
Female	167,243.2	35,992.8	11,0229.7
Total	306,452.9	83,1252.5	26,5218.2

Appendix 13: Age specific distribution of alcohol consumption (NWPHO, 2008)

Age	Males (g/day)					Females (g/day)				
	None	1 - 19	20-39	40 - 74	75+	None	1 - 19	20 - 39	40-74	75+
16 to 24	18.1%	43.5%	20.5%	9.9%	7.9%	23.8%	51.3%	16.2%	5.2%	3.5%
25 to 34	17.8%	42.0%	20.7%	13.2%	6.3%	23.9%	56.2%	13.7%	4.8%	1.4%
35 to 44	12.4%	45.6%	22.9%	14.7%	4.5%	23.1%	55.3%	15.1%	4.9%	1.5%
45 to 54	12.4%	42.7%	22.0%	14.5%	8.4%	25.5%	52.9%	14.3%	6.1%	1.2%
55 to 64	13.9%	44.8%	19.4%	16.0%	5.9%	30.3%	51.3%	12.2%	5.2%	1.1%
65 to 74	20.0%	49.2%	16.7%	9.9%	4.1%	43.5%	46.2%	7.8%	1.7%	0.9%
75 +	28.5%	49.6%	12.9%	7.5%	1.5%	52.3%	41.4%	4.8%	1.2%	0.2%
16-75	16.5%	45.0%	19.9%	12.9%	5.7%	30.2%	51.5%	12.5%	4.4%	1.4%

Appendix 14: Relative Risks (RR) for ICD-10 codes K73 and K74 (NWPHO, 2008)

Condition	ICD10 code(s)	Relative risk estimate (g/day)							
		Males				Females			
		1-19	20-39	40-74	75+	1-19	20-39	40-74	75+
Unspecified liver disease	K73, K74	1.95	2.9	7.13	26.53	1.95	2.9	7.13	26.53

Appendix 15: A worked example of the calculation of the AAF for K74- Fibrosis and cirrhosis of liver in males aged 16 to 24

The worked example below shows the calculation of the AAF for K74- Fibrosis and cirrhosis of liver in males aged 16 to 24 where 18.1% are abstainers, 43.5% drink between 1 and 19 g/day, 20.5% drink between 20 and 39 g/day, 9.9% drink between 40 and 74 g/day and 7.9% drink more than 75 g/day.

Using abstainers as the reference groups (RR=1.00), the RR estimates for K73 are: 1.95 for drinking 1-19 g/day; 2.90 for drinking 20-39 g/day; 7.13 for drinking 40-74 g/day and 26.53 for drinking more than 75 g/day.

Applying the formula above gives the following estimates of the AAF.

K74 AAF for males aged 16-24 drinking between 1 and 19 g/day:

$$= (0.435 \times (1.95 - 1)) \div 1 + (0.181 \times (1.00 - 1)) + (0.435 \times (1.95 - 1)) + (0.205 \times (2.90 - 1)) + (0.099 \times (7.13 - 1)) + (0.079 \times (26.53 - 1)) = 9.3\%$$

K74 AAF for males aged 16-24 drinking between 20 and 39 g/day:

$$= (0.205 \times (2.90 - 1)) \div 1 + (0.181 \times (1.00 - 1)) + (0.435 \times (1.95 - 1)) + (0.205 \times (2.90 - 1)) + (0.099 \times (7.13 - 1)) + (0.079 \times (26.53 - 1)) = 8.8\%$$

K74 AAF for males aged 16-24 drinking between 40 and 74 g/day:

$$= (0.099 \times (7.13 - 1)) \div 1 + (0.181 \times (1.00 - 1)) + (0.435 \times (1.95 - 1)) + (0.205 \times (2.90 - 1)) + (0.099 \times (7.13 - 1)) + (0.079 \times (26.53 - 1)) = 13.7\%$$

K74 AAF for males aged 16-24 drinking more than 75 g/day:

$$= (0.079 \times (26.53 - 1)) \div 1 + (0.181 \times (1.00 - 1)) + (0.435 \times (1.95 - 1)) + (0.205 \times (2.90 - 1)) + (0.099 \times (7.13 - 1)) + (0.079 \times (26.53 - 1)) = 45.6\%$$

$$\text{The overall AAF for K74 in males aged 16 to 24} = (9.3 + 8.8 + 13.7 + 45.6) = 77\%$$

Appendix 16: Alcohol Attributable Fractions by age and gender

Males (16-24)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	9%	9%	14%	46%	
0	0%	8%	8%	12%	41%	
1	0%	8%	7%	11%	37%	
2	0%	7%	6%	10%	33%	
3	0%	6%	6%	9%	29%	
4	0%	5%	5%	7%	25%	
5	0%	4%	4%	6%	21%	
6	0%	3%	3%	5%	16%	
7	0%	2%	2%	3%	11%	
8	0%	1%	1%	2%	5%	
9	0%	0%	0%	0%	0%	

Males (25-34)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	9%	9%	19%	38%	
0	0%	8%	8%	17%	34%	
1	0%	8%	7%	15%	30%	
2	0%	7%	7%	14%	27%	
3	0%	6%	6%	12%	24%	
4	0%	5%	5%	10%	20%	
5	0%	4%	4%	9%	17%	
6	0%	3%	3%	7%	13%	
7	0%	2%	2%	5%	9%	
8	0%	1%	1%	2%	4%	
9	0%	0%	0%	0%	0%	

Males (35-44)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	11%	11%	23%	29%	
0	0%	10%	10%	20%	26%	
1	0%	9%	9%	18%	23%	
2	0%	8%	8%	16%	20%	
3	0%	7%	7%	14%	18%	
4	0%	6%	6%	12%	15%	
5	0%	5%	5%	10%	13%	
6	0%	4%	4%	8%	10%	
7	0%	3%	3%	5%	7%	
8	0%	1%	1%	2%	3%	
9	0%	0%	0%	0%	0%	

Males (45-54)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	8%	9%	18%	44%	
0	0%	8%	8%	17%	40%	
1	0%	7%	7%	15%	36%	
2	0%	6%	6%	13%	32%	
3	0%	5%	6%	12%	29%	
4	0%	5%	5%	10%	25%	
5	0%	4%	4%	9%	21%	
6	0%	3%	3%	7%	17%	
7	0%	2%	2%	5%	12%	
8	0%	1%	1%	2%	6%	
9	0%	0%	0%	0%	0%	

Males (55-64)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	10%	9%	23%	35%	
0	0%	9%	8%	21%	32%	
1	0%	8%	7%	18%	28%	
2	0%	7%	6%	16%	25%	
3	0%	6%	5%	14%	22%	
4	0%	5%	5%	12%	19%	
5	0%	4%	4%	10%	16%	
6	0%	3%	3%	8%	12%	
7	0%	2%	2%	6%	9%	
8	0%	1%	1%	3%	4%	
9	0%	0%	0%	0%	0%	

Males (65-74)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	14%	9%	18%	30%	
0	0%	12%	8%	15%	27%	
1	0%	10%	7%	13%	23%	
2	0%	9%	6%	12%	20%	
3	0%	8%	5%	10%	17%	
4	0%	6%	4%	8%	15%	
5	0%	5%	4%	7%	12%	
6	0%	4%	3%	5%	9%	
7	0%	3%	2%	4%	6%	
8	0%	1%	1%	2%	3%	
9	0%	0%	0%	0%	0%	

Males (75+)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	18%	10%	18%	15%	
0	0%	15%	8%	15%	13%	
1	0%	13%	7%	13%	11%	
2	0%	11%	6%	11%	9%	
3	0%	9%	5%	9%	7%	
4	0%	7%	4%	7%	6%	
5	0%	6%	3%	6%	5%	
6	0%	4%	2%	4%	4%	
7	0%	3%	2%	3%	2%	
8	0%	1%	1%	1%	1%	
9	0%	0%	0%	0%	0%	

Females (16-25)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	16%	10%	11%	30%	
0	0%	14%	9%	9%	26%	
1	0%	12%	8%	8%	22%	
2	0%	10%	6%	7%	19%	
3	0%	9%	6%	6%	16%	
4	0%	7%	5%	5%	13%	
5	0%	6%	4%	4%	11%	
6	0%	4%	3%	3%	8%	
7	0%	3%	2%	2%	5%	
8	0%	1%	1%	1%	3%	
9	0%	0%	0%	0%	0%	

Females (25-34)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	22%	11%	12%	15%	
0	0%	18%	9%	10%	12%	
1	0%	15%	7%	8%	10%	
2	0%	13%	6%	7%	8%	
3	0%	11%	5%	6%	7%	
4	0%	9%	4%	5%	6%	
5	0%	7%	3%	4%	5%	
6	0%	5%	2%	3%	3%	
7	0%	3%	2%	2%	2%	
8	0%	2%	1%	1%	1%	
9	0%	0%	0%	0%	0%	

Females (35-44)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	21%	11%	12%	15%	
0	0%	18%	10%	10%	13%	
1	0%	15%	8%	8%	11%	
2	0%	12%	7%	7%	9%	
3	0%	10%	6%	6%	8%	
4	0%	8%	5%	5%	6%	
5	0%	7%	4%	4%	5%	
6	0%	5%	3%	3%	4%	
7	0%	3%	2%	2%	2%	
8	0%	2%	1%	1%	1%	
9	0%	0%	0%	0%	0%	

Females (45-54)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	20%	11%	15%	12%	
0	0%	17%	9%	13%	10%	
1	0%	14%	8%	11%	9%	
2	0%	12%	6%	9%	7%	
3	0%	10%	5%	7%	6%	
4	0%	8%	4%	6%	5%	
5	0%	7%	4%	5%	4%	
6	0%	5%	3%	4%	3%	
7	0%	3%	2%	2%	2%	
8	0%	1%	1%	1%	1%	
9	0%	0%	0%	0%	0%	

Females (55-64)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	21%	10%	14%	12%	
0	0%	17%	8%	11%	10%	
1	0%	14%	7%	9%	8%	
2	0%	12%	6%	8%	7%	
3	0%	10%	5%	7%	6%	
4	0%	8%	4%	5%	5%	
5	0%	6%	3%	4%	4%	
6	0%	5%	2%	3%	3%	
7	0%	3%	1%	2%	2%	
8	0%	1%	1%	1%	1%	
9	0%	0%	0%	0%	0%	

Females (65-74)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	23%	8%	5%	12%	
0	0%	18%	6%	4%	10%	
1	0%	15%	5%	3%	8%	
2	0%	12%	4%	3%	6%	
3	0%	10%	3%	2%	5%	
4	0%	8%	3%	2%	4%	
5	0%	6%	2%	1%	3%	
6	0%	4%	1%	1%	2%	
7	0%	3%	1%	1%	2%	
8	0%	1%	0%	0%	1%	
9	0%	0%	0%	0%	0%	

Females (75+)		g/per day alcohol				
Year	0	1 to 19	20 to 39	40 to 74	75+	
-1	0%	24%	6%	5%	3%	
0	0%	19%	4%	4%	2%	
1	0%	15%	3%	3%	2%	
2	0%	12%	3%	2%	2%	
3	0%	9%	2%	2%	1%	
4	0%	7%	2%	1%	1%	
5	0%	6%	1%	1%	1%	
6	0%	4%	1%	1%	1%	
7	0%	3%	1%	0%	0%	
8	0%	1%	0%	0%	0%	
9	0%	0%	0%	0%	0%	

Appendix 17: Number of admissions for ICD-10 codes K73 and K74 for males and females

* Denotes value less than 5

Males	K74- Cirrhosis of liver	K74- Cirrhosis of liver
Age	Cases	Cases
16-24	*	*
25-34	*	*
35-44	11	*
45-54	*	*
55-64	*	*
65-74	*	*
75+	*	*
TOTAL	25	6

Females	K74- Cirrhosis of liver	K74- Cirrhosis of liver
Age	Cases	Cases
16-24	*	*
25-34	*	*
35-44	6	*
45-54	5	*
55-64	15	*
65-74	18	*
75+	*	*
TOTAL	49	*