INDEPENDENT REVIEW OF THE EFFECTS OF ALCOHOL PRICING AND PROMOTION: Part B

Modelling the Potential Impact of Pricing and Promotion Policies for Alcohol in England: Results from the Sheffield Alcohol Policy Model Version 2008(1-1)

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EXECUTIVE SUMMARY

Introduction & Methodological Approach

This report summarises the methods, results and implications of a research study funded by the Department of Health Policy Research Programme to quantify the potential impact of policies targeting pricing and promotion of alcohol on alcohol related harm in England. It accompanies the report of Phase 1 of this study, a systematic review report summarising the existing research evidence on this topic.

The aim was to model the potential implications of changes to current policies, especially the population-based impact on health, crime, and wider economy, again for the population as a whole and also with a focus on:

- young people under 18 who drink alcohol
- 18-24 year old binge drinkers
- harmful drinkers whose patterns of drinking damage their physical / mental health or causes substantial harm to others.

The questions that the study has been able to address are: What is the potential effect on alcohol related harm of introducing

- general price increases, including separate analyses for on- and off-trade and for low-priced alcohol (on-trade refers to licensed premises, off-trade to supermarkets, off-licenses etc)
- minimum prices per unit of alcohol
- restrictions on the extent of discounted price-based promotion in the off-trade.

The study has not been able to examine questions around on-trade promotions such as ‘happy hours’, due to a lack of systematically collected quantified data on the scale and types of discounting and the resulting effects on consumer demand.

The study also contains exploratory analyses concerning the potential impact of restrictions on advertising (in particular focussed on the proportion of advertising space/time for public health messages, and on reducing exposure to advertising for under-18s). We report on the substantial uncertainty in the available evidence and the need for further research.

Based on existing guidelines on alcohol consumption in England, drinkers are classified in three drinking categories based on their mean intake per week:

- “moderate drinkers”, i.e. drinkers with an intake of alcohol less likely to damage health and/or associated with negative consequences (up to 21 units per week for men and 14 units for women)

- "hazardous drinkers", i.e., drinkers with an increased risk of psychological and physical consequences due to alcohol intake (more than 21 to 50 units per week for men and more than 14 to 35 units for women)
- "harmful drinkers", i.e. drinkers with an intake that is likely to adversely affecting health and/or other negative consequences (more than 50 units per week for men and more than 35 units per week for women).

Individuals can also be classified as a "binge drinker" based on the maximum intake of alcohol during a single session. A binge is defined as an intake of more than twice the recommended daily limit (i.e. more than 8 units per day for men and more than 6 units per day for women).

Harms Included in the Analysis

The study examines alcohol related harm in terms of health, crime and employment.

For health, the study examines 47 conditions which are either wholly attributable to alcohol (e.g. alcoholic liver disease), partially attributable to long-term chronic alcohol use (e.g. throat cancers), or partially attributable to level of acute alcohol intake on a single occasion (e.g. falls or road traffic accidents). Published research evidence is used to quantify the relationship between extent of alcohol use and the risk of illness and death for each condition, split by gender and age group. For chronic conditions, the model considers the time it takes to achieve the full effect on disease prevalence following a change in the extent of alcohol use. The model results for each policy are measured using deaths avoided, illnesses avoided (person specific), numbers of hospital admissions avoided, and NHS costs (including inpatient, outpatient, A&E, ambulance and primary care costs). By examining life expectancies for the deaths avoided using survival statistics, we also estimate the 'years of additional life' for the population. An index of health-related quality of life is used to allow comparison across conditions (with a score between 1 for perfect health, and 0 for a health condition so severe that death might be equally preferable). This enables improvements in both quality of life and survival to be summarised into the measure 'quality adjusted life years' (QALY) gained by the policy change. The policy effects on health can be valued financially using the Department of Health valuation of £50,000 per QALY. Together with the direct NHS costs this then provides an estimate of the full health-related costs saved by each policy alternative.

For crime, the study builds upon previously published work by the Cabinet Office and the Home Office, examining policy impacts on violent crimes, criminal damage, thefts, robberies and other offences. As with health, published statistics on the extent to which each crime is attributable to alcohol are used, and published research evidence quantifies the relationship between the extent of 'acute' alcohol intake on a single occasion and the risk of each crime, again split by gender and age groups. The research evidence on the proportion of crime that is directly related to alcohol consumption and the how risk of crime varies for different consumption levels is less robust than in the health field. Therefore, sensitivity analysis is undertaken to examine how model results change when using different assumptions or evidence sources. The model results for each policy are measured using reductions in numbers of crimes, costs to the criminal justice system and a measure of the impact of crimes on victims, using published QALY estimates for each type of crime. The policy effects on crime are valued using the Home Office valuation of approximately £80,000 per QALY for victims of crime. Together with the direct criminal justice system costs, this provides an estimate of crime costs saved by each policy option.

For employment, the study examines absence from work and unemployment attributable to alcohol use. Published evidence is used on the extent to which absence is attributable to alcohol and to quantify the relationship between the extent of 'acute' alcohol intake and the risk of absence. Similarly, evidence is used to quantify the relationship between 'chronic' high volume alcohol and the risk of unemployment, again split by gender and age groups. Sensitivity analysis examines the effects of using alternative assumptions/evidence sources. Model results are measured in days of absence and numbers unemployed and given a financial value by multiplying by gross average salary levels for the age/sex groups.

Evidence on Alcohol Consumption, Purchasing Patterns and Pricing

A key aspect of this research study is the use made of two detailed individual-level population survey datasets. One provides data on alcohol consumption (the General Household Survey or GHS), the other on alcohol purchasing including price paid (the Expenditure and Food Survey or EFS).

The consumption patterns reported in the latest available version of the GHS (2006) provide the baseline position in our analysis. This dataset provides, for each individual, details on mean consumption of alcohol (used for modelling 'chronic' harms), and maximum per day alcohol intake in the survey week (used for modelling 'acute' harms). We split the consumption data into the categories beers, wines, spirits and 'Ready-To Drinks' (RTDs, these are also called alcopops). Consumption level is reported in standard alcohol units. For the modelling, we split the population into moderate drinkers, hazardous drinkers and harmful drinkers. As the GHS does not cover under-16s, data on 11-15 year olds was obtained from the Smoking Drinking and Drug Use Survey, a school survey which contains the same consumption indicators as the GHS (SDD). The most important issue with the GHS is that there is no information on the price paid or the place of purchase (on-trade or off-trade) of the alcohol consumed.

The EFS is an annual household survey which uses a 14-day diary to record purchasing of products. Access to data from the latest 5 surveys (2001/2 through to 2005/6) has enabled a detailed analysis of alcohol purchasing patterns showing alcohol units purchased split by beers, wines, spirits and RTDs including an on- and off-trade split and most importantly the price paid for each purchase. In particular, this allows analysis of volumes of purchasing of the different categories of alcohol and distributions of prices paid for moderate, hazardous and harmful drinkers split by the age groups and gender. Both the EFS and the GHS have data on the age, sex, income, education history and other attributes of the individual respondents allowing statistical adjustment for these factors.

Econometric analysis on the EFS 5-year dataset has been undertaken to quantify the elasticity of demand for alcohol – the change to purchasing levels that can be expected to happen when prices change. We undertook elasticity analyses for 16 different categories of alcohol: beers, wines, sprits and ready-to-drinks, split by on- or off-trade purchase and further split into two price categories, using a cut-off for low priced alcohol of less than 30p per unit of alcohol (off-trade) and less than 80p per unit of alcohol (on-trade).

The primary results of this econometric analysis are ‘own-price elasticities’ which describe how demand for a product changes if the product’s own price changes. An own-price elasticity of, say, -0.5 for beer is interpreted as follows: if the price of that product is increased by 1% then the amount of beer purchased would change by -0.5% i.e. a price increase results in reduced purchasing. The analyses also provide ‘cross-price elasticities’ which give a picture of switching between products when prices change e.g. a cross-price elasticity of +0.2 between beer and wine would mean that people would increase their purchasing of wine by 0.2% as a result of a 1% increase in the price of beer. Analyses have been undertaken for the whole population and separately for moderate, hazardous and harmful drinkers.

The results show for example that typical own-price elasticities are in the range -0.36 to -0.62 overall, which is in line with evidence reported in our systematic review. Own price elasticities for moderate drinkers range typically from -0.23 to -0.52, for hazardous drinkers from -0.30 to -0.61 and for harmful drinkers from -0.41 to -0.70. Patterns for cross-price elasticities suggest that product switching is complex, with some products being substitutes i.e. price change causes a switch and others being complements i.e. a price rise in one causes reductions in purchasing of both. Cross-price elasticities are higher in scale (i.e. switching occurs more) for hazardous and harmful drinkers than for moderate drinkers, with cross-price elasticities as high as +0.06 for hazardous compared with +0.01 for moderate. These elasticity analyses are fundamental to the integrated model estimates for policy options in which prices change.

To examine the extent of discounted price-based promotion, the study has gained access to an important market research database on alcohol sales and prices in the off-trade sector from Nielsen. Data is based on the barcodes of off-trade purchased products in major grocery chains across England, and enables analysis of the volumes and prices of alcohol sold. Importantly, the dataset provides information on whether the product was sold on a promotion and an estimate of its regular sale price. Thus, for example, we can see that of beer sold in supermarkets at a price of 20p to 25p per unit of alcohol, 67% is sold on promotion, and of the promoted volume 26% has a regular price in that range, 33% has an RRP of 25-30p, 24% of 30-35p, 11% of 35-40p, 5% of 40-50p and 1% of 50-60p. This enables the modelling to analyse the effects of restrictions to price-based promotion, e.g. no longer allowing promotions of more than 20% below regular price.

The model looks forward examining the harm reduction changes estimated for each policy year on year. In line with Treasury and Department of Health policy, benefits accruing several years from now are discounted using standard discounting rates.

Model Results

The modelling undertaken in this report has analysed 53 separate scenarios to examine the impact of various policies around pricing and advertising of alcohol on health, crime, and employment related harms. These analyses, reported in detail in the results section of this report provide thousands of numerical results, estimates for the effects of policies and sensitivity to uncertainties in the evidence or values of particular model parameters. Here, we report the main trends, themes and findings rather than detailed results.

1. Policy effects on alcohol consumption

General price increases: General price increases (to all products in the on- and off-trade at once) tend to exhibit relatively large reductions in mean consumption for the population. This is partly due to only limited switching behaviour because prices increase across the board, and partly because all consumer groups are targeted equally. The model results show that greater general price increases lead to larger consumption reductions. Policies targeting price changes specifically on low-priced products lead to smaller changes in consumption, as they only cover a part of the market. Targeting low priced products also causes some switching.

Minimum pricing options: Increasing levels of minimum pricing show very steep increases in effectiveness. Overall changes in consumption for 20p, 25p, 30p, 35p, 40p, 45p, 50p, 60p, 70p are: -0.1%, -0.3%, -0.6%, -1.4%, -2.6%, -4.5%, -6.9%, -12.8% and -18.6%. Lower minimum prices affect beers and spirits more than wine. Higher minimum prices reduce switching effects. Minimum prices targeted at particular beverages are less effective than all-product minimum prices, and only minimum prices for beer show noticeable effects. Differential minimum pricing for on-trade and off-trade leads to more substantial reductions in consumption (30p off-trade together with an 80p on-trade minimum price -2.1% versus -0.6% for 30p only; 40p together with 100p -5.4% compared to -2.6% for 40p only). This is firstly because much of the consumption by younger and hazardous drinking groups (including those at increased risk of criminal offending due to high intake on a particular day) occurs in the on-trade. It is also because increasing prices of cheaper alcohol in the on-trade dampens down the behaviour switching effects when off-trade prices are increased.

Restrictions on off-trade price promotions: Bans of off-trade ‘buy one get one free’ offers have small impacts as these affect only a small proportion of total sales. Tighter restrictions on off-trade discounting have increasing effects. For example, bans of discounts of >30% (covering “3 for the price of 2” offers) and >20% (covering “5 for the price of 4”) lead to overall consumption reductions similar to the 25p and 35p minimum pricing scenarios, respectively. Tighter restrictions affect wine consumption most. Bans on discounts only for lower-priced alcohol (<30p per unit) are not effective in reducing consumption. A total ban on off-trade discounting is estimated to reduce consumption by -2.8%.

2. Policy effects on consumer spending

Price increases are not matched by consumption reductions and overall spending on alcohol is estimated to increase. Changes in spending per drinker for each policy are broadly proportionate to the price increase. As might be expected, those who buy more alcohol are disproportionately affected, and changes in spending affect mostly harmful drinkers, with hazardous drinkers somewhat affected and moderate drinkers affected very little.

3. Policy effects on sales, duty and VAT

The extent to which the on-trade or off-trade sectors benefit from significant gains in retail receipts varies according to policy. Policies targeting only off-trade prices for example sometimes cause switching behaviour to on-trade consumption.

Effects on tax and duty are estimated to be relatively small and vary according to whether on- or off-trade is most affected. The exact picture varies by policy because the duty is applied to the volume of sales on a per unit basis (which in most scenarios is reducing), but the VAT applies to the monetary value of the sales (which is increasing).

4. Policy effects on health harms

As prices increase, alcohol-attributable hospital admissions and deaths are estimated to reduce. Prevented deaths occur disproportionately in harmful drinkers. On balance, the health harm reductions mostly relate to chronic diseases rather than acute conditions such as injuries. This is because much of the alcohol-attributable health harm occurs in middle or older age groups at significant risk of developing or dying from chronic disease. For chronic diseases, the time for a change in consumption to achieve the full effect in changing the prevalence of disease is important in the modelling. Health harm reductions in Year 1 for chronic diseases are estimated to be around 1/10th of the level that will accrue when the full effect of consumption changes occurs.

Policies resulting in bigger price increases reduce numbers of deaths in moderate and hazardous drinkers as well. In terms of hospital admissions, policy options which increase prices for only a proportion of products and by marginal amounts have very small effects (e.g. increasing the prices of cheap off-trade alcohol by 10% or 25%, increasing prices of cheap on-trade alcohol by 10%, introducing a 20p minimum unit price or banning discounts at the 40% level). Policy options leading to greater price rises do begin to have larger effects, e.g. a 40p minimum price gives an estimated change of around 40,000 admissions per annum at the full effect (-5.2%).

5. Policy effects on crime harms

Crime harms are estimated to reduce as prices are increased. Crime reductions for policies take place across the spectrum of violent crime, criminal damage and theft, robbery and other crimes. A minimum price of 30p is estimated to reduce total crimes by around 3,800 whereas for 40p the reduction is estimated at 16,000 per annum. Crime harms are estimated to reduce particularly for 11-18s because they are disproportionately involved in alcohol-related crime and are affected significantly by targeting price rises at low-priced products. It is important to note that different policies emerge as effective when compared to health harms: discount bans, targeting cheap off-trade alcohol and low minimum pricing options, which effectively influence only the off-trade sector, are all less effective in reducing crime compared to health or employment.

6. Policy effects on employment harms

Unemployment harm reduces proportionately more than health or crime harms. Generally, all policy options that target harmful and hazardous drinkers are effective in reducing alcohol related harm in the workplace. The size of the effect is dependent on the extent of price increases. Unemployment due to alcohol problems is focussed on harmful drinkers and is estimated to reduce as prices increase: e.g. 3,800 avoided unemployment cases for 30p versus 12,400 for 40p minimum price. Absence reductions are particularly focussed on hazardous and harmful drinkers: e.g. for 40p, the 100,000 estimated reduction in days absence is made up of 34,500 days for hazardous and 54,300 days for harmful drinkers.

7. Financial valuation of policies

The societal value of harm reduction for many of the potential policies can be substantial when accumulated over the ten year time horizon of the model. Many policies have estimated reductions in harm valued over £500m and some as high as £5billion over the ten year period. The financial value of harm reductions becomes larger as prices are increased. The largest financially valued component of harm avoided due to policies is in the estimated unemployment reductions. The financial value of avoided mortality and morbidity is valued using direct (NHS) costs avoided and also using the quality-adjusted life years (QALY) measure. This latter measure also improves as prices are increased: e.g. the value of QALY loss avoided changes from -£400m for the 30p minimum price to -£1,931m for 40p. Crime costs are also estimated to reduce as prices increase. The financial value of crime harm reduction comes mostly via reductions in consumption for harmful drinkers. For example, the ten year cumulative value of harm reduction estimated for the 30p minimum price is -£0.1bn for moderate drinkers, -£0.1bn for hazardous, and -£1.2bn for harmful drinkers. Quality of life impacts on crime victims is an important component of the evaluation, and as with health in many policies tends to exceed the actual criminal justice system costs saved when crime is reduced.

8. Differential effectiveness for priority groups

Consumption: Moderate drinkers are affected in only very small ways by the policy options examined both in terms of their consumption of alcohol and their spending. Harmful drinkers are expected to reduce their absolute consumption most, but in the more effective policy options also spend significantly more on their purchases. Policies which target low-priced alcohol affect harmful drinkers disproportionately (as well as 11-18s). This is because moderate drinkers tend to drink only a small proportion of the very low price products available.

Health effects are shared across the priority groups. There are significant effects on harmful drinkers, but important health gains also occur in hazardous and moderate drinkers. Even though moderate drinkers are at the lower risk of health-related harms, there are large numbers and the small changes in their consumption feed through in the model to small changes in risk and appreciable changes in health. In general across the policies, deaths avoided occur disproportionately in the harmful drinking group. This is especially the case for policies which produce small scale changes in consumption, for example, because they specifically target very low priced alcohol purchased disproportionately by harmful drinkers. 11-to-18-year-old drinkers, and the 18-to-24-year-old hazardous drinkers group (a proxy for 18-to-24-year-old binge drinkers), benefit less from health harm reductions because their baseline levels of risk for many of the conditions examined and attributable to alcohol are very low at such young ages.

Patterns of **crime** reduction estimated by the model are very different across the priority groups from those for health. A much larger proportion of the crime-related harm occurs from the 11-18s and the 18-to-24-year-old hazardous drinkers. When estimating policy impacts, crime avoided comes more from the harmful and hazardous drinking groups them from the moderate group. However there is some reduction in crime due to changes in moderate drinkers consumption because even though they are by definition moderate, and therefore a lower risk in terms of their average weekly alcohol intake, they do occasionally binge and within the model it is binge behaviour, i.e. the maximum daily intake of alcohol, that is related to risk of committing crime.

Sensitivity Analysis and Uncertainty (Pricing Policy Results)

A series of sensitivity analyses have been undertaken on key model parameters and assumptions. The basecase analysed was for the 40p minimum price policy option, chosen as it has reasonably large effects on each of the model dimensions. The sensitivity analyses included: an alternative structure for elasticity matrices (moderate, hazardous and harmful separately), different slopes for the expected scale of binge given mean consumption function, the exclusion of any protective effects of alcohol, alternative time to full effect for chronic harms ranging from 5 to 15 years, use of alternative evidence on the multiplier for the extent of reporting of “less serious wounding” crimes and on the fraction of crimes attributable to alcohol, use of UK-based work absence data, use of a lower value for salary to compute unemployment effects, and the value for the relative risk of not working for harmful drinkers (from MacDonald and Shields 2004). Each had some small or modest effect (+/-25% of the basecase for 10-year cumulative value of harm) except for the elasticity matrices (-39%) and the relative risk of not working for harmful drinkers (+68%). All of the sensitivity analyses are on model parameters rather than the particulars on any one policy over another. They would therefore not substantially affect the relative differences between the policies.

Exploratory Analyses around the Effects of Advertising Restrictions

The published quantified evidence on the effects of restrictions on advertising, including the small number of UK studies, exhibit considerable uncertainty, with effect sizes ranging from very small to substantial (see Systematic Review report). The limited published evidence on public health promotions (counter-advertising) suggests marginal or insignificant effects on consumption. We have undertaken exploratory analyses to evaluate the impact of these uncertainties in the model results. The recently suggested policy that 1/6th of advertising be devoted to public health messages is modelled assuming no beneficial effects on consumption but a reduction in total alcohol advertising by 1/6th. Results vary substantially depending upon which published evidence is assumed to be most applicable to England, with overall changes in consumption of between -0.2% and -2.2%, and the financial value of harm avoided over 10 years ranging from -£0.39bn to -£3.9bn. Similar exploratory analyses for the total elimination of exposure to advertising for under-18s show an overall change in consumption ranging from -0.1% to -0.4%, and the financial value of harm avoided over 10 years ranging from -£0.3bn to -£1.0bn.

There is disagreement in the academic research literature concerning whether advertising bans (in the absence of other legislation) reduce alcohol consumption, or increase it (by having the unintended side-effect of increased price competition between competitors). Depending on which position is taken, the effects of a total ban in advertising are estimated to range from an overall change in consumption ranging from –26.9% to +4.9%, and a financial value of harm avoided over 10 years ranging from -£44.0bn to +£9.5bn. The substantial range between the higher and lower end of possible effects in these advertising analyses suggests that definitive further research on advertising impacts, particularly around elimination of exposure would be valuable for policy makers.

Discussion, Limitations, and Possible Further Research

This is the first study to integrate modelling approaches intended to answer specific policy questions around pricing and promotion of alcohol and the related effects on harms in terms of health, crime and employment in England. We have developed an integrated suite of models, linking the aspects of price, advertising, drinking patterns, purchasing patterns, elasticities, health conditions including diseases wholly attributable to alcohol, chronic and acute alcohol-related illnesses and mortality, crimes including violence and criminal damage, and work absence and unemployment attributable to alcohol. This study is the first to derive own-and cross-price elasticities for 16 beverage categories (high- and low-priced beers, wines, spirits and RTDs, split further by on- and off-trade purchasing). The model contains detailed data on individual consumption and purchasing patterns through linked use of GHS and EFS data, enabling analysis by age/sex/consumption group and by the 16 categories of alcohol, and accounting for the heterogeneity in the UK drinking population in terms of consumption preferences and of responses to changes in product prices.

In a validation / comparison, we ran the model to the very extreme in a scenario of zero alcohol consumption in England, producing broadly the same scale of effects as estimated recently by Home Office and NWPHO reports. The cross-sectional econometric modelling also produces elasticities consistent with published evidence (Gallet 2007).

The large scale databases used from GHS and EFS provide a wealth of material but are not without limitations. Binge drinking is not adequately represented in EFS, and we also cannot disentangle response to price from response to price promotions. Of course, the person who buys is not necessarily the person who drinks, and alcohol bought in the off-trade may be stored over any length of time. Alcohol surveys have a number of general limitations, including a tendency to underestimate alcohol consumption due to underreporting and under sampling people who drink the most. Our analyses suggest under-estimates in GHS of 21% which will affect sales value estimates in the modelling but not the harm analyses.

Many risk estimates were based on non-UK research as UK studies were not available, lacked necessary detail, or were not available for all age and gender groups modelled, most notably for the under-18s age group. Risk function evidence is less well developed in crime and in employment and a linear approach was often selected, in the absence of empirical evidence, to translate attributable fractions into risk functions

There are several areas for further research. Analysis of time trends in population consumption could be incorporated into the modelling. Direct costs to government of implementation and monitoring of any of the policies should be accounted for when available. Economic research could account industry response to the policy options and possible effects on market structure and supply, and possibly extend to wider costs or benefits, “drinkers’ pleasure” or “social lubricant” effects, or include lower-level social disorder and the effect on families and friends of harmful drinkers. Detailed data on the extent of sales promotion in the on-trade are lacking and research or infrastructure investment to ascertain patterns here would probably be beneficial for policy and evaluation of change. There remains substantial uncertainty in the effects of changes or restrictions in advertising and further UK based research or data collection may be warranted.

Finally, the development of these modelling approaches to consider policy questions represents a substantial challenge. This work has surmounted several of the important hurdles and aims to support policy makers directly in relation to important decisions. We hope it will be useful for current and future policy decisions.

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The original data creators, depositors or copyright holders, the funders of the Data Collections (where different) and the UK Data Archive bear no responsibility for the analysis and interpretation of the GHS, SDD, EFS and OCJS data sets downloaded from the Economic and Social Data Service and used in this study.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

ABBREVIATIONS

AAF	Alcohol Attributable Fraction
ABV	Alcohol By Volume
A&E	Accident and Emergency
AR	Absolute Risk
BCS	British Crime Survey
CI	Confidence Interval
DH	Department of Health
DTLR	Department of Transport, Local Government and the Regions
EFS	Expenditure and Food Survey
F	Female
g	Grams
HA	Hospital Admission
HES	Hospital Episode Statistics
HSE	Health and Safety Executive
HODaR	Health Outcomes Data Repository
GHS	General Household Survey
GP	General Practitioner
Hi	High Price
HMRC	HM Revenue and Customs
ICD	International Classification of diseases
IHD	Ischaemic Heart Disease
L	Litre
LFS	Labour Force Survey
Low	Low price
M	Male
Ml	Millilitre
MORI	Market & Opinion Research International, Ltd
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
NWPHO	NorthWest Public Health Observatory
OCJS	Offence Crime Justice Survey
Off	Off-Trade
On	On-Trade
ONS	Office for National Statistics
PIF	Population Impact Fraction
PSA	Probabilistic Sensitivity Analysis
PSHA	Person-Specific Hospital Admission
QALY	Quality Adjusted Life Year

RR	Relative Risk
RRP	Recommended retail price
RTD	Ready-To-Drink (Alcopop)
SDD	Smoking, Drinking, and Drug Use Survey
SKU	Stock Keeping Unit
UK	United Kingdom
VAT	Value Added Tax
WHO	World Health Organisation

1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

In the Updated Alcohol Strategy (2007)[1], the UK Government announced plans to commission an independent review of evidence on the relationship between alcohol price, promotion and harm, and to consider the need for future regulatory change, if necessary. The Government wished to review the evidence on how and in what circumstances price – including discounting, advertising and other forms of promotion – drives overall consumption of alcohol and problem drinking in particular. The review was also to consider the evidence that pricing structures may form an effective part of a harm reduction strategy.

This research was commissioned by the Department of Health Policy Research Programme. The original objectives were as follows:

a) Systematically review the evidence on 1) the link between the price and promotion of alcohol on the one hand and patterns of consumption and alcohol-related harm on the other and 2) the effectiveness of related policy interventions

b) Indicate how pricing and promotion affect total alcohol intake and patterns of consumption in the whole population and also with a focus on four priority groups.

c) Model the potential implications of changes to current policies, especially the population-based impact on health, crime, and the likely impact on the alcohol industry and wider economy, again for the population as a whole and also with a focus on:

- young people under 18 who drink alcohol
- 18-24 year old binge drinkers
- harmful drinkers whose patterns of drinking damage their physical / mental health or causes substantial harm to others.

d) Summarise/disseminate the practical, policy and research implications of the findings.

Phase one of our study undertook the systematic reviews of evidence[2]. The current report focuses on the modelling of the likely effects of pricing and promotion policies on alcohol consumption and harm.

1.2 OVERVIEW OF PREVIOUS ESTIMATES OF THE BURDEN OF ALCOHOL-RELATED HARM IN ENGLAND

In 2003, the Cabinet Office produced a significant report "Alcohol Misuse: How Much Does It Cost? September, 2003"[3]. The main focus of the report was to analyse the costs attributable to alcohol misuse in England in relation to health, crime, and employment/productivity harms. Analyses were undertaken using a prevalence-based estimate, i.e. all costs incurred at any time in a given year. Only external costs were examined (cost to third parties) using a "societal perspective", i.e. direct (costs associated with treatment, prevention, law enforcement) and indirect costs (i.e. loss of productivity) as the results of alcohol misuse.

Healthcare costs attributable to alcohol were mainly derived from data available at the time of the study (Hospital Episode Statistics, GHS, MORI etc) and assumptions when appropriate. Costs in the workplace were analysed for three components; absenteeism, unemployment and reduced efficiency. Main sources used were the Health and Safety Executive (HSE) study for absenteeism[4] and MacDonald and Shields (2004)[5] for unemployment. Costs associated with reduced efficiency could not be estimated due to the lack of data, while lost outputs due to premature mortality were estimated based on the Labour Force Survey (2001)[6], the 2001 New Earning Survey[7] and data from Transport (DTLR,2001)[8]. Alcohol-related crime costs were mainly derived from the British Crime Survey (BCS)[65] and Brand and Price (2000)[66]. Crime costs were examined for three components: costs incurred in anticipation of crime, costs incurred as a consequence of crime and costs to the criminal justice system (CJS). Overall, alcohol misuse was estimated to account for health, crime and employment costs of between £18.5 to £20.0 billion in England.

This study was recently updated by the Home Office/Department of Health in the consultation document "Safe, Sensible, Social – consultation on further action, Impact assessment"[9] based on recent estimates for the costs of alcohol-related crime and costs to the NHS[10]. The update for the employment/productivity merely adjusted earlier figures for inflation. For crime, the methodology was updated to take into consideration additional costs. Furthermore, assumptions were mainly made about multipliers (to move from reported crimes to an estimate of the actual number of offences committed) and the proportion of crime attributable to alcohol. Healthcare costs attributable to alcohol were extracted from a recent report published by the Department of Health aimed at estimating the cost of alcohol harm to the NHS in England[10]. This study took into consideration the increase in the cost of crime as well as recent data on alcohol consumption and harms. The new estimate of costs of alcohol misuse in England was estimated to range between £17.7 and £25.1 billion. Details of costs are presented below in Table 1.

Table 1: Update of the Cabinet Office overall costs of alcohol misuse – reproduction of the DH consultation document (DH, 2008)[9]

	First estimate (£ millions)	Second Estimates (£ millions)
Healthcare costs		
Hospital inpatient & day visits		
Directly attributable to alcohol misuse	168	168
Partly attributable to alcohol misuse	1,023	1,023
Hospital outpatient visits	272	272
Accident and emergency visits	646	646
Ambulance services	372	372
Practice nurse consultations	10	10
NHS GP consultations	102	102
Laboratory tests	N/A	N/A
Dependency prescribed drugs	2	2
Other health care costs	54	54
Specialist treatment services	117	117
Workplace and wider economy costs		
Lost output due to absenteeism	1,389	2,044
Lost output due to reduced employment	1,976	2,465
Lost output due to reduced employment efficiency	N/A	N/A
Lost output due to premature death	2,580	2,841
Costs of alcohol-specific and alcohol-related crime	9,000	15,000
TOTAL COSTS	**17,711**	**25,115**

1.3 PREVIOUS WORK ON MODELLING EFFECTS OF POLICY CHANGES ON ALCOHOL CONSUMPTION

Some previous modelling studies examine consumption defined as a number of discrete states, then use transition probabilities to describe how consumption changes from year to year. State-transition models are a natural approach to alcohol consumption modelling – and have also been used in tobacco policy modelling (see, for example, Levy et al's (2006) *SimSmoke*)[11].

This approach has been used by Chisholm et al (2004)[12] in an implementation of the WHO-CHOICE cost-effectiveness framework (Tan Torres et al, 2003[13]) based on Lauer et al's (2003) state-transition population health model (known as *PopMod*)[14]. The model has a set of states for every year of life, with the transitions between consumption states for the population at age *a* during the period *t* to *t*+1 forming the initial conditions for age *a*+1 at time *t*+1. A basic schematic of PopMod is shown below:

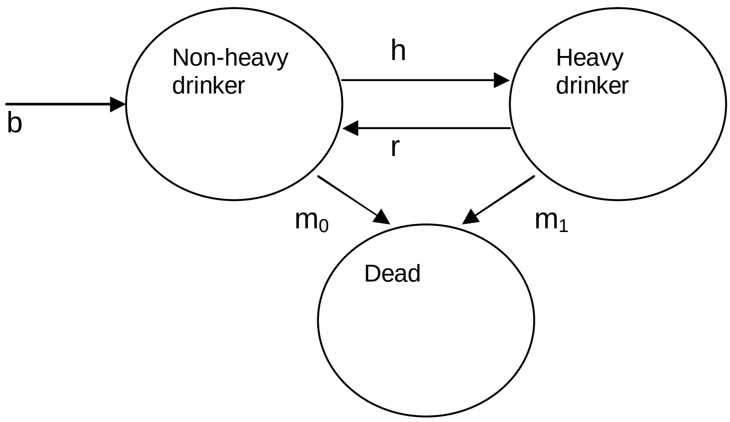


Figure 1: Schematic of PopMod

where *b* = birth rate, *h* = incidence rate for heavy drinking, *r* = remission rate, m_0 = mortality rate, m_1 = mortality rate of heavy drinkers. Only two consumption states (heavy drinking and non-heavy drinking) are used in PopMod, which constrains the data requirements for transition probabilities but limits the range of outcomes that can be measured. The approach is also limited because the transition probabilities are derived at the WHO sub-region level only and do not vary by age.

In a broader state-transition approach, Hollingworth et al (2006)[15] used a model with six consumption states. Transition probabilities were defined for 10 year periods, with those for young drinkers estimated from US longitudinal data. However transitions for post-30 year olds had to be derived from the younger drinkers based on general trends in cross-sectional data. Again, this approach has limited applicability for England since corresponding longitudinal data is not available and the US transition probabilities may not be an appropriate surrogate.

Holder and Blose (1987)[16] developed a system dynamics-based framework known as *SimCom* for modelling community prevention strategies. Like PopMod, SimCom also uses a set of consumption states (or classes) split by gender and age. However the SimCom model is static from a population perspective: cohorts do not age over time as they do in PopMod. Policy interventions impact on this steady-state by changing the prevalence of consumption between classes for each {gender, age} group modelled. This change of prevalence is assumed to occur over a time step of the simulation. A schematic of SimCom is shown below:

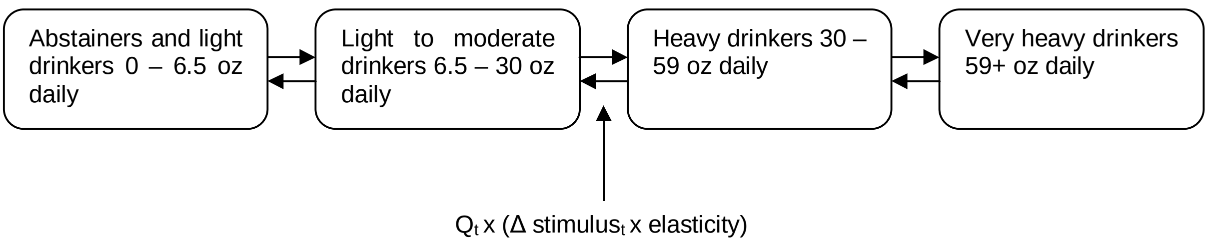


Figure 2: Schematic of SimCom

where Q is consumption, t is time step, Δ*stimulus* is the change in price (or other factor) and *elasticity* is the elasticity corresponding to the stimulus (which may be a function of other parameters in the system dynamics model). The core assumption in SimCom is that there are no cohort effects for the consumption of alcohol: consumption patterns are determined by life-cycle changes associated with age, and these patterns are relatively stable over time (for example, the prevalence of drinking in 20 year olds in 2018 would be the same as that for 20 year olds in 2008, all else being equal). The data requirements for this approach are viable in an English context, since only cross-sectional data on current consumption prevalence is required, rather than the longitudinal data needed to derive transition probabilities. However the key concern is whether or not the consumption patterns in England are sufficiently stable to assign consumption by age group in the model.

In the only known birth cohort analysis of alcohol consumption for the English population, Kemm (2003)[17] used multiple cross-sectional data from the General Household Survey (GHS) to test for any cohort effects using data from 1978 to 1998. The prevalence of light or heavy drinking was seen to be narrowly distributed across birth cohorts for most ages for both males and females, although prevalence was seen to have increased in 1998 for most female cohorts, and particularly dramatically so for women in the latest birth cohort. We have extended Kemm's (2003)[17] analysis with GHS data to 2006[23] to test for cohort effects that would breach the core SimCom assumption. The prevalence of heavy drinking by age for both males and females is shown in Figure 3. The increase in heavy drinking for the later female birth cohorts is seen to have continued post 1998. The prevalence for women between the ages of 15 and 25 is seen to be close to – and in some cases exceeding – the corresponding prevalence for men. This is very different to the behaviour in this age range for older birth cohorts as previously reported by Kemm (2003)[17]. The figure shows a move back to a lower prevalence of heavy drinking in the final two years of data, but it should be noted that changes to the consumption assumptions in the GHS may reverse this late trend (data not shown).

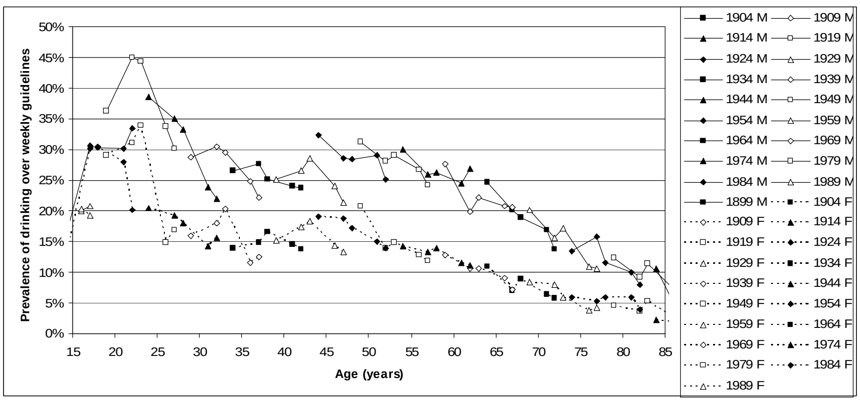


Figure 3 Percentage of drinking over weekly guidelines – extension of Kemm

None of these models have undertaken a full analysis of the effects of pricing and promotion on alcohol consumption and harms with up to date English data.

1.4 POTENTIAL POLICIES TO BE EXAMINED

The systematic review of evidence undertaken in phase 1 of our study[2] identified a variety of policies for regulation of pricing or promotion of alcohol for which there is evidence of effectiveness. The major findings from the systematic reviews were as follows:

- The review found strong and consistent evidence linking the price of alcohol to the demand for alcohol. Increasing the price of alcohol reduces consumption and alcohol-related harm. The strongest and most plentiful evidence was found for effects of price increases on total population-level consumption, although evidence also showed effects of increased prices on subpopulations, including young, binge and heavy drinkers. It is worth noting that studies have typically studied price increases in relation to taxation, with fewer studies on other pricing policies.
- The review also found direct evidence linking price increases to reductions in chronic and acute health harms, including cancers, stroke, accidents, injuries and violence.
- Increases in alcohol advertising expenditure were related to increased demand for alcohol, however the effect was small when compared to the impact of price changes. Longitudinal research on advertising exposure by young people typically shows that those who are exposed to more alcohol advertising during childhood have more positive drinking attitudes, start to drink earlier and drink considerably more as adolescents.
- The review specifically looked for evidence on groups identified as a priority by the Government: underage drinkers, 18 to 24 year old binge drinkers and harmful drinkers of any age. Consistent evidence was found for an association between alcohol price and patterns of drinking for under 18s, binge drinkers and also harmful drinkers. Point of sales promotions and various types of advertising were found to influence the attitudes and drinking intentions of young people.
- The review found conclusive evidence that alcohol consumption – and especially heavy consumption – is associated with a large range of both chronic and acute harms, including cancers, stroke, accidental injuries and violence.

A summary of findings has been published on
http://www.dh.gov.uk/en/Consultations/Liveconsultations/DH_086412.

In consultation with the Department of Health, the researchers considered the feasibility of modelling pricing- and advertising-related policy options which might be considered for adoption in this country, which specifically excluded tax-based options. In particular, these included:

- Minimum pricing per unit of alcohol[*]
- Ban on all price based promotions – off-trade and/or on-trade

[*] In the UK, the alcohol content of a product is measured by alcohol units, whereby a unit of alcohol is the equivalent of 10ml of neat (100%) alcohol. Minimum unit pricing would consider setting a minimum price on each alcohol unit. Thus, if a product contains 2 units (e.g. a can of beer) and the Government decided on a minimum price of 30p per unit, then product could not be sold for less than 60p (2x30p).

- Restrictions on price based promotions (e.g. those above a certain discount threshold)
- Ban on price based promotions – on-trade (e.g. free drinks in large quantities or to specific groups, entry fees that purchase unlimited drinks)
- Ban on loss leaders[*] (i.e. below-cost selling as defined by the Competition Commission)
- Ban on time based promotions – on-trade (e.g. 'happy hours')
- Bans[†] or watersheds for alcohol advertising, especially regarding adverts likely to be watched by children
- Mandatory restrictions of certain types of advertising/promotion content likely to be attractive to young people (e.g. promotions linked to sport- or music-events)
- Requirement for counter-advertising[‡] by industry.

1.5 NEED FOR EVIDENCE AND RELEVANT ENGLISH DATA

When attempting to model the impact of policy options, there are two crucial constraints:
the policies selected for consideration should be both evidence based and relevant in the local context.

We are interested in a series of effects:

- The effect of the policy on the distribution of price of different types of alcohol
- The effect of price on patterns of consumption both on-trade and off-trade (patterns of consumption might be measured by (a) average consumption or (b) peak consumption, during a specified time period
- The effect of advertising on consumption
- The effect of price based promotions on consumption
- The effect of consumption on health-related harm for diseases which are wholly attributable to alcohol (e.g. alcoholic liver disease), or partially attributable to alcohol on either a chronic (e.g. cancer of the oesophagus) or acute (road traffic accident) basis.
- The effect of consumption on crime.
- The effect of consumption on unemployment and absenteeism
- The effect of changes in consumption on volume and value of sales of alcohol and hence income to the alcohol industry and tax revenues to the government.

[*] A loss leader is defined as: "A good which is priced low, possibly even below cost, to attract customers who are expected to buy other goods which yield a profit. The use of loss leaders can be profitable only if consumers are more conscious of the relative prices of some goods than of others. This may be so, if goods differ in how easily their quality is checked, and how frequently they are bought. Selling cheap goods about which customers are well informed may be used to attract custom for other goods on which they are less well informed, and can therefore be exploited." 1. Oxford Dictionary of Economics, Black, J., Oxford University Press Inc., New York, 2002 (2nd Edition)

[†] Advertising bans are here defined as total or partial legal prohibitions of advertising of alcoholic beverages. Partial bans limit advertising of either particular types of alcoholic beverages, in certain types of media, or during particular hours of the day.

[‡] Counter-advertising is defined here as actions involving the use of advertising-styled messages about the risks or negative consequences of drinking, for example in the form of print or broadcast advertisements (definition adapted from Babor et al 2003). Note that the use of product warning labels is not included in our definition.

For each of these, the two key constraints of evidence of effect and data specific to England need to be met in order to produce realistic robust estimates. For several of the potential effects identified above, it has proved impossible to derive realistic estimates because quantified evidence of the scale of effect of a policy on distributions of price or consumption are unavailable, or data needed as inputs to the model do not exist or cannot be obtained and analysed within the time and resources available to this research project.

1.6 RESEARCH QUESTIONS ADDRESSED

Given the constraints of evidence and data available to analyse the potential policies, the research team has in discussion with the Department of Health prioritised the following set of policies for analysis:

Q1. What are the likely effects of **general price rises** on alcohol consumption, alcohol sales, health harms, crime and employment?

Q2. What are the likely effects of introducing a **minimum unit price** on alcohol consumption, alcohol sales, health harms, crime and employment?

Q3. What are the likely effects of introducing restrictions on **alcohol price discounting** on alcohol consumption, alcohol sales, health harms, crime and employment?

Q4. What are the likely effects of introducing **restrictions on advertising** on alcohol consumption, alcohol sales, health harms, crime and employment?

Q5 What are the likely effects of introducing **counter-advertising requirements** on alcohol consumptions, sales, health harms, crime and employment?

2 METHOD

2.1 OVERVIEW

The aim of the model is to appraise various policy options for the pricing and promotion of alcohol via cost-benefit analysis. We have broken down the aims into a series of sub-questions to be modelled

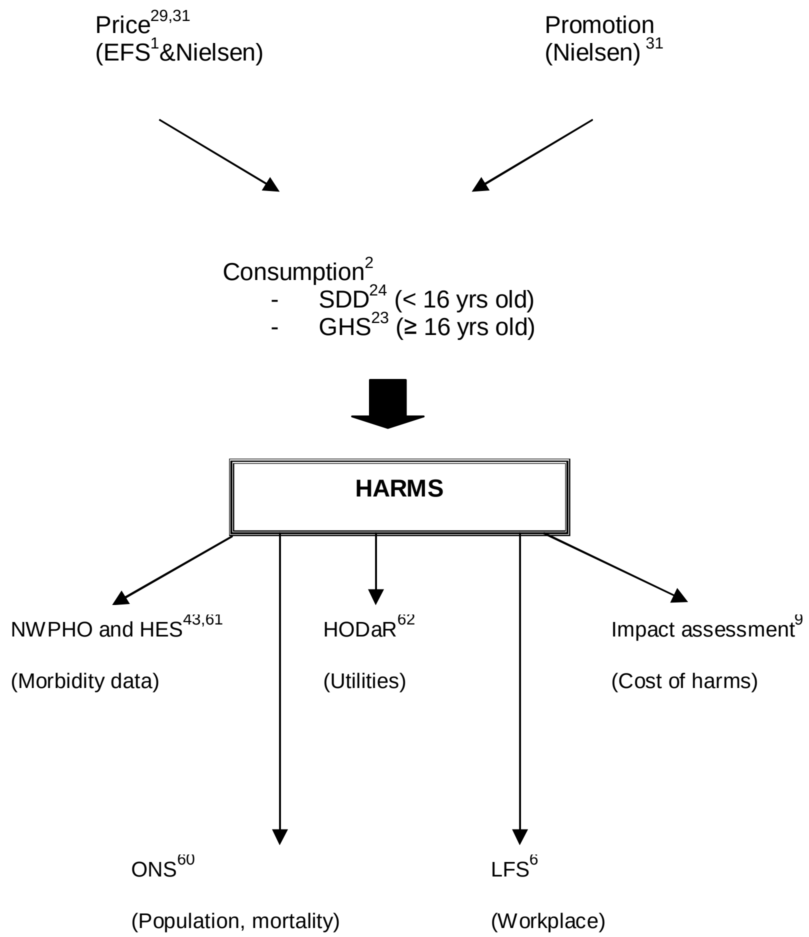
- The effect of the policy on the distribution of price of different types of alcohol.
- The effect of price on patterns of consumption both on-trade and off-trade
- The effect of advertising and other promotions on consumption
- The effect of consumption on health-related harm
- The effect of consumption on crime
- The effect of consumption on unemployment and absenteeism
- The effect of changes in consumption on sales of alcohol.

Two connected models have been built:

1. Model of the relationship between alcohol prices or promotion effects on the one hand and consumption on the other, which examines the relationship between average and peak volume of drinking and the distribution of consumption, for the total population, and split by moderate, hazardous and harmful drinkers. This model uses newly estimated own-price and cross-price elasticities based on recent English data.

2. Model of the link between average and peak consumption and health, crime and employment costs.

The schematic below Figure 4 indicates the main sources and datasets used to provide different 'slices' of the picture. The model developed links evidence from these datasets to enable analysis of policies as a whole.



[1] Price paid available for On- / Off-Trade, high / low prices and beverage type

[2] Consumption available only by beverage type (distribution for On- / Off-Trade and High / Low price not available)

Figure 4: Schematic on integrating data sources

2.2 MODELLING THE LINK BETWEEN PRICE OR PROMOTION AND CONSUMPTION

One major aspect in the modelling exercise was to integrate datasets on price, promotion and consumption due to the absence of a dataset in England covering all three components. While the General Household Survey (GHS) provides good estimates of the consumption in England, data is not available around purchasing and separate consumption distributions by price point or for alcohol purchased on- vs. off-trade. Conversely, while EFS provides a good picture of alcohol purchasing in England, a consumption distribution based on this dataset may not reflect accurately the patterns of consumption in England.

The link between price, promotion and consumption was thus modelled using different datasets. Data available in each dataset are shown in Table 2. This section provides an overview of data sources on alcohol consumption, pricing and promotion, before detailing the procedures for modelling the effect of price and promotion policies and consumption.

Table 2: Overview on integrating data sources

Data Source	Price based Promotion	Price	Purchasing by individuals	Consumption
GHS	Nothing	Nothing	Nothing	Detailed analysis of mean and binge consumption by individuals but no 'on or off-trade' or 'price paid' split
EFS	Nothing	Price paid by individuals for different purchase including beers, wines, spirits and alcopops, on and off-trade, can be used to generate estimates of elasticities. No data on consumption patterns		Nothing
Nielsen	Estimate of Regular price of promoted sales (off-trade only)	Actual prices paid for different types of alcohol, no details on consumption patterns	Nothing	Nothing

2.2.1 ALCOHOL CONSUMPTION DATA

Population surveys continue to provide the main approach to assessing alcohol consumption in the population. Such surveys ask respondents about the volume of certain types of drinks bought or consumed over a certain time period. These volumes are then standardised by converting them into alcohol units (one UK unit = 10ml of pure ethanol). The conversion of reported volumes to units is based on assumptions about the average alcohol content, or % ABV, of different types of drink. From 2006, government surveys have started to implement a revised methodology of unit counting which addresses several reasons for underestimating consumption (GHS from 2006, SDD 2007; see Goddard 2007 for details[21]). We also use this revised unit estimation method when converting EFS diary data on alcohol purchases into alcohol units.

Importantly, it is generally accepted that this self-reported data underestimates actual consumption by as much as 50% (Stockwell et al 2004[18]). For example, in the 2005 GHS men and women reported an average weekly alcohol consumption of 15.8 units and 6.5 units, respectively (Goddard 2006)[19], whereas the estimate for all adults based on clearance data from the HMRC was 21.9 units (HMRC 2007)[20]. Also for 2005, HMRC data on clearances suggested per capita sales of 11.3 litres of pure alcohol over the year, whereas GHS estimates came to 5.6 litres. It is important to understand not only the magnitude of such underestimation, but also the potential biases:

- Undersampling: Household and school-based surveys underrepresent some of the groups who drink the most (e.g. those in unstable living conditions, school excludees, drop-outs or truants, Stockwell et al 2004[18]).
- When asked about typical drinking, people do not take into account heavy drinking occasions (Goddard 2007[21], Stockwell et al. 2004) [18].

Heavy drinkers tend to underestimate their drinking more than moderate drinkers (e.g. Townshend & Dukat 2002).[22]

Regarding alcohol consumption, one main aspect is the classification of drinkers / non-drinkers in terms of typical alcohol intake per week and the maximum intake in a single occasion (i.e. binge drinking).

Based on recent recommendation on alcohol consumption in England, drinkers are classified in three drinking categories based on their mean intake per week

- “moderate drinkers”, i.e. drinkers with an intake of alcohol less likely to damage health and/or associated with negative consequences (less than 21 units per week for men and less than 14 units for women).

- "hazardous drinkers", i.e. drinkers with an increased risk of psychological (such as mood disturbance) and physical consequences (such as injuries) due to alcohol intake (21 to 50 units per week for men and 14 to 35 units for women).
- "harmful drinkers", i.e. drinkers with an intake that is likely to adversely affecting health and/or other negative consequences (more than 50 units per week for men and more than 35 units per week for women).

Individuals are classified as a "binge drinker" if they exceed a certain maximum intake of alcohol during a single session. A binge is commonly defined as an intake of over twice the recommended daily limit (i.e. over 8 units per day for men and over 6 units per day for women). Binge drinking can and does occur in each of the moderate to harmful drinking categories, however, both likelihood and scale of the binge (how much is drunk on each occasion) are strongly associated with mean consumption.

2.2.1.1 The General Household Survey (GHS): Individuals aged 16 years old and over

The General Household Survey (GHS)[23] is an annual cross-sectional household survey of around 23,000 individuals living in UK households. Respondents are asked how often over the last year they have drunk each of a number of different types of drink, and how much they have "usually" drunk on any one day. The method used for calculating average weekly consumption is to multiply the number of units of each type drunk on a usual drinking day by the frequency with which it was drunk. Respondents are also asked about the number of units consumed on the heaviest drinking day in the past week. The GHS raw data on volumes of alcohol consumption is analysed and transformed into units of alcohol consumed.

The main questions on alcohol consumption allow an estimation for each individual of:

- Number of weekly units consumed (split by beers, wines, spirits and alcopops) – used as a proxy for average consumption.
- Units consumed on the 'heaviest drinking day' during the past week – a measure of peak levels of drinking which provides a proxy for 'binge drinking'
- Detailed population distribution by characteristics such as age, sex and income

We have obtained and analysed data for the most recent year, GHS 2006, from the UK Data Archive (http://www.data-archive.ac.uk/) and selected data relating to England only. In 2006, 14,289 individuals had data for both the mean weekly consumption and the maximum consumption one day over the past week, excluding outliers (individuals with a mean weekly intake over 300 units and a maximum unit one day over the week over 60 units).

In terms of limitations, the GHS does not provide:

- Information on prices paid for alcohol
- Information on location of purchase or consumption i.e. no split of on-trade versus off-trade
- Information on whether bingeing occurred on more than one occasion in the past week or how typical this is for the respondent.
- Information on young people (<16 years of age)
- Information on some at-risk groups (e.g. homeless).

The 2006 age and sex-specific distribution of alcohol consumption for adults (18+ years) in England is presented in Appendix 1 (Figure 36, Figure 37). The distribution of consumption split by category of drinker (moderate, hazardous and harmful) given their binge drinking the last week is presented in Figure 36 while Figure 37 reports the proportion of drinkers classified as binge drinkers based on their behaviour in the past week.

In 2006, drinkers aged 18 years old and over in England had an average weekly intake of 21.09±25.10 units for males and 11.16±15.28 units for females (Figure 5). Figures for the number units drunk on the heaviest drinking day are 6.03±6.55 and 3.64±4.52 respectively (Figure 6).

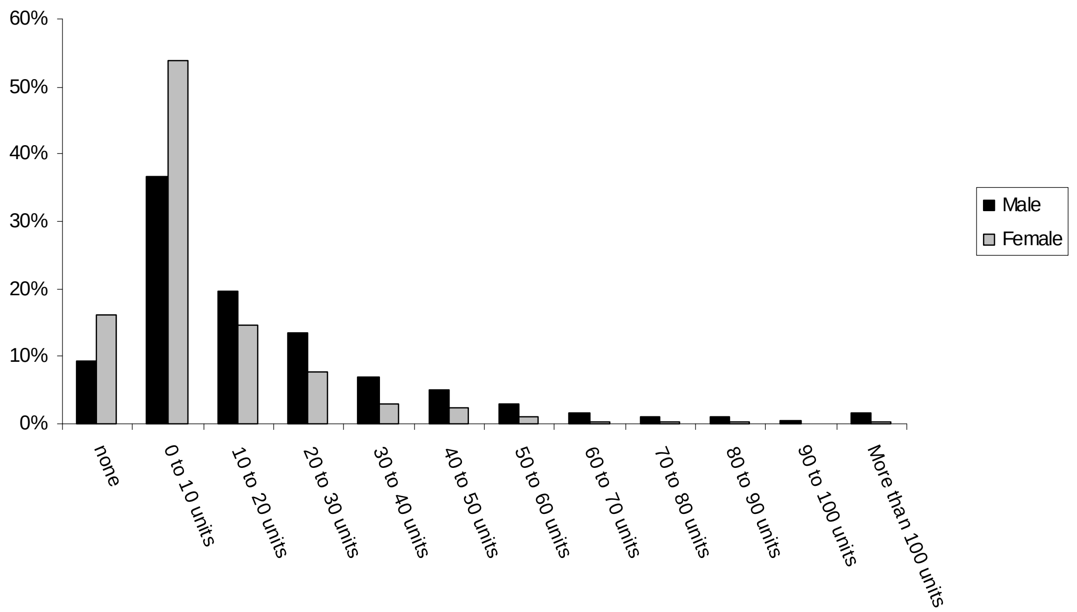


Figure 5: Distribution of the mean weekly intake among individuals aged 18 years old and over (GHS, 2006)

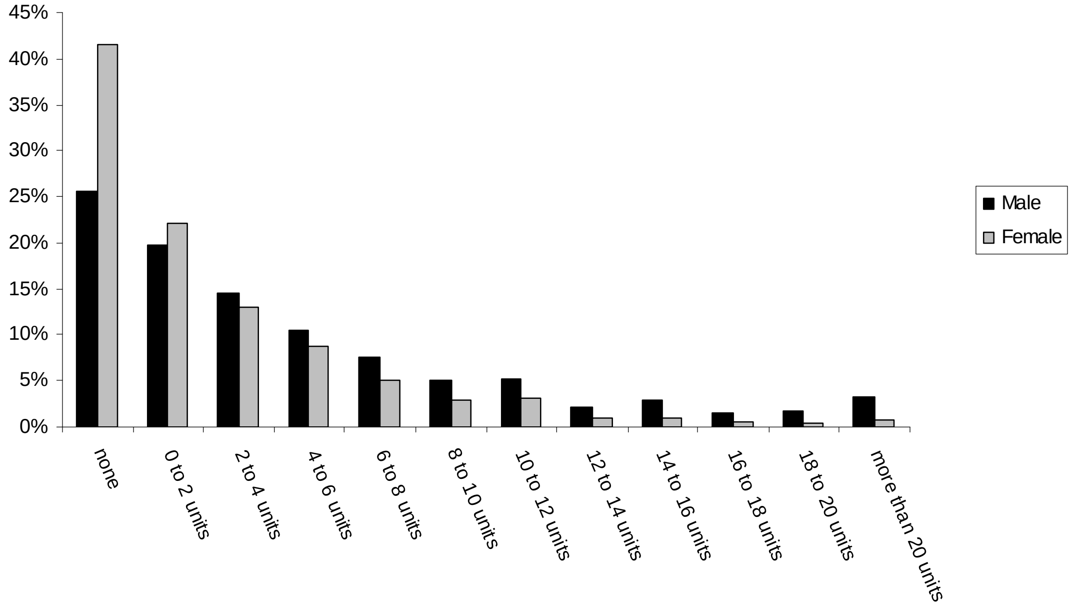


Figure 6: Distribution of the maximum unit drunk one day the last week among individuals aged 18 years old and over (GHS, 2006)

2.2.1.2 Smoking, Drinking and Drug Use Survey (SDD): Individuals aged 11 to 15 years old

Information on childhood drinking is available from the ONS survey Smoking, Drinking and Drug Use among Young People in England (SDD)[24], a national annual cross-sectional school survey. We use data derived from the 2007 Smoking, Drinking and Drug Use in Young People Survey (data made available by the UK Data Archive, http://www.data-archive.ac.uk/)). The survey covers pupils in grades 7 through to 11 (ages 11-15). The 2007 survey includes data from 7,831 pupils in 273 schools in England. The survey has in recent years suffered from low response rates, particularly in 2007 when it fell to 53%. Most non-response is at the school-level, with only 61% of school agreeing to take part. If non-participating schools were disproportionately based in urban “problem” areas, this could lead to underestimation of alcohol consumption. Older pupils, who tend to drink more, were also more likely to refuse participation compared to younger pupils (Clements et al, 2008)[25]. There are also concerns about the validity of self-reports especially for young people in school-settings. Previous studies have found exaggerations of substance use (false positive reporting), non-disclosure (false negative reporting) and recanting of previously disclosed substance use (Fendrich & Rosenbaum, 2003[26]; Percy et al 2005[27]). In the SDD, there are attempts to minimise peer pressure by administering the – anonymous - questionnaires under ‘exam conditions’; pupils were not allowed to discuss the questions with each other or look at others’ answers.

In 2007, the alcohol consumption questions related to

- the frequency of drinking (from never to every day/almost every day) and
- past-week quantity consumed broken down by beverage type (Clements et al 2008[25]).

In some years, pupils are also asked about whether alcohol was bought, stolen, or obtained from family/friends, most recently in 2006.

Limitations: The SDD does not provide

- Information on prices paid for alcohol
- Information on on-trade/off-trade split
- Information on binge drinking
- Information on some at-risk groups who are known to drink more and more heavily (i.e. those not in mainstream schools: Truants, young offenders, those in pupil referral units) (Donmall et al. forthcoming, ACMD 2006[28]) leading to likely underestimation young people's drinking levels.

2.2.2 PRICE DATA: THE EXPENDITURE AND FOOD SURVEY (EFS)[29]

The EFS[29] is an annual survey of around 7,000 households in the United Kingdom. It records the purchasing of a range of goods, via a diary system for the individual over a two week period. Parents keep diaries for children under 16, whilst over 16s (including 16-17 group) complete their own diary. In general, EFS records the amount of a good bought, the price paid by the purchaser and the type of outlet where the purchase was made. For alcohol, we are able to classify the purchasing into beers, wines, spirits and alcopops and outlets can be split into the on-license and off-license trade. To link estimates to those derived from the GHS, there is a need to convert the volume of a beverage bought into alcohol units, for which we adopted the new ONS methodology outlined in Goddard et al (2007)[19]. We have obtained and analysed data for EFS for the 5 years from 2005/6 back to 2001/2. The standard EFS data is available from the UK Data Archive, however anonymised EFS diary individual data was obtained directly from DEFRA after a special data request. Over these five years, we have records of 69,618 individuals, of whom 44,150 (63.4%) purchased items of alcohol within their two week diary period. To account for inflation over the 5 year period, we apply specific RPI inflators for alcoholic beverages to provide the complete dataset in 2005/06 prices.

Some limitations of the EFS need to be taken into consideration:

- A low response rate of around 55% of approached households, with potentially important differences in the response rates by age, social class and educational status (Dunn, 2008[30]).

The resulting data allows an assessment for each individual of:

- The price paid, type of alcohol, volume of beverage and hence number of units purchased. This is split by beverage type (beers, wines, spirits and alcopops) and by on-trade (e.g. licensed trade) vs off-trade purchasing (e.g. supermarkets, off-licenses).
- Mean units per week purchased over the two weeks (split as above) - providing a proxy for mean consumption.
- Units purchased on each day during the two weeks – although off-trade purchasing may be consumed over several days or weeks, on-trade purchasing probably provides a satisfactory proxy of actual consumption.
- Purchasers' individual characteristics including age, sex, income, education

The EFS does <u>not provide:</u>

- Information on actual consumption of alcohol – only purchasing and prices paid.
- Reliable data on under 16s, as parents are unlikely to know about alcohol purchases by their children.
- Information on some high-risk groups not covered by household surveys (e.g. those who are homeless)

Table 3: Distribution of prices paid per unit of alcohol (EFS05/06 prices)

Price Band	Cumulative % off-trade volume distribution	Cumulative % on-trade volume distribution
<15p/unit	2%	0%
15p-25p/unit	12%	6%
25p-30p/unit	27%	9%
30p-40p/unit	59%	14%
40p-60p/unit	83%	23%
60p-75p/unit	97%	35%
75p-100p/unit	98%	74%
100-120p/unit	99%	87%
120 – 200p/unit	100%	96%
Over 200p/unit	100%	100%

As part of this project, the Department of Health is keen to understand the pricing and promotion in particular of low priced alcohol. Table 4 shows the distribution of prices paid derived from EFS (2005/06 prices). For our analysis, we have defined the following categories:

Table 4: Definition of our 'lower priced' category

Category	Price paid per unit threshold
Off-trade lower priced alcohol	<30p/unit
Off-trade higher priced alcohol	>=30p/unit
On-trade lower priced alcohol	<80p/unit
On-trade higher priced alcohol	>=80p/unit

We can then define 16 categories of alcohol (the four beverage types by the four trade-price categories shown above) and use the EFS to examine patterns of purchasing for each and provide a baseline picture of alcohol purchasing.

It is clear that off-trade purchasing on a particular day may bear little relationship to actual consumption that day since the purchase can be stored and consumed later. However, purchasing of alcohol on-trade should bear some relation to consumption. We have defined an 'on-trade purchase binge' whenever an individual in EFS purchased more than 8 units (males) and 6 units (females) on-trade. Of course such purchasing could be for friends and in 'rounds'. However, we assume a zero effect, as round buying usually involves taking turns and in effect this would be similar to each person buying their own alcohol. However, such an assumption may overestimate or underestimate the binge drinking behaviour in some individuals. One quite significant limitation is that we are able to base this only on alcohol bought whilst in licensed premises, and alcohol consumed at home prior to going out (sometimes called "frontloading") is not accounted for. This is particularly popular amongst young drinkers, therefore proportions of binge drinkers and peak consumption levels are likely to be underestimated. It is also the case that at a population level, the fortnightly purchasing distribution from the EFS may bear some relationship to the mean weekly consumption from GHS. Comparison of this with the analogous GHS distribution shows that a higher proportion of the population are towards either end of the distribution in the EFS and fewer in the middle area of the distribution. This is firstly because many of the people who purchased no alcohol in the EFS may have purchased just before or just after the fortnight diary. Secondly, some of the 'harmful purchase' from EFS may be shared with other individuals in terms of consumption. This comparison underlines the need to utilise GHS as the baseline for consumption patterns, and to make some form of link to EFS, which has the data combining purchases and prices paid.

2.2.3 PROMOTION DATA: RETAIL SALES FROM NIELSEN[31]

Data has been made available to the research team from Nielsen[31] which allows an examination of the volume and sales value of alcohol for 32 different product types. Most importantly, these datasets enable detailed analysis of the extent of priced based promotion in the off-trade sector.

Nielsen collects data from off-trade stores across the UK on a weekly basis. They have an extremely detailed dataset over the past three years. As each new week of data becomes available the three year period is redefined and data older than 3 years old is discarded. Whilst the detailed data provides a wealth of material, Nielsen does not provide any individual-level information on buyers e.g. no age/sex data, nor does it provide any direct information on actual consumption (as distinct from purchase) of alcohol.

For the "Grocery Multiples channel", which is essentially supermarket chains, data is collected at ""stock keeping unit (SKU) level". An SKU would, for example, be a 4-pack of a particular brand of lager with 4*440ml cans and is defined by individual bar-codes. To protect the anonymity of individual brand data, Nielsen are unable to provide data at SKU level. However they are able to group the SKUs into 32 product types. The Nielsen data on a particular SKU for alcoholic beverages, includes the following fields:

- SKU code
- Week
- Store / outlet (at individual store level)
- Volume of sales (litres of beverage)
- Value of sales (in £)
- Flag identifying whether these sales were on promotion or not
- Product category

Nielsen use an industry recognised method to determine if a price of an item (an SKU in an outlet) is promotional or not in any given week. The highest price recorded over the previous 5 weeks in the outlet is treated as the regular price ("RRP") of the item. If the price drops from the regular price by 5% or more in a subsequent week, the item is classified as being on promotion. If the reduced price remains in place for more than 4 weeks it then becomes the new regular price (i.e. the item is no longer on promotion). Thus, for each record in the data Nielsen can also produce the field:

- Regular price (computed as above) if SKU had not been on promotion.

Nielsen was asked to provide a series of analyses based on these data. Our model performs analysis at the aggregated level of beers, wines, spirits and alcopops but we have slightly more detail by Nielsen's Product categories in order to aggregate the later data by ethanol content. The transformation from litres of beverage to units of alcohol was necessary. This was achieved bv applying Alcoholic by Volume (ABV) estimates (Table 5) to the volume of the product to obtain ethanol quantity and then converting to units (1 UK unit = 10ml ethanol). The 32 product categories were:

Beers:

- Non/low alcoholic lager, Commodity lager, Standard lager, Premium lager, Super-strength lager, Non/low alcoholic ale, Commodity ale, Standard ale, Premium ale, Super-strength ale, Stout, Cider and Perry

Spirits:

- Blended Scotch Whisky, Malt Whisky, Imported Whisky, Gin, Vodka, Liqueurs, Brandy/cognac, Rum

Wines:

- Australian Light Wine, French Light Wine, Italian Light Wine, USA Light Wine, German Light Wine, Chilean Light Wine, Sparkling Wine, Champagne

Fortified wines:

- Sherry, Port, Vermouth

Alcopops:

- RTDs (Flavoured Alcoholic Beverages)

Table 5: ABV estimates

Product	ABV	Source
Commodity lager	3.2%	SGAIP[*] - assume same as beer
Standard lager	4.0%	SGAIP - assume same as beer
Premium lager	5.0%	SGAIP - assume same as beer
Superstrength lager	8.0%	SGAIP - assume same as beer
Commodity beer	3.2%	SGAIP
Standard beer	4.0%	SGAIP
Premium beer	5.0%	SGAIP
Superstrength beer	8.0%	SGAIP
Stout	3.9%	CCFRA labelling study[†]
Cider and perry	6.5%	SGAIP - mid-point of cider and perry
Blended Scotch Whisky	40.0%	SGAIP
Malt Whisky	40.0%	SGAIP
Imported Whisky	37.5%	SGAIP - assume maps to whiskey
Gin	37.5%	SGAIP
Vodka	37.5%	SGAIP
Liqueurs	35.0%	SGAIP - using non-cream version
Brandy/cognac	40.0%	SGAIP - using cognac
Rum	37.5%	SGAIP - using middle ABV rum category
Australian Light Wine	12.9%	CCFRA labelling study
French Light Wine	12.4%	CCFRA labelling study
Italian Light Wine	12.0%	CCFRA labelling study
USA Light Wine	12.3%	CCFRA labelling study
German Light Wine	9.3%	CCFRA labelling study
Chilean Light Wine	13.3%	CCFRA labelling study
Sparkling Wine	12.5%	SGAIP
Champagne	12.5%	SGAIP
Sherry	15.8%	CCFRA labelling study
Port	20.0%	CCFRA labelling study
Vermouth	16.5%	CCFRA labelling study
RTDs	5.0%	ONS (Goddard 2007)

Data is available for Great Britain and can also be partitioned for England & Wales. Our requirement was for three separate analyses for each of the three years of Nielsen data. Data for England in isolation is not available. Hence, data from England and Wales was used for the analysis

In order to examine price distributions we defined 10 price range categories for the off-trade sector and a further 10 price range categories for the on-trade sector. These were defined at Product level in terms of price per litre of beverage, with the prices selected such that each

[*] Scottish Government – Alcohol Industry Partnership data (2008)
[†] This data was collected for Monitoring Implementation of Alcohol Labelling Regime (Campden & Chorleywood Food Research Association Group, June 2008). The data was not collected for the ScHARR review, and CCFRA has no responsibility for the analysis of the data in this work.

category mapped back to an equivalent price per unit of alcohol (Table 6). Again, for SKU anonymity reasons, we were unable to obtain the price distribution at a greater resolution than 10 price categories.

Table 6: Price bin ranges for Nielsen data

Price Category	Off-trade price (£) per unit of alcohol		On-trade price (£) per unit of alcohol	
	Lower	Upper	Lower	Upper
1	0	0.15	0	0.4
2	0.15	0.2	0.4	0.5
3	0.2	0.25	0.5	0.6
4	0.25	0.3	0.6	0.7
5	0.3	0.35	0.7	0.8
6	0.35	0.4	0.8	0.9
7	0.4	0.5	0.9	1.1
8	0.5	0.6	1.1	1.3
9	0.6	0.7	1.3	1.5
10	0.7	N/A	1.5	N/A

With these price ranges defined, we were able to obtain data on the sales volume and sales value of each of the 32 products in each of the three years. For example (illustrative data):

Table 7: Example of data collected

Product: **Cider/ perry**	Non-promotional sales	
Price range	Total volume of sales (in litres)	Total value of sales (in £)
1	10,000,000	2,500,000
2	12,000,000	7,000,000
…	…	…
10	1,000,000	7,500,000

Tables such as these were available separately for the two Nielsen databases:

- § Grocery multiples
- § Impulse channels.

In addition for Grocery multiples – but not in the other channels – promotion data was available and data tables of the form below were produced. The table shown is for all beverage purchases in the final year of data (Table 8).

Table 8: Grocery multiple data – final year © Nielsen 2008.

Actual Price Band	Sum of Promoted Volume (L)	Sum of Non-Promoted Volume (L)	Sum of Promoted Value (£)	Sum of Non_Promoted Value (£)	Sum of Value of Promoted Sales (if on RRP) (£)
1	20,327,944	46,285,416	19,703,950	42,812,704	23,145,839
2	36,955,834	36,006,268	43,848,066	44,003,149	56,021,218
3	138,746,558	51,107,748	176,483,153	117,026,750	222,164,862
4	224,136,257	125,436,191	436,977,038	439,874,321	525,905,306
5	196,205,092	182,858,206	551,566,021	564,042,178	650,918,536
6	163,696,206	145,449,159	576,508,016	419,138,959	689,774,543
7	188,464,714	168,081,603	805,369,389	690,468,709	987,568,927
8	78,231,614	80,458,243	382,723,118	402,373,266	447,052,700
9	25,388,792	37,287,395	152,863,898	222,876,130	174,997,504
10	23,986,713	36,160,954	261,613,428	397,899,570	300,105,573

Data is more limited for the Impulse and on-trade channels; in particular, promotion data is not available in these channels.

For more detail on the data obtained for each of the 32 products see the data specification in Appendix 2.

2.2.3.1 Purchasing patterns in the population

By using combined purchasing data from EFS and Nielsen it is possible to build a representation of purchasing by different demographics in the population that is useful for modelling.

We have used five years of EFS data, converted to price per unit and inflated to 2007 prices, to build overall detailed price distributions for beer, wine, spirits and ready-to-drink beverage in both the on-trade and off-trade. We then, in the off-trade, use the more aggregated, but more accurate, sales data from Nielsen to ensure that the price distribution matches with actual sales data at known points of the distribution. We then interpolate the EFS data between the known Nielsen data points. The results are shown in the Figure 7. The combined Nielsen-EFS price distribution is then decomposed into the different age, sex and consumption sub-populations (e.g. 18-24 year old male hazardous drinkers[*]) using the demographic data in EFS.

[*] We use 18-24 year old hazardous drinkers – of whom 58% are estimated to be binge drinkers – as a proxy for the 18-24 year old binge drinking priority group.

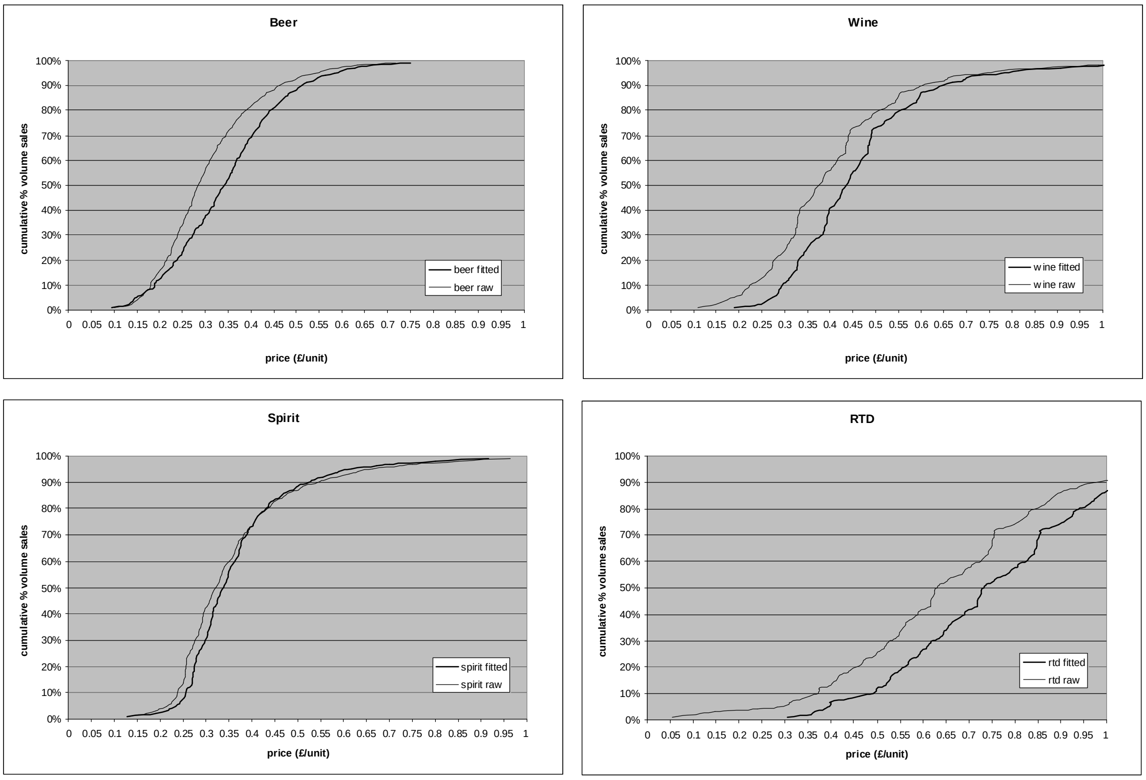


Figure 7: Interpolation (fitting) of the (raw) EFS off-trade data based on Nielsen data

Note that Nielsen do not provide distributional data for on-trade sales and so just the EFS data is used to build the price distribution for the on-trade.

For the off-trade, the Nielsen-EFS price distribution can also be decomposed by level of sales discount. For each of the ten actual price categories, Nielsen provide the value and volume of sales across ten (equivalent) recommended retail price categories. Thus we are able to build a distribution of sales promotion conditional on a price being within a particular actual price category. We then use the observed mean sales price for each actual-RRP combination to estimate the scale of the discount corresponding to the observed volume of sales.

For beer, the distribution of sales promotion is shown in Table 9.

For example, 42.4% of promoted sales with an actual price of less than £0.15/unit have an RRP of between £0.15/unit and £0.2/unit, and have a mean discount of 20%. This data can be used in a model to understand how prices would increase if sales promotions were limited (assuming no market response).

Table 9: Distribution of promotional sales (based on data provided by Nielsen, © Nielsen 2008):

Beer		RRP (p/unit)									
		0-15	15-20	20-25	25-30	30-35	35-40	40-50	50-60	60-70	70+
Sales	0-15	0.473	0.424	0.088	0.010	0.004	0.001	0.001	0.000	0.000	0.000
Price	15-20	0.000	0.465	0.350	0.054	0.084	0.041	0.006	0.000	0.000	0.000
(p/unit)	20-25	0.000	0.000	0.263	0.323	0.242	0.112	0.053	0.007	0.000	0.000
	25-30	0.000	0.000	0.000	0.308	0.346	0.199	0.095	0.051	0.001	0.000
	30-35	0.000	0.000	0.000	0.000	0.427	0.367	0.169	0.028	0.008	0.001
	35-40	0.000	0.000	0.000	0.000	0.000	0.495	0.422	0.065	0.007	0.011
	40-50	0.000	0.000	0.000	0.000	0.000	0.000	0.689	0.244	0.050	0.016
	50-60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.664	0.296	0.041
	60-70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.633	0.367
	70+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Table 10: Magnitude of promotional discount (based on data provided by Nielsen, © Nielsen 2008):

Beer		RRP (p/unit)									
		0-15	15-20	20-25	25-30	30-35	35-40	40-50	50-60	60-70	70+
Sales	0-15	0.062	0.202	0.343	0.521	0.620	0.688	0.756	0.811	0.840	0.921
Price	15-20	0.000	0.059	0.166	0.338	0.438	0.479	0.550	0.681	0.736	0.761
(p/unit)	20-25	0.000	0.000	0.044	0.146	0.264	0.364	0.478	0.528	0.630	0.709
	25-30	0.000	0.000	0.000	0.033	0.142	0.254	0.353	0.488	0.535	0.692
	30-35	0.000	0.000	0.000	0.000	0.034	0.121	0.246	0.367	0.496	0.565
	35-40	0.000	0.000	0.000	0.000	0.000	0.023	0.127	0.281	0.433	0.500
	40-50	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.156	0.252	0.440
	50-60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.145	0.243
	60-70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.167
	70+	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081

2.2.4 A MODEL LINKING PATTERNS OF BINGE DRINKING TO PURCHASING

For acute harms, it is the intake of alcohol in a single day (a proxy for intoxication), rather than the mean weekly units that is most strongly associated with harm e.g. falls, crimes or violence. Analysis of binge drinking behaviour rather than just mean consumption over the week or the year is therefore essential. In theory, it would be good to model two aspects of binge drinking:

1. The sensitivity of binge *drinkers* to price and/or promotion: Binge drinkers might behave differently in their response to price and / or promotion than drinkers who do not binge. With an idea dataset containing both information on consumption and purchasing patterns, separate elasticities could be computed for “binge drinkers” and individuals who do not binge.

2. The sensitivity of binge *drinking* (especially the number of units consumed during a binge drinking session) to price and promotion. People might respond differentially to price during binge drinking occasions compared to non-binging occasions (for example, it is plausible that the presence of friends and increasing levels of intoxication during typical binge drinking occasions may lead to reduced price sensitivity). It would therefore be useful to be able to compute elasticities relating price changes to changes in the number of units drunk during a binge.

2.2.4.1 Issues in linking data on binge drinking to purchasing

There are difficulties linking data on binge drinking (GHS/SDD) with data on price and purchasing (EFS). GHS data provides evidence on likelihood and scale of binge drinking via the maximum intake of alcohol during the last week. This variable is used in the model to represent the baseline level of binge drinking. However, since the GHS contains no information about price or purchasing, it cannot be used to generate the above mentioned elasticities.

EFS data provides evidence on purchasing both on- and off-trade, but does not contain a measure of binge drinking. Whilst it would seem sensible to assume that on-trade purchasing is directly associated with consumption, it is clearly not reasonable to assume that off-trade purchases are consumed on the same day and by the individual purchasing the alcohol. EFS data can therefore provide only a very incomplete picture of binge drinking, which is essentially an estimate of the extent of ‘on-trade bingeing’ ignoring any off-trade consumption. This has significant limitations as it is recognised that significant proportions of binge drinking occurs at home or involves a combination of both on- and off-trade consumption. We attempted to produce a 16*16 matrix of elasticities for 6 subgroups (i.e. moderate, hazardous and harmful drinkers by on-trade binge/off-trade binge). However, there were insufficient numbers of people in the sub-datasets, and it was not possible to compute such elasticities.

We then chose to explore an alternative approach, based on the observation that in the GHS, probability and scale of binging is related to the mean weekly intake of alcohol (20% of moderate drinkers binge drink on at least one day the last week, whereas figures for hazardous and harmful drinkers were 62% and 74% respectively). This indicates that elasticity matrices developed for moderate, hazardous and harmful drinkers allow at least some reflection of the differential purchasing response to price changes that bingers and non-bingers might have. However, it is important to note that this approach does not consider the possibility that price sensitivity may vary by whether drinking occurs during a binge drinking occasion or not. Using the overall matrices also does not address the issue of estimating the change in the scale of binge given a change in price and / or promotion. Our chosen solution to this is presented below, together with a discussion of limitations.

2.2.4.2 Regression model to predict the scale of the binge

One main advantage of the GHS (2006)[23] is the availability of data for both the mean weekly intake (here converted to mean daily intake) and the maximum units drunk in the heaviest day. It was thus possible to map the scale of binge from the mean intake using standard statistical regression model techniques. Separate linear models were constructed for each drinker type due to the anticipated differences in behaviour of moderate, hazardous and harmful drinkers. For each age and sex group, models predict the maximum daily intake from the average daily intake of alcohol[*].

Regression coefficients from the three models are presented in Appendix 3. For illustration, the three models were plotted for men aged 25 to 34 years in Figure 8. The gradient of the regression models are less steep as the daily intake of alcohol increase.

[*] Individuals with data about the mean weekly consumption, the maximum unit drunk one day the last week and the income were selected. Individuals with a mean weekly consumption over 300 units or a maximum unit drunk one day the last week over 60 were considered as outliers and removed accordingly.

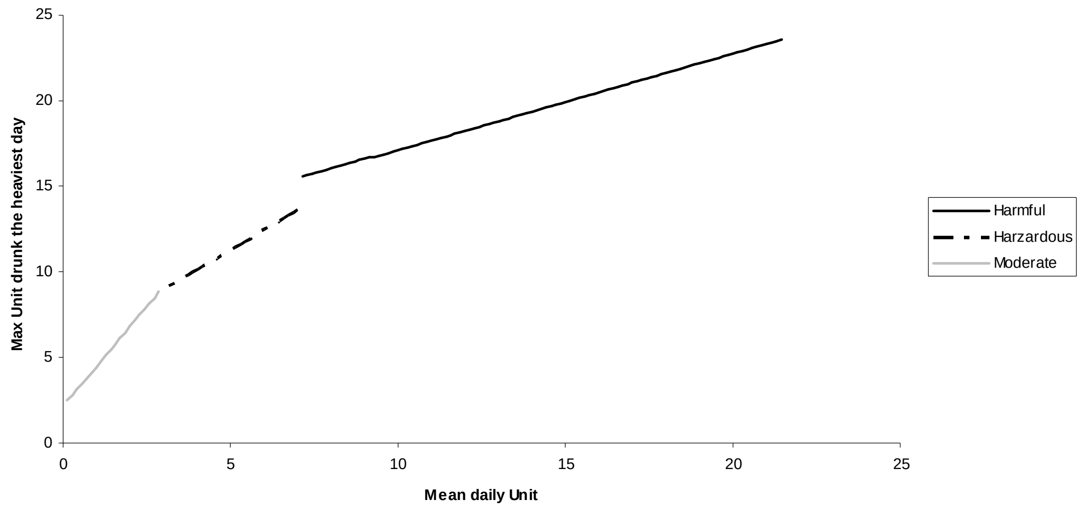


Figure 8: Illustrative example in men aged 25 to 34 years old

The regression models are used to predict the relative change in the scale of binge between baseline and an intervention. The relative change is then applied to the baseline unit of alcohol drunk on the heaviest day (original data from the GHS). To illustrate, consider a man aged 25-34 with a mean daily intake at baseline of 8 units (i.e. a harmful drinker) who drunk 20 units on the heaviest drinking day. Let us assume a given policy reduces the mean daily intake by 2 units. This changes the mean consumption from 8 units to 6 units, a reduction of 25%. Our models predict a corresponding reduction of 14% in the scale of binge, i.e. a reduction from 20 units to 17.5 units.

2.2.5 ESTIMATION OF PRICE AND INCOME ELASTICITIES USING EFS DATA

The EFS data enables a detailed analysis of the relationship between the demand for alcohol and, in particular, the price of alcohol, set in the context of recent patterns of purchasing in England.

The analysis uses data from the most recent five years available (2001/02 to 2005/06). We have been able to define our 16 categories of alcohol purchased: beers, wines, spirits and ready-to-drinks (alcopops), split by low priced and higher priced, and split by on- or off-trade purchase. Also within the data set are variables recording expenditure on other non-durable goods such as food and tobacco. We have transaction-level data on the individual purchasing the alcohol, from the two-week diary, in terms of volume purchased and price paid. We also have a substantial set of information on the individuals' characteristics, including: gender, ethnicity, age, education, region, household composition, household size, employment status and income.

An econometric model has been developed and used to examine the relationship between the purchasing of units of the 16 alcohol categories and of other non-durable goods (on the left hand side) and their prices, the income of the individual and the covariates around gender, ethnicity, age, education, region, household composition, household size and whether the individual is unemployed (on the right hand side). The resulting system of equations was analysed using iterative three-stage least squares regression to estimate coefficients for all relevant terms. We were then able to compute elasticities of demand for the various products from these coefficients.

These elasticities provide information on the responsiveness of the population to price changes. They inform the scale of expected reduction in purchasing of a category of alcohol if its price changes. They also inform the knock on effects on purchasing of other products, via the so-called 'cross elasticities' for price, enabling an assessment of the potential scale of switching to increased purchasing of a second category of alcohol (e.g. cheaper off-trade wine) if the price of the first category of alcohol (e.g. cheaper on-trade beer) increases.

Elasticities can also be estimated for income, enabling an assessment of the potential change in purchasing of alcohol with changes to income.

We have attempted to estimate elasticities for advertising by putting into the model data on the level of expenditure on alcohol advertising in each of the five years. Disaggregation of exposure of advertising to individuals within EFS is not possible due to lack of data. It is possible in theory to disaggregate further than just national level advertising spend, for example by examining regional differences in expenditure or making assumptions concerning relative levels of exposure for different subgroups in the population, but again we could find no robust data sources for England. The resulting advertising elasticities from our econometric model were both very small and not statistically significant and they are not reported here.

We have been able to estimate 16*16 elasticity matrices for various population groupings within the overall English EFS data:

- Total population (Table 14)
- Moderate drinkers (Table 12)
- Hazardous and harmful drinkers combined (Table 13)
- Hazardous drinkers (Table 15)
- Harmful drinkers (Table 16).

As a simple example of how to interpret the elasticity matrices, consider the moderate drinker 16*16 matrix shown in Table 12.The lead diagonal in the table shows the own-price elasticities. For example, the table shows an own-price elasticity of -0.4217 for off-trade low-price beer. This indicates that a 1% increase in the price of off-trade low-priced beer would lead to an approximately 0.4% reduction in the demand for such a beverage. Complementary and substitute relationships between beverages are also indicated by the cross-price elasticities that comprise the remainder of the matrix. For moderate drinkers, the majority of cross-price effects are of a substitute-based nature. For example, the cross-price elasticity between off-trade low-priced beer and on-trade higher-priced beer in Table 12 is +0.0157, indicating an estimated 0.02% rise in demand for on-trade higher-priced beer if the price of off-trade low-priced beer were to rise by 1%.

Note that the ideal scenario would be to produce 16*16 matrices for every sub-group in our analysis (e.g. 18-24 year old male hazardous drinkers), however there is insufficient data in our five-year EFS sample to enable the regression algorithm to converge satisfactorily on a robust solution.

Further information on the methods used to estimate price, income and advertising elasticities can be found in Appendix 4, together with detailed summary statistics from the regression analyses.

The elasticity matrices on their own are not sufficient to reveal the likely behaviour of the population to price changes, since these also depend on the preferences for beverage, drinking location and price point that the different sub-groups exhibit. However they do form a useful starting point for analysis, and can be compared with existing results from the literature.

Recent systematic reviews and meta-analyses by Gallet (2007)[36] and Wagenaar et al (2008)[32] found, respectively, a median elasticity for alcohol of -0.535 and a mean elasticity for alcohol of -0.51. By comparison, our elasticity matrix for all of England shows broadly similar results, with own-price elasticities ranging from a least elastic estimate of -0.2350 for on-trade higher-priced spirits to a most elastic estimate of -2.9386 for on-trade low-priced spirits. All other own-price estimates lie between these two points, and all exhibit inelasticity.

In terms of a more detailed decomposition by beverage type, Gallet (2007)[36] collated -0.360 for beer compared with our -0.4794 to -0.5525; -0.700 for wine compared with our -0.2829 to -0.5764; and -0.679 for spirits which is similar to our off-trade estimates of approximately -0.62. Note that elasticities do tend to be dependent on the country of interest, with the most popular type of beverage typically having the lowest estimated elasticity.

Few elasticity estimates are available that relate closely to the population of England. The most recent analysis by Huang (2003)[33] produced own price elasticity of -0.48 for on-trade beer, -1.03 for off-trade beer, -1.31 for spirits and -0.75 for wine excluding coolers. Like Huang (2003), we have found a larger elasticity for off-trade beer than on-trade beer, although in relative terms our observed difference is somewhat smaller.

Huang was also able to estimate cross-elasticities between beverage types, as was Gruenewald et al (2006)[34] in a study of off-trade Swedish price and sales data. Both studies tend to produce larger cross-price elasticities than those observed in our analysis of EFS data. The substitution effects estimated by Gruenewald et al (2006) are sufficient to result in overall increased demand for alcohol for some price increase configurations. The 16*16 matrix of elasticities for hazardous drinkers, when implemented in our overall model, is also capable of generating such a result at sub-group level for some price change configurations (note the cross-price elasticities for off-trade higher-priced wine and on-trade beer in Table 12) but this behaviour is not observed at total population level.

Some evidence exists in the literature to suggest that heavier drinkers are less responsive to price increases (in relative terms) than lighter drinkers. Manning et al (1995)[35] derived a price elasticity response function with respect to drinking quantile, indicating that moderate drinkers are the most price elastic and that the 95th percentile of drinkers have an elasticity not significantly different from zero (perfect price elasticity). Wagenaar et al (2008)[32] meta-analysis computes a mean elasticity of -0.28 for heavy drinkers compared to the overall -0.51 described earlier. By contrast, our elasticity estimates for moderate, hazardous and harmful drinkers (Table 12, Table 15 and Table 16 respectively) show, in general, own-price elasticity magnitudes increasing with mean quantity of alcohol consumed. However the relationship we observe between overall price elasticity and level of drinking is more complex due to the inclusion of cross-elasticities, with hazardous drinkers showing the greatest level of substitution behaviour, which in some cases is an order of magnitude greater than that estimated for moderate drinkers.

To enable more direct comparability with the estimates in the literature we have also generated elasticity estimates for total alcohol purchasing from the EFS, shown in Table 11. These are in broad agreement with the literature, showing that – at the highest level of aggregation – hazardous and harmful drinkers (combined elasticity of -0.21) are less price elastic than moderate drinkers (elasticity of -0.47). Note that these high-level estimates are provided for reference only and are not included in the model.

Table 11: High-level elasticities for different drinking categories, derived from EFS

	Drinking category	
	Moderate	**Hazardous or Harmful**
Elasticity (all alcohol)	-0.47	-0.21

In the baseline model we have chosen to use the moderate and combined hazardous and harmful matrices as input data. These provide a more central estimate of substitution behaviour than the matrix for all of England (which tends to smooth out the switching behaviour evident at sub-group level) and the separate matrices for hazardous and harmful (where, for hazardous, the magnitude of switching behaviour is perhaps somewhat greater than is realistic, given our knowledge of beverage, trade and pricing preferences from these groups from our synthesis of the EFS, GHS and Nielsen data). Hence these latter elasticity matrices are used only for sensitivity analysis.

Table 12: Price-elasticity estimates from 5 years of EFS data for 16 alcohol categories (moderate drinkers)

	CONSUMPTION →		OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.4217	0.0044	0.0023	0.0082	0.0011	0.0055	-0.0002	0.0035	0.0131	0.0157	0.0001	0.0020	0.0029	0.0048	0.0004	0.0050
		HI	0.0037	-0.4224	0.0027	0.0095	0.0010	0.0037	0.0000	0.0032	0.0130	0.0174	-0.0001	0.0025	0.0033	0.0057	0.0006	0.0055
	WINE	LOW	0.0051	0.0063	-0.4127	0.0032	0.0012	0.0028	0.0001	0.0019	0.0115	0.0102	-0.0002	0.0004	0.0033	0.0033	0.0001	0.0038
		HI	0.0040	0.0064	0.0012	-0.4612	0.0009	0.0032	0.0000	0.0019	0.0111	0.0155	-0.0002	0.0020	0.0038	0.0042	0.0002	0.0047
	SPIRIT	LOW	0.0030	0.0098	0.0023	0.0097	-0.5129	0.0029	0.0000	0.0018	0.0151	0.0142	0.0003	-0.0006	0.0024	0.0031	0.0003	0.0033
		HI	0.0049	0.0056	0.0014	0.0085	0.0007	-0.5242	0.0000	0.0019	0.0124	0.0161	0.0000	0.0017	0.0025	0.0036	0.0003	0.0039
	RTD	LOW	0.0118	0.0075	0.0022	0.0010	0.0003	0.0008	-0.3146	0.0009	0.0123	0.0068	-0.0002	-0.0006	0.0017	-0.0080	0.0004	0.0039
		HI	0.0059	0.0104	0.0001	0.0053	0.0011	0.0027	-0.0001	-0.3287	0.0083	0.0103	0.0002	0.0016	0.0020	0.0034	0.0004	0.0041
ON	BEER	LOW	0.0051	0.0067	0.0027	0.0083	0.0010	0.0047	-0.0001	0.0027	-0.3778	0.0259	-0.0003	0.0044	0.0043	0.0082	0.0009	0.0064
		HI	0.0060	0.0085	0.0022	0.0091	0.0010	0.0042	-0.0001	0.0032	0.0206	-0.4063	0.0000	-0.0003	0.0051	0.0123	0.0006	0.0075
	WINE	LOW	0.0007	-0.0019	0.0009	0.0030	0.0019	0.0016	0.0000	0.0005	0.0148	0.0150	-0.2328	0.0013	0.0010	0.0067	0.0002	0.0060
		HI	0.0021	0.0034	0.0010	0.0052	0.0007	0.0031	0.0000	0.0010	0.0121	0.0072	-0.0002	-0.2907	0.0022	0.0053	0.0006	0.0041
	SPIRIT	LOW	0.0017	0.0006	0.0032	0.0101	0.0002	0.0004	0.0000	0.0004	0.0029	-0.0110	0.0001	0.0190	-1.7810	0.0100	0.0023	0.0183
		HI	0.0015	0.0011	0.0009	0.0023	0.0002	0.0000	0.0000	0.0007	-0.0038	-0.0060	-0.0011	-0.0102	-0.0005	-0.1891	0.0004	-0.0020
	RTD	LOW	0.0016	0.0015	-0.0001	-0.0038	0.0004	0.0005	0.0000	0.0011	0.0075	0.0061	-0.0022	0.0094	0.0414	-0.0149	-0.3304	0.0067
		HI	0.0009	0.0019	-0.0004	0.0020	0.0006	0.0020	-0.0001	0.0008	0.0087	0.0012	0.0001	0.0043	0.0050	-0.0087	0.0007	-0.3191

Table 13: Price-elasticity estimates from 5 years of EFS data for 16 alcohol categories (hazardous and harmful drinkers combined)

	CONSUMPTION →		OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.5896	0.0086	0.0088	0.0367	0.0041	0.0057	0.0002	0.0006	0.0167	0.0249	-0.0002	0.0041	0.0019	0.0073	0.0002	0.0053
		HI	0.0094	-0.5746	0.0098	0.0357	0.0039	0.0033	0.0003	0.0006	0.0136	0.0206	0.0005	0.0032	0.0016	0.0061	0.0004	0.0054
	WINE	LOW	0.0198	0.0142	-0.5603	0.0116	0.0024	0.0065	0.0003	0.0043	0.0248	0.0281	-0.0001	0.0007	0.0006	0.0048	0.0005	0.0038
		HI	0.0168	0.0151	0.0053	-0.6260	0.0047	0.0062	0.0002	0.0012	0.0280	0.0390	0.0000	0.0025	-0.0001	0.0085	0.0008	0.0037
	SPIRIT	LOW	0.0064	0.0120	0.0041	0.0206	-0.6266	0.0016	0.0001	-0.0001	0.0181	0.0206	0.0006	0.0036	0.0000	-0.0009	0.0003	0.0004
		HI	0.0056	0.0042	0.0037	0.0182	0.0017	-0.6459	0.0000	0.0007	0.0205	0.0236	0.0001	0.0025	0.0003	-0.0007	0.0004	0.0009
	RTD	LOW	-0.0049	-0.0115	0.0038	0.0178	-0.0047	-0.0013	-0.3816	-0.0005	0.0018	0.0044	-0.0001	0.0006	-0.0012	0.0213	0.0001	-0.0007
		HI	-0.0002	-0.0018	0.0135	0.0072	0.0045	0.0057	0.0000	-0.4158	0.0015	0.0077	-0.0001	0.0003	-0.0028	0.0037	0.0001	0.0008
ON	BEER	LOW	0.0201	0.0175	0.0129	0.0464	0.0052	0.0061	0.0000	0.0024	-0.6161	0.0524	-0.0011	0.0034	0.0039	0.0059	-0.0011	0.0088
		HI	0.0201	0.0185	0.0113	0.0415	0.0046	0.0055	0.0002	0.0015	0.0329	-0.6331	-0.0001	-0.0027	0.0048	0.0015	0.0003	0.0026
	WINE	LOW	0.0049	-0.0033	-0.0009	-0.0014	-0.0017	0.0123	0.0001	-0.0038	-0.0312	0.0122	-0.3799	0.0004	-0.0022	-0.0069	0.0032	0.0045
		HI	0.0097	0.0045	0.0021	0.0121	0.0029	0.0045	0.0002	0.0007	0.0148	-0.0039	0.0001	-0.4106	-0.0028	-0.0050	0.0013	0.0025
	SPIRIT	LOW	0.0176	0.0190	-0.0019	0.0041	-0.0005	-0.0036	0.0000	0.0001	0.0147	0.0128	-0.0012	0.0277	-3.7220	0.0227	-0.0019	-0.0138
		HI	0.0066	0.0023	0.0055	0.0179	-0.0006	-0.0018	-0.0003	-0.0026	-0.0048	-0.0181	-0.0003	-0.0015	-0.0006	-0.2861	-0.0002	-0.0043
	RTD	LOW	0.0052	0.0042	-0.0046	0.0043	-0.0049	0.0046	0.0003	0.0006	0.0055	0.0119	0.0045	0.0020	0.0679	-0.0299	-0.3925	0.0135
		HI	0.0024	-0.0002	0.0048	0.0100	0.0019	-0.0020	0.0002	0.0003	0.0152	0.0022	0.0008	0.0086	0.0019	-0.0053	0.0012	-0.4194

Table 14: Price-elasticity estimates from 5 years of EFS data for 16 alcohol categories (All drinkers)

	CONSUMPTION →		OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.5525	0.0003	-0.0072	-0.0094	-0.0004	-0.0008	-0.0001	-0.0016	0.0085	0.0093	-0.0004	-0.0009	-0.0005	0.0022	0.0001	0.0020
		HI	0.0024	-0.5160	-0.0035	-0.0129	-0.0002	-0.0032	0.0000	-0.0007	0.0078	0.0095	-0.0001	-0.0011	-0.0014	0.0018	0.0004	0.0025
	WINE	LOW	0.0001	-0.0030	-0.5117	-0.0002	-0.0011	-0.0010	0.0001	0.0007	0.0020	-0.0050	-0.0003	-0.0011	0.0010	-0.0009	0.0001	0.0009
		HI	-0.0012	-0.0058	0.0005	-0.5764	0.0002	-0.0023	0.0000	-0.0011	0.0027	-0.0023	-0.0003	0.0003	0.0004	0.0005	0.0003	0.0012
	SPIRIT	LOW	-0.0077	-0.0019	-0.0089	-0.0139	-0.6131	-0.0002	0.0000	-0.0022	-0.0024	-0.0036	0.0000	-0.0012	-0.0005	-0.0020	0.0001	-0.0013
		HI	-0.0046	-0.0106	-0.0064	-0.0213	0.0003	-0.6217	0.0000	-0.0013	0.0006	-0.0043	-0.0003	-0.0030	-0.0002	-0.0016	0.0002	-0.0007
	RTD	LOW	-0.0066	-0.0112	-0.0035	0.0002	-0.0043	-0.0019	-0.3562	-0.0006	0.0002	-0.0116	0.0000	-0.0006	-0.0014	0.0066	0.0001	0.0008
		HI	-0.0041	-0.0023	0.0033	-0.0011	0.0022	0.0017	0.0000	-0.3815	-0.0022	-0.0023	-0.0004	-0.0006	-0.0028	0.0005	0.0001	0.0013
ON	BEER	LOW	0.0046	0.0014	-0.0023	-0.0035	-0.0003	-0.0012	-0.0002	-0.0004	-0.4794	0.0240	-0.0010	0.0002	0.0015	0.0022	-0.0001	0.0038
		HI	0.0058	0.0035	-0.0041	-0.0074	-0.0005	-0.0022	-0.0001	-0.0005	0.0203	-0.5049	-0.0001	-0.0051	0.0001	0.0031	0.0003	0.0021
	WINE	LOW	-0.0050	-0.0103	-0.0009	-0.0020	-0.0001	0.0023	0.0000	-0.0028	-0.0095	0.0070	-0.2829	0.0003	-0.0005	-0.0009	0.0010	0.0040
		HI	-0.0028	-0.0059	-0.0003	0.0036	0.0002	-0.0010	0.0000	-0.0010	0.0060	-0.0049	-0.0002	-0.3280	0.0004	-0.0003	0.0006	0.0015
	SPIRIT	LOW	0.0037	-0.0015	-0.0011	0.0017	-0.0005	-0.0022	0.0000	-0.0015	0.0001	-0.0417	-0.0005	0.0180	-2.9386	0.0129	-0.0030	-0.0046
		HI	-0.0018	-0.0059	-0.0011	-0.0048	-0.0004	-0.0014	-0.0001	-0.0023	-0.0184	-0.0348	-0.0014	-0.0105	-0.0005	-0.2350	-0.0002	-0.0047
	RTD	LOW	-0.0009	-0.0019	-0.0001	-0.0087	-0.0028	0.0009	0.0000	-0.0002	-0.0167	-0.0087	0.0010	0.0021	0.0239	-0.0346	-0.3672	0.0072
		HI	-0.0022	-0.0045	-0.0016	0.0001	0.0003	-0.0013	0.0000	-0.0002	0.0029	-0.0124	0.0003	0.0031	0.0045	-0.0099	0.0008	-0.3638

Table 15: Price-elasticity estimates from 5 years of EFS data for 16 alcohol categories (hazardous drinkers)

	CONSUMPTION →		OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.5360	0.0154	0.0190	0.0589	0.0064	0.0107	-0.0002	0.0028	0.0266	0.0367	0.0001	0.0078	0.0009	0.0096	-0.0002	0.0065
		HI	0.0130	-0.5398	0.0163	0.0536	0.0056	0.0092	0.0001	0.0026	0.0220	0.0307	0.0004	0.0056	0.0023	0.0101	0.0001	0.0068
	WINE	LOW	0.0266	0.0223	-0.4991	0.0182	0.0052	0.0101	0.0003	0.0049	0.0317	0.0335	0.0000	0.0022	-0.0005	0.0082	0.0004	0.0041
		HI	0.0210	0.0225	0.0078	-0.5646	0.0053	0.0110	0.0001	0.0024	0.0344	0.0462	0.0000	0.0043	0.0012	0.0106	0.0005	0.0054
	SPIRIT	LOW	0.0207	0.0234	0.0168	0.0440	-0.5822	0.0051	0.0004	0.0038	0.0329	0.0397	0.0007	0.0092	0.0004	0.0028	0.0001	0.0011
		HI	0.0144	0.0172	0.0107	0.0496	0.0027	-0.6056	0.0001	0.0020	0.0308	0.0375	0.0002	0.0045	0.0002	0.0019	0.0003	0.0020
	RTD	LOW	-0.0149	-0.0046	0.0146	0.0361	0.0122	-0.0012	-0.3004	-0.0012	0.0045	0.0171	-0.0002	-0.0009	-0.0016	-0.0014	-0.0004	-0.0015
		HI	0.0104	0.0054	0.0095	0.0113	0.0029	0.0043	0.0000	-0.3991	0.0039	0.0111	-0.0004	0.0015	0.0002	0.0029	0.0001	0.0013
ON	BEER	LOW	0.0229	0.0237	0.0187	0.0592	0.0072	0.0107	0.0001	0.0033	-0.5739	0.0603	-0.0006	0.0036	0.0036	0.0090	-0.0003	0.0105
		HI	0.0236	0.0249	0.0197	0.0584	0.0077	0.0105	0.0001	0.0012	0.0415	-0.5987	-0.0007	-0.0025	0.0115	0.0069	-0.0001	0.0046
	WINE	LOW	0.0005	0.0033	0.0023	0.0033	0.0041	0.0048	0.0000	-0.0030	0.0058	0.0135	-0.3595	0.0016	-0.0009	-0.0103	0.0005	-0.0015
		HI	0.0124	0.0076	0.0029	0.0120	0.0023	0.0062	0.0001	0.0022	0.0184	-0.0032	0.0003	-0.3974	-0.0041	0.0001	0.0007	0.0046
	SPIRIT	LOW	0.0162	0.0223	0.0029	0.0267	0.0007	0.0002	0.0000	0.0007	0.0260	0.0229	-0.0006	0.0292	-3.5809	0.0195	0.0020	-0.0110
		HI	0.0077	0.0058	0.0046	0.0228	-0.0005	-0.0001	0.0000	-0.0006	-0.0059	-0.0048	-0.0005	-0.0002	-0.0039	-0.2751	0.0000	-0.0038
	RTD	LOW	0.0088	0.0044	-0.0025	0.0119	-0.0014	0.0005	0.0000	0.0002	0.0266	0.0115	0.0020	0.0189	0.0683	-0.0201	-0.3836	0.0139
		HI	0.0039	-0.0004	0.0061	0.0152	-0.0003	0.0006	0.0000	0.0006	0.0263	0.0077	0.0000	0.0127	0.0038	-0.0020	0.0010	-0.4118

Table 16: Price-elasticity estimates from 5 years of EFS data for 16 alcohol categories (harmful drinkers)

	CONSUMPTION →		OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.6315	0.0092	0.0190	0.0576	0.0136	0.0111	0.0008	0.0002	0.0134	0.0231	-0.0002	0.0024	0.0038	0.0070	0.0007	0.0051
		HI	0.0114	-0.6195	0.0159	0.0504	0.0104	0.0063	0.0005	-0.0011	0.0082	0.0145	0.0008	0.0017	-0.0003	0.0024	0.0010	0.0040
	WINE	LOW	0.0349	0.0145	-0.6263	0.0158	0.0104	0.0119	0.0002	0.0050	0.0261	0.0345	-0.0002	-0.0004	0.0014	0.0025	0.0009	0.0039
		HI	0.0331	0.0166	0.0082	-0.6928	0.0153	0.0118	0.0003	0.0017	0.0290	0.0446	0.0000	0.0006	-0.0023	0.0081	0.0014	0.0019
	SPIRIT	LOW	0.0170	0.0139	0.0158	0.0442	-0.6551	0.0020	0.0000	-0.0015	0.0183	0.0154	0.0007	0.0007	0.0002	-0.0021	0.0006	0.0010
		HI	0.0132	0.0032	0.0118	0.0291	0.0023	-0.6833	0.0000	0.0007	0.0194	0.0200	0.0001	0.0017	0.0011	-0.0017	0.0006	0.0009
	RTD	LOW	0.0159	-0.0133	0.0081	0.0237	-0.0115	-0.0019	-0.4261	-0.0013	0.0082	0.0071	0.0001	0.0008	-0.0023	0.0381	0.0003	0.0007
		HI	-0.0076	-0.0095	0.0165	0.0123	0.0082	0.0078	0.0000	-0.4359	0.0003	0.0084	0.0008	-0.0002	-0.0047	0.0059	0.0001	0.0001
ON	BEER	LOW	0.0312	0.0202	0.0209	0.0648	0.0142	0.0103	0.0001	0.0030	-0.6965	0.0530	-0.0020	0.0058	0.0067	0.0026	-0.0030	0.0058
		HI	0.0290	0.0210	0.0149	0.0576	0.0108	0.0093	0.0002	0.0048	0.0308	-0.6915	0.0015	-0.0008	-0.0060	-0.0070	0.0014	-0.0003
	WINE	LOW	0.0205	-0.0059	0.0011	0.0048	0.0006	0.0290	0.0003	-0.0023	-0.0498	0.0216	-0.4057	-0.0016	-0.0038	-0.0024	0.0073	0.0152
		HI	0.0148	0.0050	0.0036	0.0188	0.0095	-0.0005	0.0002	-0.0006	0.0028	-0.0191	-0.0001	-0.4486	-0.0048	-0.0233	0.0028	-0.0048
	SPIRIT	LOW	0.0478	0.0039	0.0079	-0.0318	-0.0009	-0.0069	0.0004	-0.0017	-0.0010	-0.0116	-0.0026	0.0210	-4.0713	0.0371	-0.0119	-0.0163
		HI	0.0156	0.0003	0.0124	0.0290	0.0000	-0.0019	-0.0001	-0.0065	-0.0005	-0.0409	-0.0005	-0.0031	0.0073	-0.3078	-0.0005	-0.0040
	RTD	LOW	0.0036	0.0100	-0.0024	-0.0013	-0.0034	0.0135	0.0006	0.0016	-0.0083	0.0319	0.0093	-0.0230	0.0808	-0.0416	-0.4058	0.0147
		HI	0.0140	0.0091	0.0083	0.0116	0.0124	-0.0021	0.0003	0.0011	-0.0034	-0.0076	0.0034	0.0013	-0.0008	-0.0117	0.0018	-0.4356

2.2.6 PRICING/PROMOTION TO CONSUMPTION MODEL

Data from the GHS[23] were used to provide the baseline for consumption of alcohol in England.

The main mechanism in the model is that a change in price and / or promotion modifies the consumption pattern from the GHS, i.e. that a new GHS is simulated year after year based on the impact of selected policies.

However, as explained earlier, the GHS does not provide information about on- and off-trade and high and low price consumption, while EFS contains such data. Such a distribution is necessary to model the impact of specific policy aimed at on-/off-trade or low and high prices.
The price/promotion to consumption model is thus based on three major steps (Figure 9):

1) derive a new GHS for 16 elements of the matrices (on/off, high/low, beer, wine, spirits, alcopops)
2) interpolate the EFS[29] from Nielsen data[31] (see Method section 2.2.3.1)
3) estimate the impact of the implementation of a policy in terms of change in consumption

Step 1 was carried out by combining the consumption distribution from GHS with the EFS purchasing distribution to produce a "new GHS" for the 16 elements of the matrices[*].

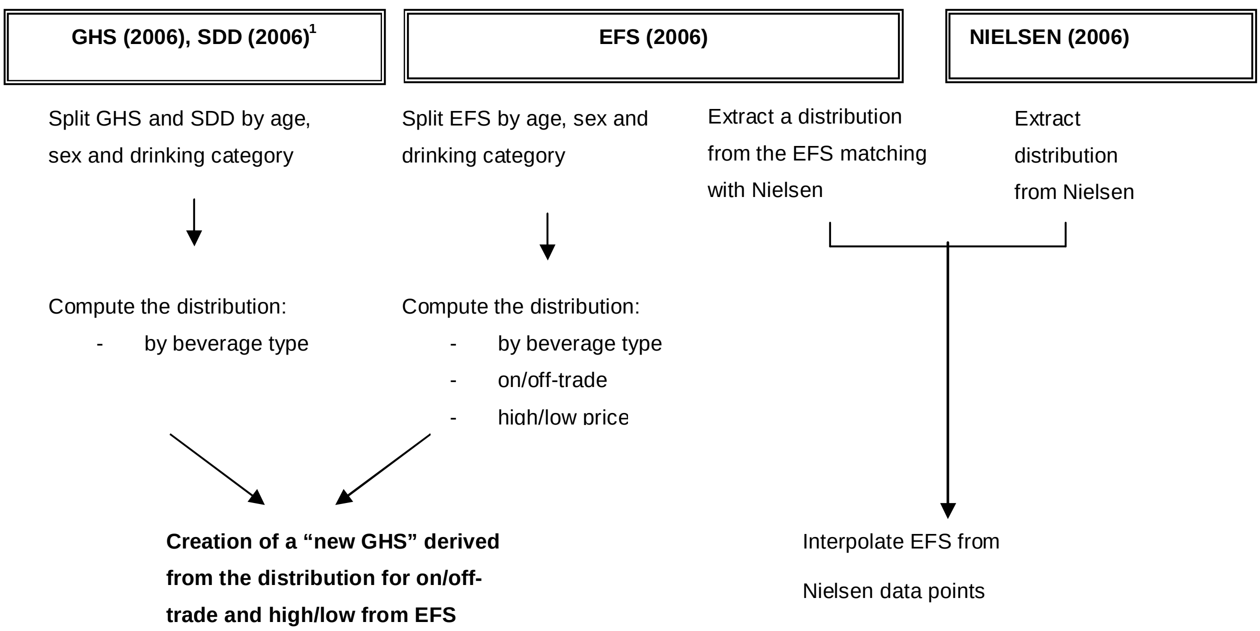


Figure 9: Model initialisation steps: creation of a new GHS and new EFS-Nielsen dataset

[*] Note that for the modelling we compute the preference vector at a group level rather than at individual sample level to mitigate the issue of zeros in consumption vectors. Since our elasticity matrix works on relative price changes, zeros could potentially bias the results by underestimating cross-price effects.

[1] While no information about binge drinking was available in the SDD (2006) for individuals aged 11 to 15 years old, binge drinking behaviour was estimated assuming a linear consumption over the week derived from the total unit of alcohol drunk over the last week and the number of days drunk in that week. Such assumption may underestimate the measure of binge drinking in 11 to 15 year old given that it consumption patterns out of drinking occasions over a week.

More details about step 2 are available in section 2.2.3.1 (methods)

Finally, after a "new GHS" has been created, the impact of a price /promotion policy on the mean consumption was examined using the elasticity matrices described in section 2.2.5. The formula used to apply elasticity is shown below:

$$\%\Delta\text{Consumption} = e^T * \%\Delta\text{price with } e^T = \text{elasticity}$$

Regression models are then used to predict the change in the scale of binge (see section 2.2.4).

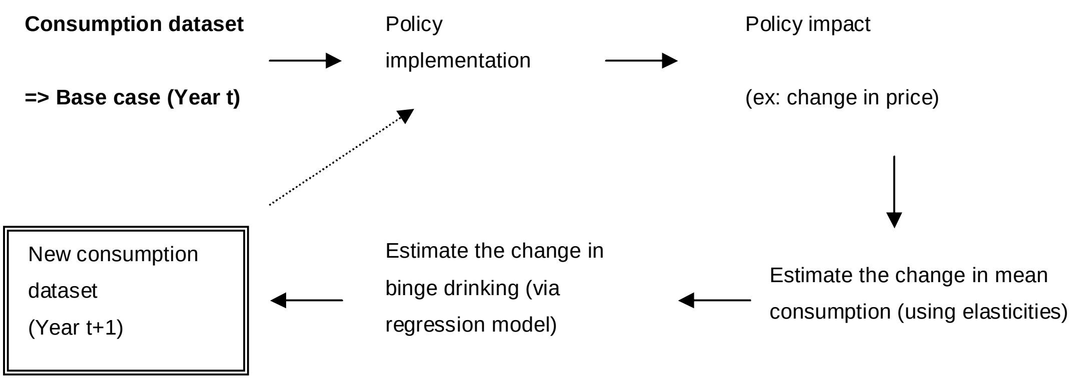


Figure 10: Steps to simulate a "new consumption dataset" after the policy has been implemented

2.2.7 INCREMENTAL POLICY ANALYSIS ON A STAY STEADY ALCOHOL CONSUMPTION BASELINE

The current version of the model treats GHS 2006[23] as the base year of consumption, assumes that not changing policy would result in a stay steady scenario of existing consumption, and analyses the incremental effect of a policy affecting price or promotion on consumption and hence harms.

Further research work could be undertaken to model the recent trends in consumption for different population subgroups over the last few years, and project forward a continuation of these trends if no policy action were taken. The estimated incremental effect of a policy over and above such a trend based baseline model would be of the same scale as in our current version because the same elasticity evidence would be used to compute it.

2.2.8 EVIDENCE USED FOR ADVERTISING ANALYSES

The alcohol policy model needs information on how consumption levels change as a result of policy impacts on alcohol advertising. There is significant debate on whether advertising effects can be adequately estimated using currently available methodologies and data. The main criticisms are: 1) oversimplification of consumer decision making processes and disregard of the mechanisms through which advertising influences consumers, especially in the longer term and 2) in a market where there is advertising saturation, it may be difficult to detect effects of marginally higher or lower advertising efforts.

Estimates of advertising effects tend to come from two sources: 1) advertising elasticities, which provide a measure of how changes in industry spending on advertising relates to changes in consumption; and 2) cohort studies, which include repeated measures of advertising exposure amongst children and relate these to adolescent and adult drinking outcomes.

There are limitations to both approaches. Studies estimating advertising elasticities rely on high-level aggregates of advertising expenditure, mostly with short-run series. This makes it unlikely that such studies will find significant effects. This approach is also unable to differentiate between different forms of advertising or groups of drinkers. Cohort studies can be prone to confounding effects, i.e. unmeasured third variables that influence both advertising exposure and later drinking behaviour.

In light of these problems, we decided to base our analysis on a range of different sources of evidence, thereby providing an indication of the likely minimum and maximum effects that can be expected from changes to advertising policy. We also attempted to estimate new advertising elasticities for England, but due to the nature of the available data (short-run, highly aggregated) we were unable to obtain reliable estimates.

2.2.8.1 Meta-analysis of Studies

Gallet (2007)[36] conducted a meta-analysis of 322 estimates of advertising elasticities, the majority of which stem from US studies. He reports an overall median advertising elasticity of 0.029, and advertising elasticities for beer (0.020); wine (0.007) and spirits (0.070). An advertising elasticity of 0.029 means that for every 10% increase in advertising expenditure, the demand for alcohol increases by 0.29%. We will use this estimate in one of the model runs.

2.2.8.2 UK-specific data[37]

Duffy (2003)[37] reports advertising elasticities specifically for the UK which, depending on the model used, vary between 0.018 and 0.025. These elasticities are very similar indeed to the findings of the more recent meta-analysis by Gallet (2007)[36], therefore separate results based on these estimates will not be reported.

2.2.8.3 Advertising Exposure: Effect on Young People[38]

Research estimated the effectiveness of advertising restrictions on youth (age 13 to 17) drinking, based on longitudinal US survey data (Saffer and Dave, 2006)[38]

Depending on the estimation model used, relevant advertising elasticities varied between 0.065 and 0.21, with the latter presenting the highest advertising elasticity reported in the econometric literature. We chose to model the more conservative 0.065 for people under 18 in the model.

2.2.8.4 Advertising Bans[39]

The same team estimated the effectiveness of advertising bans on consumption, based on pooled time-series data from 20 countries over 26 years (Saffer and Dave, 2002)[39]. A ban was defined either as partial - a ban of advertising of one beverage type on one media channel e.g. ban of beer adverts on TV – or full (all beverage types on one media channel). Up to 3 media bans were possible: for TV, radio and print. Saffer and Dave's estimate was that the introduction of a partial ban could reduce consumption by 5% per partial ban, whilst a total ban would reduce consumption by 9% per ban. We have implemented both formulations in the model, but for simplicity we will only report results for the latter form of ban.

2.2.8.5 Counter-Advertising

Counter-advertising is defined here as actions involving the use of advertising-styled messages about the risks or negative consequences of drinking, for example in the form of print or broadcast advertisements (definition adapted from Babor et al 2003[40]). The use of product warning labels is not included in our definition. Government has proposed the introduction of requirements for industry to use 1/6 of broadcast advertising time for counter-advertising measures. The possible effects are two-fold: (1) reduction of advertising expenditure by 1/6 as industry now had to fund counter-advertising; (2) any effects of the counter-advertising message in changing consumption. There is very limited evidence on the effect of counter-advertising on consumption outcomes. What evidence there is seems to suggest that there are minimal or no effects[2]. Therefore, we only model the effect of a 1/6th reduction in advertising expenditure by industry.

2.2.8.6 Modelling of advertising policies

As discussed above, we do not have sufficient data to enable a detailed model to be built in the manner of price or sales promotion described earlier. Instead we apply elasticities from the literature directly to the GHS-level consumption data to produce revised consumption estimates. These elasticities are assumed to apply to mean consumption only, and therefore the binge model is again used to estimate revised maximum daily drinking levels.

2.3 IMPACT OF ALCOHOL ON HARMS: OVERVIEW AND METHOD TO ESTIMATE RISK FUNCTIONS

The main mechanism of the consumption to harm model is the definition of risk functions. Risk functions are essential for modelling the impact on consumption associated with the implementation of price and /or promotion policies.

2.3.1 RELATIONSHIP BETWEEN ALCOHOL-ATTRIBUTABLE FRACTION AND RELATIVE RISK

The methodology by which the relationship between alcohol exposure and harm can be analysed is described in a new report by the NWPHO on "Alcohol-attributable fractions for England"[43], published in June 2008. The AAF of a disease can be defined as the difference between the overall average risk (or incidence rate) of the disease in the entire population (drinkers and never-drinkers[*]) and the average risk in those without the exposure factor under investigation (never-drinkers), expressed as a fraction of the overall average risk. For example, the AAF for breast cancer is simply the risk of breast cancer in the total female population minus the risk of breast cancer in women who have never drunk alcohol, divided by the breast cancer risk for the total female population. Thus, AAF are used as a measure of the proportion of the disease that is attributable to alcohol. While this approach has traditionally been used for chronic health-related outcomes, such approach can in principle be applied to other harms.

AAF can be calculated using the following formula:

Equation 1: AAF Formula

$$AF = \frac{\sum_{i=1}^{n} p_i \left(RR_i - 1\right)}{1 + \sum_{i=1}^{n} p_i \left(RR_i - 1\right)}$$

where,

RR_i is the relative risk of exposure to alcohol for band i

p_i is the proportion of the population exposed to alcohol in band i

p_0 the proportion of the population in the reference category (in this case zero alcohol)

If the reference category is abstention from alcohol then the AAF describes the proportion of outcomes that would not have occurred if everyone in the population had abstained from drinking. Thus the numerator is essentially the excess expected cases due to alcohol exposure and the denominator is the total expected cases. In situations where alcohol consumption reduces the risk of an outcome (e.g. coronary heart disease) the AAF can be negative and would describe the additional cases that would have occurred if everyone was an abstainer. An example calculation is shown below in Table 17.

[*] Never drinkers are different from abstainers

Table 17: Relative risks for males: malignant neoplasm of oesophagus (see Table 2 in NWPHO report[43])

	Grams of alcohol per day				
	0	**1-19**	**20-39**	**40-74**	**75+**
RRi *	1.00	1.20	1.39	1.93	3.59
Illustrative p_i	20%	30%	30%	15%	5%
(RRi-1)*pi	0	0.0600	0.1170	0.1395	0.1295
Numerator	0.4460				
Denominator	1.4460				
AAF	0.3084				

* Source = Corrao et al., 2004[41]

Note that there are methodological difficulties with attributable risk studies. One problem is in defining the non-exposed group – in one sense 'never drinkers' are the only correct "non-exposed" group, but they are rare and usually quite different from the general population in various respects. However, current non-drinkers include those who were heavy drinkers in the past (and these remain a high-risk group, especially if they have given up due to alcohol-related health problems). Several recent studies show that results showing avoided coronary heart disease risk may be based on systematic errors in the way abstainers were defined in the underlying studies. For example, Fillmore et al (2006)[42] reanalysed data from previous studies and concluded that if ex-drinkers had been excluded from the abstainer group, then no protective effects of moderate consumption would have been observed.

2.3.2 METHODS USED TO ESTIMATE RISK FUNCTIONS FOR HARMS

The impact of a change in consumption on harm was examined using four categories of risk functions:

1. Relative risk functions already available in the published literature
2. Relative risk functions fitted to risk estimates for broad categories of exposure (common for chronic health harms),
3. Relative risk function derived from AAF for partially attributable harms
4. Absolute risk functions for wholly attributable harms.

The methods used to obtain the three latter risk functions are described below.

2.3.2.1 Risk functions fitted to risk estimates for broad categories of exposure

While it may be possible to use risk estimates from broad categories of exposure assuming essentially flat relative risks across each consumption category, this does not allow the examination of the effects of relatively small shifts in patterns of consumption. Continuous risk functions were therefore fitted when risk estimates were available using polynomial curves.

One limitation of the approach is that risk estimates are available for only a few exposure groups which may under- or overestimate the risk beyond the last data point. This was notably the case in health chronic harms. Thus, an upper threshold was applied for conditions where the predicted estimates were unlikely to match the anticipated behaviour. Essentially, this results in a flat risk after this upper threshold. This assumption was made in the absence of consensus in the literature[2].

2.3.2.2 Deriving a relative risk function from the AAF

For some types of harms, evidence about AAF but not relative risk functions was available such as for crime or acute health harms. Such evidence can be used to derive a relative risk function assuming the relationship described in Equation 1, since the AAF is a positive function of the prevalence of drinking and the relative risk function (NWPHO, 2008)[43].

Two assumptions are necessary to compute a relative function from an AAF:

- assumptions about the form of the curve (or risk function)
- assumptions about the threshold below which the relative risk is 1 (i.e. harm is not associated with alcohol).

A linear function was selected in our study due to the lack of data in the literature.

Consequences of alcohol consumption tend to be distinguished in terns of those due to average drinking levels (chronic harms) and those due to level of intoxication (acute harms), and different thresholds were thus used according to the link between harms and drinking pattern:

a) the risk was assumed to start from 3 units per day for males and 2 units per day for females for harms related to chronic drinking (mean consumption). These thresholds were derived from government recommendations for moderate drinking, i.e. drinking less than 21 units per week for males and 14 units per week for females.
b) The risk was assumed to start at 4 units for men and 3 units for women for harms related to peak consumption (measured as units drunk on the heaviest drinking day during the past week). These thresholds deliberately do not correspond to the intoxication definition (more than 8 and 6 units for men and women respectively), because this would imply that the risk for those drinking at the threshold would be the same as the risk of abstainers, which contradicts published evidence on acute harms[2]. The use of 4 units for men and 3 units for women (the recommended daily limits) appears a sensible choice, since it is also unlikely that the risk starts increasing from zero units of alcohol.

The resulting relative risk function is therefore a function of consumption and threshold as follows:

Equation 2: Relative Risk Linear Function

$$RR(consumption) = 1 \text{ if } consumption < threshold$$

and

$$RR(consumption) = b \times (consumption - threshold) + 1 \text{ if } consumption \geq threshold$$

An example of a linear function constructed from an AAF is presented in Figure 11. The function is composed of two parameters:

- the threshold
- the slope.

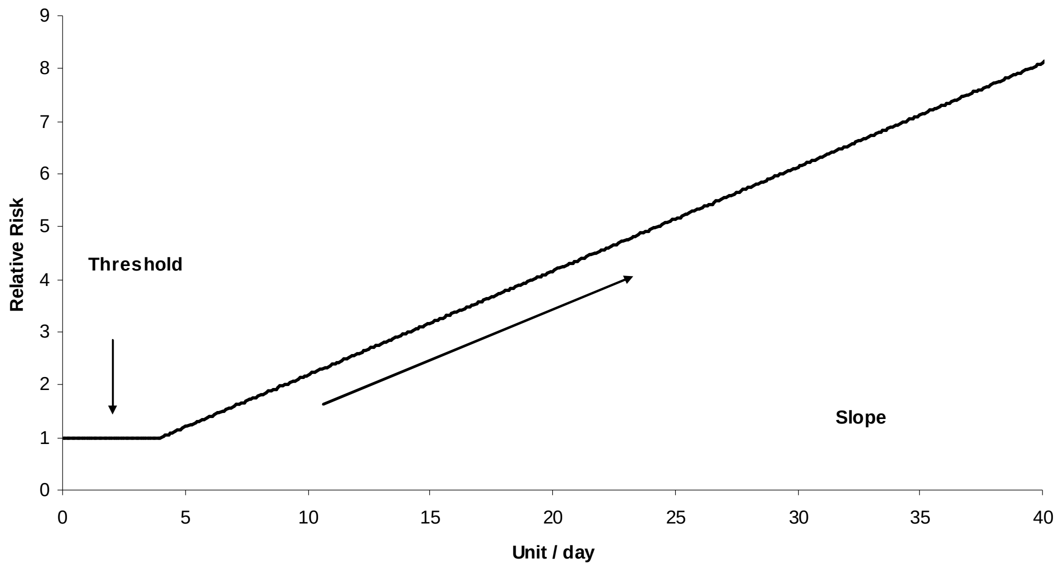


Figure 11. Illustrative linear relative risk function for a partially attributable chronic harm (threshold of 4 units)

2.3.2.3 Methods used to estimate the absolute risk function for wholly attributable harms

While it was possible to estimate RR functions for most harms, it was impossible to derive such a RR function for wholly attributable harms (with an AAF of 100%) due to the absence of a reference group.

An alternative approach was thus adopted. Absolute risk functions were calculated based on the number of events, the drinking prevalence, and the total population. As for RR functions, assumptions were necessary about the curve form and the starting threshold. The same assumptions were used for consistency.

An example of a linear absolute risk function constructed from the number of deaths is presented in Figure 12. The function is composed of three parameters:

- the threshold
- the slope
- the scale (or constant).

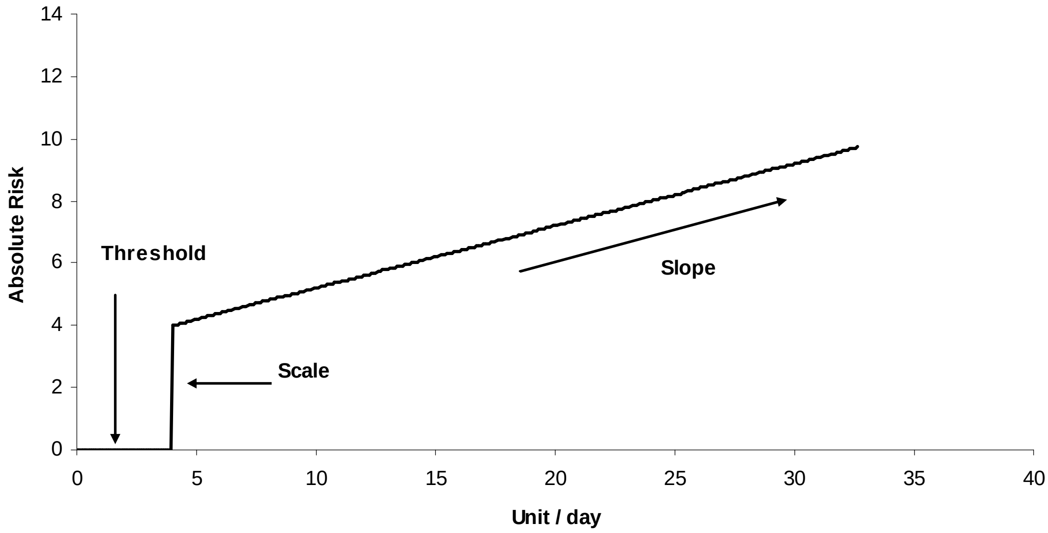


Figure 12: Illustrative linear relative risk function for a wholly attributable chronic harm (threshold of 4 units)

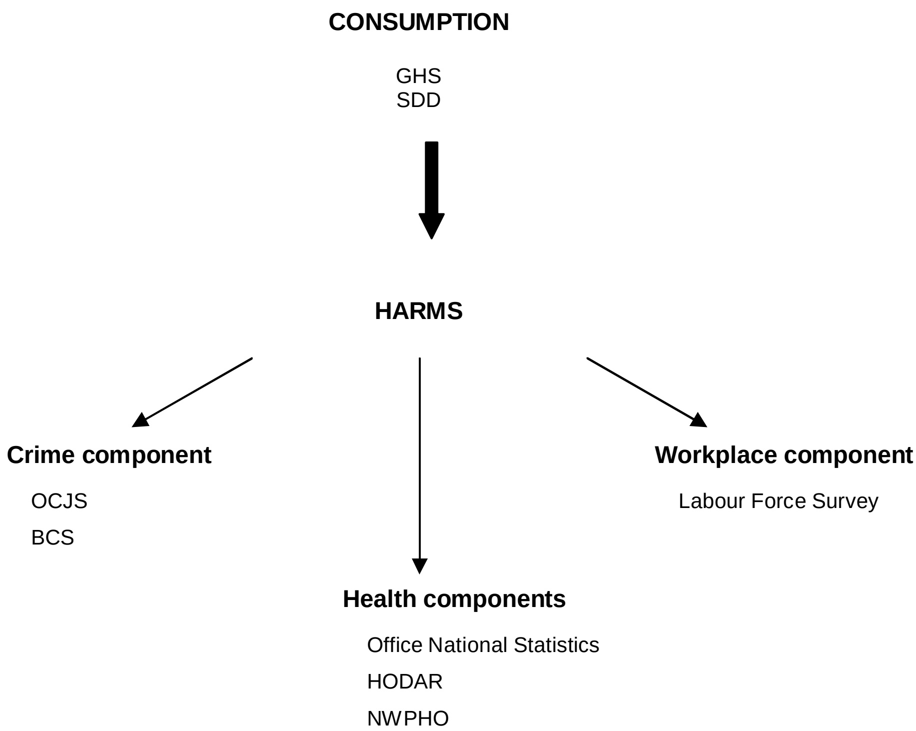
2.4 CONSUMPTION TO HARM MODEL OVERVIEW

The consumption to harms model is constructed to assess the impact of a change in consumption on three categories of harms:

- health harms,
- crime harms and
- workplace harms

These three components were modelled separately, i.e. that there was an assumption that there is no interaction between the health, crime and workplace models.

The consumption to harms model integrates data from different sources and datasets. An overview of the main integrated sources for each component of the consumption to harms model is provided in Figure 13.



[1] Price paid available for on- / off-trade, high / low prices and beverage type

[2] Consumption available only by beverage type (distribution for on- / off-Trade and high / low price not available)

Figure 13: Schematic on integrating data sources

2.5 CONSUMPTION TO HEALTH HARMS MODEL

2.5.1 HEALTH HARMS MODELLED

As mentioned before, since our systematic reviews[2] an important study has been published on health-related morbidity and mortality associated with alcohol misuse in England, the report "Alcohol-attributable Fractions for England"[43]. This study provides up-to-date analyses of hospital admissions, mortality data and AAF for 48 different conditions which evidence suggests are caused by alcohol misuse (Appendix 5).

In relation to alcohol, harms were classified into four categories of attribution

1. Wholly attributable (AAF=100%) chronic – meaning that the harm cannot occur in the absence of alcohol consumption and risk of occurrence changes with chronic exposure to alcohol (e.g. alcoholic liver disease ICD10 code = K70)
2. Wholly attributable acute – meaning that the harm cannot occur without alcohol as its cause and risk of occurrence changes with acute exposure to alcohol including intoxication (e.g. accidental poisoning by and exposure to alcohol, ICD10 code = X45)
3. Partially attributable chronic – meaning that the harm can occur without alcohol but the risk of occurrence changes with chronic exposure to alcohol (e.g. malignant neoplasm (cancer) of the oesophagus, ICD10 code = C15)
4. Partially attributable acute – meaning that the harm can occur without alcohol but the risk of occurrence changes with acute exposure to alcohol including intoxication (e.g. falls, ICD10 code = W00-W19, or assault, ICD10 = X85-Y09)

The same set of conditions was assessed in our analysis, with one exception: heart failure was excluded from our analysis due to the very small AAF reported in the NWPHO study. The list of conditions is presented in Table 18.

2.5.2 RISK FUNCTIONS

Absolute risks for wholly attributable conditions were calculated according to the method described in section 2.3.2.3 for the number of person-specific hospital admission and deaths by age and sex group. While wholly attributable chronic conditions were assumed to be a consequence of chronic drinking (use of the mean daily consumption to fit the curve), risk for wholly acute conditions was derived from the units drunk in the heaviest day the last week.

Relative risk for partly attributable conditions were derived directly from risk estimates and/or AAF when appropriate (see methods in section 2.3.2.1 and 2.3.2.2). Similar sources for AAF and RR were used as in the NWPHO report[43] (Table 18). Risk estimates for chronic conditions were primarily extracted from a recent meta-analysis conducted by Corrao et al (2004)[41] for 15 chronic conditions attributable to alcohol. Risk estimates for breast cancer were extracted from a meta-analyses conducted by Hamajima et al (2002)[44]. Pooled estimates from Gutjahr et al (2001)[45] and Rehm et al (2004)[46] were also examined for other conditions (for example epilepsy, spontaneous abortion etc). One important limitation surrounding the use of evidence from these studies was the impossibility to derive a relative risk function for each age/sex group. Where separate data was not available, risk functions were assumed to be similar between age and sex groups. We are aware that such an assumption may under- or overestimate alcohol-related harm in some age groups, notably in individuals aged less than 18 years old. Epidemiological data is usually collected for adults only. While it is likely that the relative risk for children is different from adult estimates, in the absence of data we use the estimate from the next oldest available age group.

Table 18: Health conditions included in our analysis

	Conditions	ICD-10 code(s)	Type of consumption	Sources for AAF and/or RR
Wholly chronic attributable conditions	Alcohol-induced pseudo-Cushing's syndrome	E24.4	Mean daily	100% attributable to alcohol
	Degeneration of the nervous system	G31.2	Mean daily	
	Alcoholic polyneuropathy	G62.1	Mean daily	
	Alcoholic myopathy	G72.1	Mean daily	
	Alcoholic cardiomyopathy	I42.6	Mean daily	
	Alcoholic gastritis	K29.2	Mean daily	
	Alcoholic liver disease	K70	Mean daily	
	Chronic pancreatitis	K86.0	Mean daily	
Wholly attributable acute conditions	Mental and behavioural disorders due to use of alcohol	F10	Max (heaviest day)	
	Ethanol poisoning	T51.0	Max (heaviest day)	
	Methanol poisoning	T51.1	Max (heaviest day)	
	Toxic effect of alcohol, unspecified	T51.9	Max (heaviest day)	
	Accidental poisoning by exposure to alcohol	X45	Max (heaviest day)	
Partly chronic attributable conditions	Malignant neoplasm of lip, oral cavity and pharynx	C00-C14	Mean daily	Corrao et al (2004)
	Malignant neoplasm of oesophagus	C15	Mean daily	
	Malignant neoplasm of colon	C18	Mean daily	
	Malignant neoplasm of rectum	C20	Mean daily	
	Malignant neoplasm of liver and intrahepatic bile ducts	C22	Mean daily	
	Malignant neoplasm of larynx	C32	Mean daily	
	Malignant neoplasm of breast	C50	Mean daily	Hamajima et al (2002)
	Diabetes mellitus (type II)	E11	Mean daily	Gutjahr et al (2001)
	Epilepsy and status epilepticus	G40-G41	Mean daily	Rehm et al (2004)
	Hypertensive diseases	I10-I15	Mean daily	Corrao et al (2004)
	Ischaemic heart disease	I20-I25	Mean daily	Corrao et al (1999)
	Cardiac arrhythmias	I47-I48	Mean daily	Gutjahr et al (2001)
	Haemorrhagic stroke	I60-I62, I69.0-I69.2	Mean daily	Corrao et al (2004)
	Ischaemic stroke	I66-I66,I69.3, I69.4	Mean daily	
	Oesophageal varices*	I85	Mean daily	
	Gastro-oesophageal laceration-haemorrhage syndrome	K22.6	Mean daily	English et al (1995)
	Unspecified liver disease	K73, K74	Mean daily	Corrao et al (2004)
	Cholelithiasis	K85, K86.1	Mean daily	Gutjahr et al (2001)
		L40 excluding	Mean daily	Corrao et al (2004)
	Acute and chronic pancreatitis	L40.5		
	Psoriasis	O03	Mean daily	Gutjahr et al (2001)
	Spontaneous abortion		Mean daily	
Partly acute attributable conditions	Road traffic accidents - non pedestrian		Max (heaviest day)	Ridolfo et al (2001)
	Pedestrian traffic accidents	V90-V94	Max (heaviest day)	
	Water transport accidents	V95-V97	Max (heaviest day)	Single et al (1996)
	Air/space transport accidents	W00-W19	Max (heaviest day)	
	Fall injuries	W24-W31	Max (heaviest day)	Ridolfo et al (2001)
	Work/machine injuries	W32-W34	Max (heaviest day)	English et al (1995)
	Firearm injuries	W65-W74	Max (heaviest day)	Single et al (1996)
	Drowning	W78	Max (heaviest day)	English et al (1995)
	Inhalation of gastric contents	X00-X09	Max (heaviest day)	Single et al (1996)
	Fire injuries	X31	Max (heaviest day)	
	Accidental excessive cold	X60-X84	Max (heaviest day)	
	Intentional self-harm	X85-Y09	Max (heaviest day)	English et al (1995)
	Assault	E24.4	Max (heaviest day)	Single et al (1996)

For external causes (acute partially attributable conditions), only AAF were available in the literature. AAF were mainly extracted from the published literature in Australia (Ridolfo et al, 2001[47]; English et al, 1995[48]) and Canada (Single et al, 1996[49]) as described in the NWPHO report. A RR function was computed for each age/sex group with an AAF. Again, where separate age/sex group AAF were not available, the risk function was assumed to be the same. The use of AAF from Australia and Canada and their application to the UK context may represent a limitation. While the use of country specific AAF will provide a more accurate picture of alcohol burden in England, these sources were recently used to describe AAF in England (NWPHO, 2008).

Furthermore, one important limitation is that most of the literature on partially attributable disease risk functions and AAF examines both mortality and hospitalisation data together in some weighted mix, so that different relative risk functions for mortality and morbidity are not available. Where this limitation exists we use the same relative risk functions for both mortality and morbidity. Similarly, AAF and/or risk estimated from the literature may not take into consideration possible confounding factors such as smoking which may inflate the risk attributed to alcohol.

Risk functions and/or estimated slopes are presented in Appendix 6.

2.5.3 MODEL STRUCTURE

To model health harms attributable to alcohol it was necessary to model two separate aspects of health:

- the mortality attributable to alcohol
- the morbidity attributable to alcohol.

Furthermore, when modelling the link between consumption and harm, one important input is the assumption surrounding the 'time lag', or the time needed to achieve the full benefit (reduction of harms) associated with a reduction of consumption. Such data is necessary for chronic conditions.

We reviewed the evidence in the literature on the time lag for full effects. For this, we would ideally have liked to find population-based time lags, but such evidence was not available. We therefore made the assumption that the time lag between onset of chronic alcohol consumption and onset of the disease in an individual could serve as a proxy for lag to full effect. Our review showed that the average time lag to full effect varies between 5 and 15 years, depending on the condition. Such evidence was reported for neurological disorders[50], chronic pancreatitis induced by alcohol [51], alcohol cardiomyopathy[52],[53] alcoholic liver disease[54], oesophageal cancer[55], epilepsy[56], heart failure and oral cancer[57], although it is acknowledged that the exact onset of harmful consumption is very difficult to establish. The time lag for full effect associated with certain types of cancer was reported to be slightly higher, for example the lag between consumption and onset of laryngeal and rectal cancer (between 15 and 20 years)[58].

A mean lag of 10 years was assumed for all chronic conditions. While such time lag may under/over estimate the true mean time lag for some conditions, given the lack of consensus it was felt to be a plausible estimate. The time lag for acute conditions was assumed to be zero since benefits associated with a reduction of acute harms occur instantaneously.

Our figure was compared to one reported by Nordstrom and Skog (2001)[59], the only paper identified which specifically mentions population-lags. The authors suggest an overall lag of 4 or 5 years (for combined chronic and acute conditions). The use of 10 years for chronic conditions and zero for acute conditions results in a similar average and appears thus to be a reasonable assumption.

One potential limitation is the assumption that the time lag was similar for both morbidity and mortality which is unlikely to be true for many conditions. However in the absence of data and consensus, such assumption had to be made.

The time lag effect was considered in our model assuming a linear progression. This is supported by Nordstrom and Skog, who fitted a geometric function with lambda = 0.8 to estimate the effect of the lag, which is very close to a linear effect.

Thus, for a 10 year time lag, benefits associated with a reduction in consumption at year 1 will be associated with 1/10th of the expected full benefits. 1/10th of full benefits will be achieved each year up to Year 10. An illustration is shown in Figure 14:

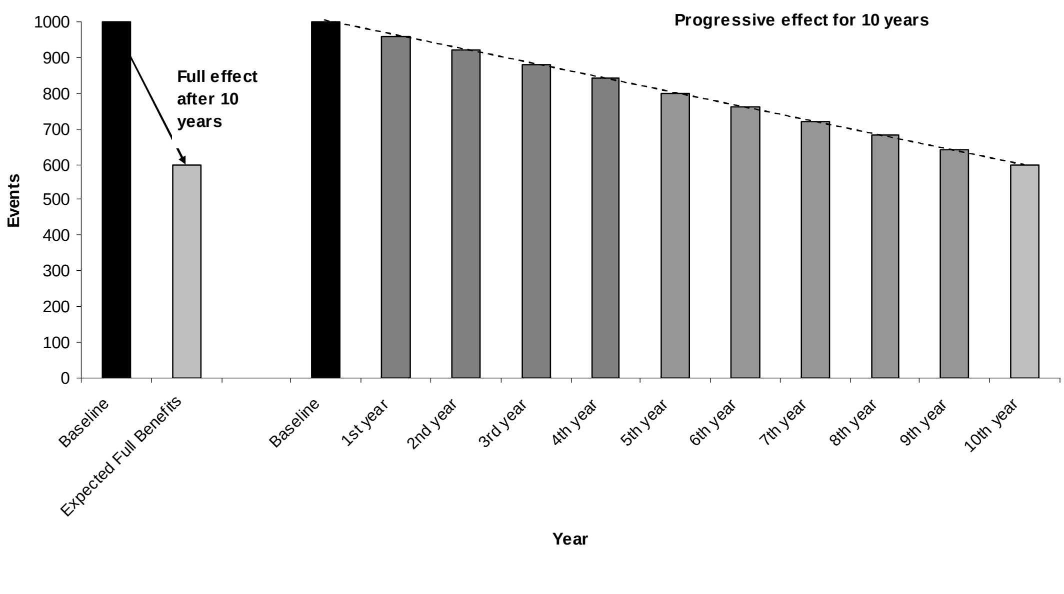


Figure 14: Illustrative example for the time lag effect for chronic conditions

2.5.4 MORTALITY MODELLING

A simplified version of the model structure for mortality is presented below in Figure 15.

The model is developed to represent the population of England in a life table, with data for the baseline year (2006) obtained from ONS population statistics[60]. Separate life tables have been implemented for males and females. Note that in the life table approach we are not following individuals and their disease progression but rather examining a current cohort within the life table for each year of the model.

The lifetable is implemented as a linked set of simple Markov models with individuals of age *a* transitioning between two states – alive and dead – at model time step *t*. Those of age *a* still alive after the transition then form the initial population for age *a*+1 at time *t*+1 and the sequence repeats.

The transition probabilities from the alive to dead state are broken down by condition and are individually modified via potential impact fractions over time t, where the PIF essentially varies with consumption (mean for chronic conditions and maximum daily for acute conditions) over time:

$$PIF_t = \frac{\sum_{i=1}^{N} r_{i,t} w_i}{\sum_{i=1}^{N} r_{i,0} w_i}$$

where PIF_t is the potential impact fraction relating to consumption at time *t*, *i* = GHS sample number, *N* = number of samples in sub-group, $r_{i,t}$ is the risk relating to the consumption of GHS sample *i* at time *t*, $r_{i,0}$ is the risk at baseline, and w_i is the weight of sample *i*.

Note that the PIF can be decomposed to enable different population groups at baseline – for example, moderate, hazardous and harmful drinkers – to be followed separately over the course of the model.

Importantly, the PIF gives the full effect if the change in consumption were achieved immediately. For acute harms, the full effect obtained from the PIF is assumed to occur in year one. For chronic conditions, the full effect is assumed to occur after 10 years (see section 2.5.3 for more details) assuming a linear progression over this period.

The model computes mortality results for two separate scenarios (a baseline – implemented as ‘no change to consumption’ in the analysis herein – and an intervention). The effect of the intervention (pricing or promotion policy) is then calculated as the difference between the lifetables of two scenarios: enabling the change in the total expected deaths attributable to alcohol due to the policy to be estimated.

Outcomes from the mortality modelling are expressed in terms of life years saved. Morbidity valuation is the purpose of a second model described below (section 2.5.5).

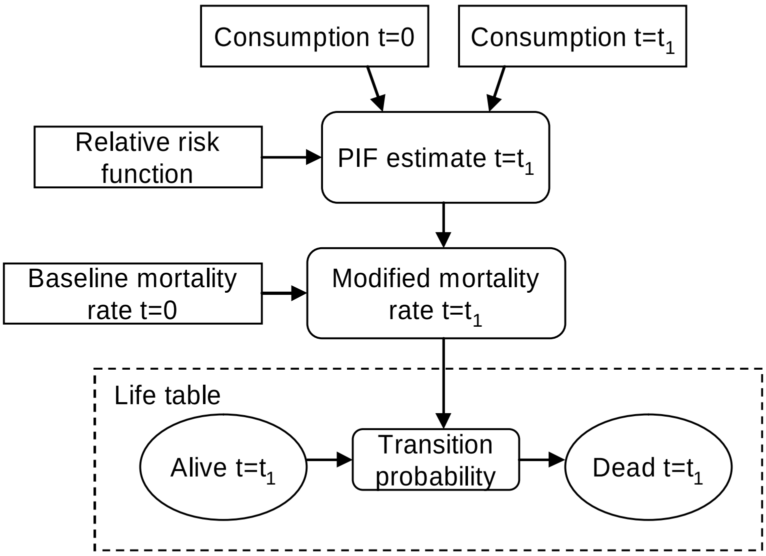


Figure 15: Simplified mortality model structure

2.5.5 MORBIDITY MODELLING: CONSEQUENCES AND HEALTH SERVICE COSTS

2.5.5.1 Person-Specific Hospitalisation

The estimates of morbidity consequences included within the model are based on the recent NorthWest Public Health Observatories (NWPHO) report[43] which provides information on 'person specific hospitalisations' for each of the 47 conditions studied. The NWPHO analysis utilises routine NHS data on hospital admissions, the Hospital Episodes Statistics (HES)[61] dataset, to examine the number of admissions in alcohol related diseases. Because data is individualised and different admissions for the same person can be examined, it is possible to analyse how many individual persons have been admitted. Thus, for example, if the same person was admitted on three separate occasions for oesophageal cancer during the year, then this would be counted as just one person-specific hospitalisation. Table 16 in the NWPHO report sets out the data for each condition. When an individual is admitted on two or more different occasions for two different reasons (e.g. once for oesophageal cancer and once for a fall) then the person-specific admission needs to be attributed to one of these reasons (otherwise there will be double counting). The NWPHO set out their rules for judging which is the most important of the admissions (primarily by examining which is the condition with the higher AAF) in the footnote on page 8 of their report[43]. NWPHO then use the same methods as for mortality to examine relative risks and attributable fractions for the diseases.

Essentially in our modelling we assume that the person-specific hospitalisation rates for each age/sex group can be considered as a proxy for the prevalence of the disease. Clearly, this assumption has some major limitations, since persons with an alcohol-attributable disease who are not hospitalised during the year are not included in the dataset[†].

Data from the NWPHO report were used as the baseline.

2.5.5.2 Morbidity model structure

A simplified schematic of the morbidity model is shown in Figure 16. As for the mortality model we are not modelling the individuals' disease history, but the expected disease prevalence for population cohorts. Thus, we only need to model how many of the population in that age/sex group are expected to suffer from the specific disease each year in the separate baseline and policy scenarios. If an incidence based approach were used instead, then much more detailed modelling of survival time, cure rates, death rates and possibly disease progression for each disease for each age/sex group would be needed.

The morbidity model works by partitioning the alive population at time *t*, rather than using a transition approach between states as previously described for the mortality model. Alive individuals are partitioned between all 47 alcohol-related conditions (and a 48th condition representing overall population health, not attributable to alcohol) analysed based on morbidity rates calculated from the NWPHO.

As in the mortality model, the PIF is calculated based on the consumption distribution at time 0 and *t* and risk functions. The PIF is then used to modify the partition rate (i.e. the distribution of the 47 conditions for alive individuals) to produce person-specific sickness volumes. These volumes then form the basis for estimating both health service costs and health related quality of life.

Quality Adjusted Life Years (QALYs) was examined using the difference in health-related quality of life (utility) in individuals with alcohol health harms and the quality of life measured in the general population (or “normal health”). Utility scores usually range between 1 (perfect health) and 0 (a state equivalent to death), though it is possible for some extreme conditions to be valued as worse than death. The utility scores are an expression of societal preference for health states with several different methods available to estimate them.

A time lag was then applied for chronic sickness as described in section 2.5.3. Note that because we have adopted a life-table approach, the method to estimate QALY change for morbidity also encompasses the mortality valuation.

Annual healthcare costs to the NHS associated with alcohol related harms are then estimated based on the cost per hospital admission derived from recent work by the Department of Health. Since the model works on person-specific hospital admissions (PSHA), a multiplier was used to derive the number of actual hospital admissions (more detail about the calculation of the multiplier is available in section 2.5.5.3). More details about the estimation of health care cost to the NHS are available in section 2.5.5.3 below.

Health outcomes (QALYs) and costs were discounted at 1.5% and 3.5% annually respectively based on standard Department of Health practice. For the purpose of the cost-benefit analysis, it was necessary to assign a financial value for discounted QALYs. Analyses were conducted assuming a financial value of £50,000, consistent with recent Department of Health impact assessments.

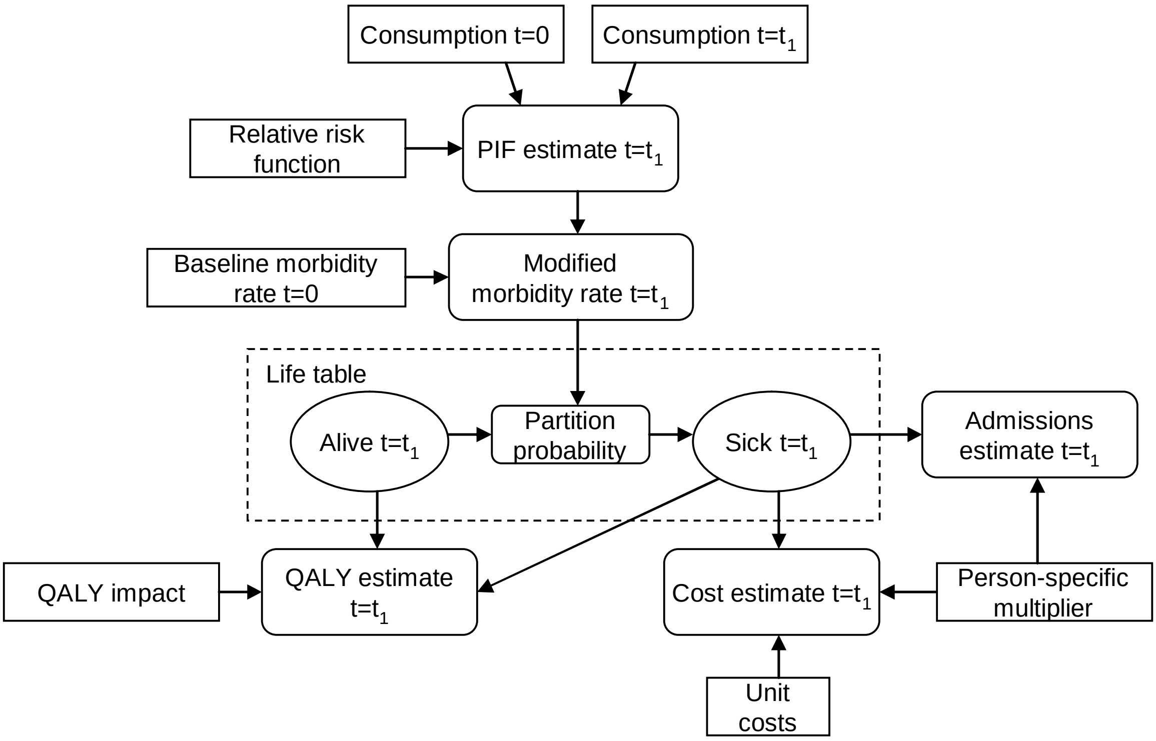


Figure 16: simplified structure of morbidity model

2.5.5.3 Mapping between PSHA and Hospital-Admission

While morbidity was assessed mainly using the PSHA definition, it was necessary to translate this figure onto a total number of hospital admissions (THA) to estimate costs.

A multiplier was thus calculated to map PSHA and THA for each condition. The multiplier was calculated from the number of THA related to alcohol (DH Impact Assessment, personal communication, 2008) in 2006 and the number of PSHA attributable to alcohol (NWPHO report) for the same year. It was possible to calculate a multiplier only for conditions with a positive AAF. The average multiplier was applied for conditions with a negative AAF.

Multipliers used are presented in Appendix 7.

2.5.5.4 Health Care Cost to the NHS

Costs to the NHS were derived from recent work by the Department of Health on NHS costs of alcohol attributable diseases[10] to approach the recent estimated cost of £2.7 billion of alcohol misuse. This cost was broken down by hospital inpatient and day visits, hospital outpatient visits, accident and emergency visits, ambulance services, NHS GP consultations, practice nurse consultations, dependency prescribed drugs, specialist treatment services and other health care costs.

The original analysis[10], for inpatient costs did not include all the conditions analysed in the NWPHO report due to the indicator chosen (Public Service Agreement, NHS Performance Framework and Local Government Performance Framework). Conditions with a small AAF were also excluded.

Inpatients costs were thus updated for missing conditions using the average tariff from the NHS reference cost (2006) while the number of alcohol hospital admissions was derived from the HES (2008)[61] and the NWPHO (2008)[43] for AAF. Inpatient costs and admissions for other conditions were directly extracted from the original DH analysis (personal communication, 2008)[10]. The cost per hospital admission for each condition is reported in Appendix 7.

Since the DH report did not report the breakdown per condition for other costs to the NHS (i.e. outpatient, A&E, ambulance, GP costs), an alternative method was used to estimate the breakdown of events (consultation) per condition. After discussion with clinical colleagues, costs were derived using the estimated total number of consultations due to alcohol in England[10] and the likelihood of consultation/event per condition (based on expert judgement). The mean number of consultations (for example, outpatient, GP, nurse visits) was estimated for each condition and calibrated using clinical colleagues opinion so that the total number of consultations approach the recent DH estimates (Table 19).

Table 19: Alcohol related cost in England – 2006 (reproduction)

	Cost Estimate £ (in million)	Number of consultation attributable to alcohol	Unit costs £
Inpatient visits	1,190.3	811,444	HRG tariffs
Outpatient visits	272.4	3,200,000	85
Accident and Emergency	645.7	6,622,796	97.5
Ambulance services	372.4	1,242,500	299.7
NHS GP consultations	102.1	2,870,000	35.55
Practice consultations	9.5	1.060.000	9
Dependency prescribed drugs	2.1		
Specialist treatment services	55.3		
Other health care costs	54.4		

2.5.5.5 Health-Related Quality of Life

A QALY approach has been used to value health outcomes in this analysis. It was necessary to estimate the health related quality of life or 'utility' score for each of the health harm conditions.

Utilities for all 47 conditions included in our model were derived from one single source, the Health Outcomes Data Repository[62] (HODaR) to avoid potential bias and variability between studies (extracted from eHODaR https://www.crc-limited.co.uk). The HODaR data measures utilities using the EQ-5D, a widely used generic (disease non-specific) quality of life instrument as recommended by the National Institute for Health and Clinical Excellence (NICE) for health economic evaluation. Data was collected by the Cardiff & Vale NHS Hospital Trust serving a local population of 424,000, and providing tertiary care for the whole of Wales. Patients discharged from hospital are requested to complete an EQ-5D questionnaire 6 weeks after their discharge via postal questionnaire. Data is collected on: demography, Health utility (EQ5D index), and Diagnoses (ICD-10) as well as a large range of other clinical, administrative and economic related information.

A mean utility value was thus extracted for each condition based on diagnoses (or ICD-10 codes). While utilities can be extracted per age and sex group, only the mean utility was extracted because direct analysis at a condition / age level involves very small sample sizes. The mean utilities for the condition were adjusted for age using the % increment/decrement observed in utilities observed in the general population (Kind and Dolan, 2005[63]). Utilities in individuals aged below 18 years were assumed to be similar to the utility in individuals aged 18 – 24 years old. The utility was also assumed to be similar for men and women.

For conditions for which no utility data was available, utilities were assumed to be similar to close conditions. Thus, utilities for mental and behavioural and alcohol induced Cushing syndrome were assumed to be similar to alcoholic polyneuropathy. Utilities for alcoholic myopathy were assumed to be similar to utilities for alcoholic cardiomyopathy. Similarly, the utility for methanol poisoning was assumed to be similar to Ethanol poisoning. Utilities for air/space and water transport accidents were assumed to be similar to road traffic accidents. Finally, utilities for firearm injuries, drowning, fire injuries and accidental excessive cold was assumed to be similar to pedestrian traffic accident.

The resulting utilities for each of the 47 conditions by age group are shown in Appendix 8.

There are some limitations in our use of these analyses. In particular, for acute conditions such as admission for road traffic accident, or fall or intentional self harm, there is a question as to whether the measure of utility at 6 weeks following discharge is representative of the full consequence of the disease. For acute conditions there is clearly the likelihood that utility scores might be worse than the 6 week recorded measure immediately around the time of the incident. Equally, it is plausible that through the recovery process, patients' utility score might be better 6 or 9 months post incident than they were at just 6 weeks. In the absence of data at other time points we assume that the 6 week utility score is representative of the score for a full year in our model. This may under- or over-estimate QALY gain of avoided health harms for acute conditions.

Utilities in the general population for "normal health" were extracted from Kind and Dolan (2005) for each age group[63]. This study showed that the average health related utility score reduces fairly steadily with age because on average more health related problems emerge for people at older ages.

2.6 CONSUMPTION TO CRIME HARMS MODEL

2.6.1 PREVIOUS CABINET OFFICE AND HOME OFFICE ANALYSES

The modelling of crime-related harms adapts original work by the Cabinet Office[3] and makes use of recent Home Office updated analysis of the costs of alcohol related crime (published in Appendix 2 of the July 2008 "Consultation on the future of alcohol" document[64]).

The Home Office analysis of alcohol related crimes[64] examines 20 defined crimes, the proportion attributable to alcohol and an estimate of the alcohol attributable costs. More details about the methodology are available elsewhere[9]. Findings from this study are presented in Appendix 9. Less serious wounding, criminal damage, sexual offences and causing death by dangerous driving were the major contributors to the overall costs of crime attributable to alcohol in England.

It should be noted that one important parameter in the Home Office analysis is the 'multiplier' for "less serious wounding", which uplifts recorded crime statistics to estimated total offences to account for under-reporting. Whilst good estimates are available on the difference between recorded and unrecorded crime for serious wounding and assault without injury, this is not the case for less serious wounding. The Home Office study suggests that the choice of multiplier used for "less serious wounding" has important implications for the overall cost of crime attributable to alcohol. Assuming a multiplier of 7.7 (as for "assault without injury) gives a total cost of crime of about £7.9billion. This figure is reduced to £1.8billion when the multiplier for "more serious wounding" (1.8) is applied.

The total number of offences reported in the Home Office report (including multipliers) was used as a basis for our model analysis. Sensitivity analyses are carried out for the choice of multiplier for "less serious wounding".

2.6.2 NUMBER OF OFFENCES BY AGE AND SEX GROUP

While the total number of offences in England in 2006 was extracted from the Home Office analysis, no information was given about how offences were distributed according to age and sex groups. It was necessary to collect such data to allow the model to estimate the impact of a policy on specific age and sex group.

Information about the age and sex distribution for reported crime is available from the British Crime Survey (BCS, 2005)[65]. However, the age split was limited to individuals aged under 21 years old and over 21 years old. Using such a coarse differentiation would limit our ability to consider the effects of consumption changes in subpopulations, for example young adult males, who tend to have very high binge drinking and crime rates.

An alternative approach was thus examined based on the distribution in offenders found guilty or cautioned in 2003 (ONS, 2005). Distributions were available for following age groups, split by gender: 10-15, 16-24, 25-34, 35+ for 7 offence categories. Assumptions were made about the mapping between offence categories and crime when appropriate (Appendix 9). While this study provides an age/sex distribution for crimes, it was necessary to adjust figures according to the modelled age distribution. The distribution in individuals aged 16 to 24 years old was collapsed for individuals aged 16 to 17 years old and 18 to 24 years old assuming an equal probability of crime at each age of the age group. Such assumption is not ideal since younger individuals may be more likely to commit crime; however, in the absence of data, we judged that this assumption was the most reasonable.

For individuals aged 35 years old and over, it is unlikely that the probability of committing a crime is similar between a person aged 35 years and 75 years. We felt that a decrease of crime with increasing age was the most appropriate assumption. Based on this, the distribution for 35 years old and over was collapsed assuming that 50%, 27.5%, 15% and 7.5% of crimes committed in this age group were committed by 35 – 44, 45 – 54, 55- 64 and 64 – 75 years olds, respectively. While this assumption may also present a limitation, no more appropriate data was identified. Finally, no alcohol-related crimes were assumed to be committed in individuals aged less than 10 years old or more than 75 years old.

The approach of using CJS statistics is not ideal and may over- or under-estimate the distribution for particular age/sex groups. For example, a bias could have been introduced since young offenders may be more/less likely to be found guilty or cautioned than older offenders. Furthermore, ideally the age and sex distribution should have been extracted directly from reported crimes data. However, access to such data was not available given the timescales of this report.

2.6.3 AAF FOR CRIME AND RISK FUNCTIONS

Prevalence-based risk modelling is not as well developed for crime as for chronic health conditions. The situation is more similar to acute health outcomes where attribution is based on direct measurement rather than an epidemiological fraction. Therefore risk functions are not generally available in the literature (the exception perhaps being road traffic accidents where there is evidence linking blood alcohol concentration prevalence to increased relative risk).

The Cabinet Office’s alcohol-attributable fractions for crime are estimated, from a sample of arrestees, as the ratio of arrestees with a positive urine test for alcohol to the total number of arrestees. This would tend to overestimate the AAF defined in classic epidemiological terms since it will contain a proportion of arrestees who would have committed the offence even without consuming alcohol. This is true of all AAF based purely on identified consumption, be this due to self-reporting, judgment by a third party (e.g. police or accident and emergency services) or measurement by a test.

However it is also possible to estimate an AAF based on attribution of consumption to the outcome (usually self-reported). In surveys of criminality this is typically done by asking the respondent if he or she committed the act *because* of his or her alcohol consumption. If attributable fractions relating to self-reported attribution are available, then it is possible to reconstruct a relative risk and thus to model changes in these outcomes due to changes in consumption (either side of a defined threshold for excess risk).

The Offending Crime and Justice Survey (OCJS) for 2005[65] includes two questions on offending related to alcohol. The first question (Q1) asks whether the offender was drunk at the time of the offence (”had you taken drugs or drunk alcohol when you did it?”). The second question (Q2) asks whether, in the offender’s view, they had undertaken the offence because they were drunk (”still thinking about when this happened, were any of these things reasons you did it?” followed by a multiple-choice list of responses including alcohol use). The Home Office update to the Cabinet Office costings for alcohol-related crime used results from Q1[9]. Note that the original Cabinet Office study used evidence from the NEW-ADAM arrestee survey, based on alcohol test findings in individuals’ urine. Those arrestees testing positive were considered to have committed alcohol related crimes. Both approaches are consistent in that it is any alcohol consumption prior to the offence that defines the attribution to alcohol, rather than whether offenders attribute their crimes to the use of alcohol.

In this report, we adopt a more conservative approach and estimate the AAF from Q2. AAF from Q1 are generally higher than those estimated from Q2. For illustration, the AAF for wounding for males aged 16 to 25 using Q2 is 11%, compared to 26% when Q1 is used. For comparison, the original Cabinet Office study found an AAF of 37%, based on the presence of alcohol in arrestees’ urine samples[‡].

While the use of Q2 may underestimate the proportion of crime attributable to alcohol, we felt that the question was probably more appropriate than Q1, and would more accurately reflect the attribution due to alcohol.

It was possible to derive AAF from the OCJS 2005 for males and females aged under 16 years old and 16 to 25 years old separately. Estimated AAF are reported in Table 14.

Table 20: Attributable fractions used as baseline in our modelling (OCJS 2005)

		Reason for committed crime				
Crime	N	Under the influence of alcohol only	Under the influence of alcohol and other drugs	Other reason	No reason given	**AAF**
Males Under 16						
Violent disorder	271	0.0%	0.0%	92.8%	7.2%	**0.0%**
Wounding	118	0.0%	0.0%	93.1%	6.9%	**0.0%**
Assault without injury	153	0.0%	0.0%	92.5%	7.5%	**0.0%**
Vehicle related thefts	32	0.0%	0.0%	96.3%	3.7%	**0.0%**
Burglary, robbery, other theft	214	0.0%	3.2%	87.1%	9.7%	**3.2%**
Criminal damage	69	1.8%	0.4%	91.4%	6.4%	**2.2%**
Females Under 16						
Violent disorder	191	0.4%	1.5%	94.1%	4.0%	**1.9%**
Wounding	91	0.0%	2.2%	91.0%	6.8%	**2.2%**
Assault without injury	100	0.8%	0.8%	97.0%	1.4%	**1.6%**
Vehicle related thefts	16	0.0%	59.9%	40.1%	0.0%	**59.9%**
Burglary, robbery, other theft	133	0.3%	3.4%	93.1%	3.2%	**3.7%**
Criminal damage	32	4.1%	16.2%	78.0%	1.6%	**20.3%**
Males 16-25						
Violent disorder	267	5.5%	9.0%	78.5%	6.9%	**14.5%**
Wounding	132	2.3%	9.0%	78.0%	10.7%	**11.3%**
Assault without injury	135	8.9%	9.1%	79.1%	2.9%	**18.0%**
Vehicle related thefts	32	5.3%	0.0%	80.3%	14.4%	**5.3%**
Burglary, robbery, other theft	183	1.4%	0.0%	84.0%	14.6%	**1.4%**
Criminal damage	70	24.0%	7.1%	57.2%	11.8%	**31.1%**
Females 16-25						
Violent disorder	163	1.1%	20.1%	64.7%	14.1%	**21.2%**
Wounding	88	0.0%	28.3%	61.0%	10.7%	**28.3%**
Assault without injury	75	2.2%	12.5%	68.1%	17.3%	**14.7%**
Vehicle related thefts	10	51.4%	0.0%	32.0%	16.6%	**51.4%**
Burglary, robbery, other theft	134	0.9%	0.4%	91.0%	7.7%	**1.3%**
Criminal damage	20	4.0%	30.1%	61.1%	4.9%	**34.1%**

AAF for each crime category from the OCJS (2005) was then mapped the closest offence (Appendix 11).

As for health acute harms, risk functions were computed from the AAF and the exposure using the method described in section 2.3.2.2. Relative risk functions were calculated for males and females for both age groups separately. Crime was assumed to be a consequence of acute (or peak) drinking. It was anticipated that individuals are more likely to commit crimes as their level of peak drinking increases.

In the absence of data about the AAF for other age/sex groups, the same relative risk function was used for individuals aged over 25 years old based on the risk function calculated for 16 to 25 years olds. This approach is not ideal since it is likely that AAF for older individuals are different to AAF for younger individuals. Whilst this is a limitation, it is not likely to greatly impact on the modelling results as individuals over 25 years contribute to less than 30% of all crimes.

Relative risk functions for crimes are presented Figure 17, Figure 18, Figure 19 and Figure 20.

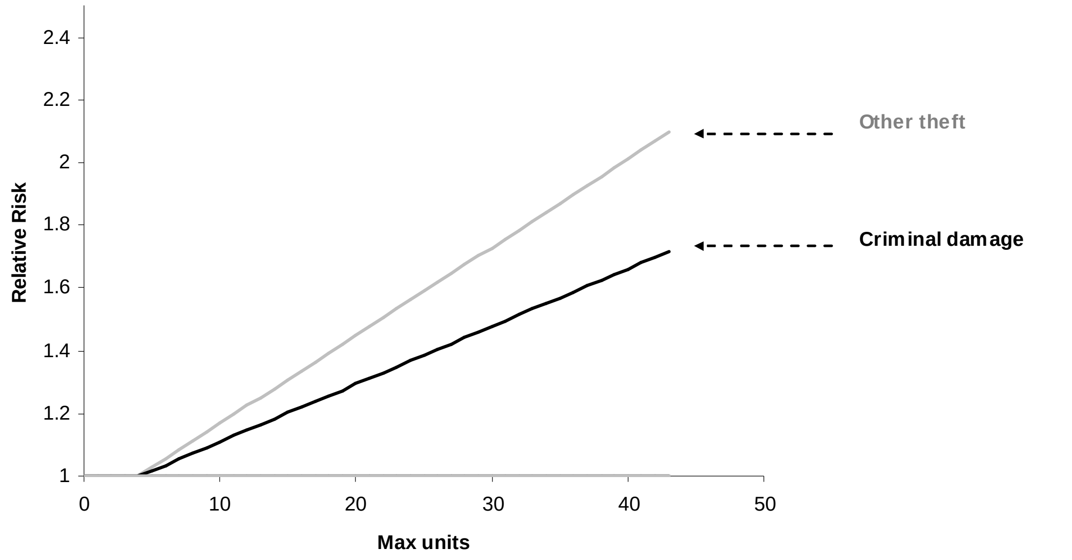


Figure 17: Relative risk functions in males aged less than 16 years of age

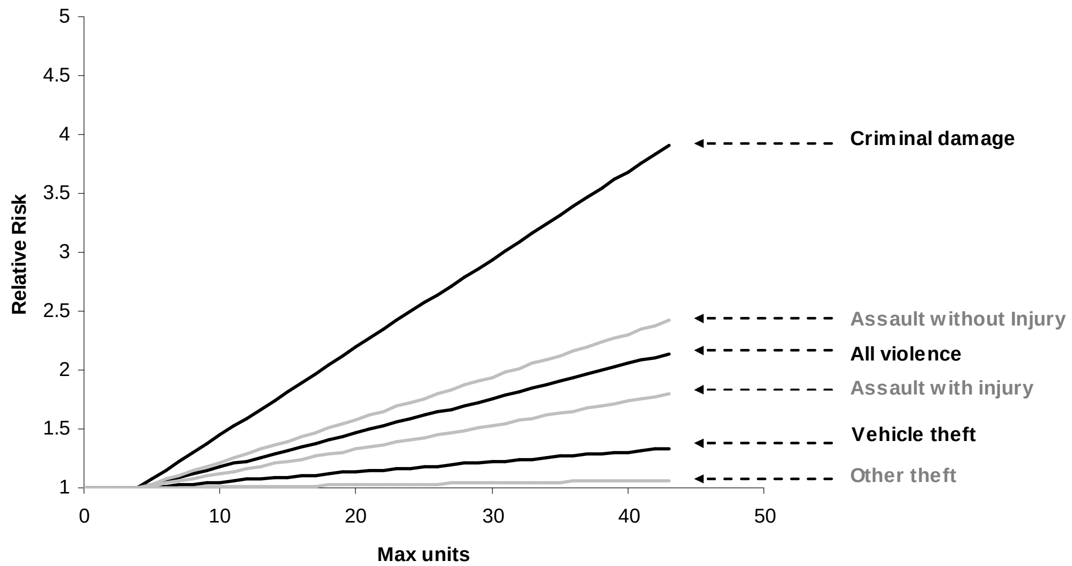


Figure 18: Relative risk functions in males aged 16 years to 25 years of age

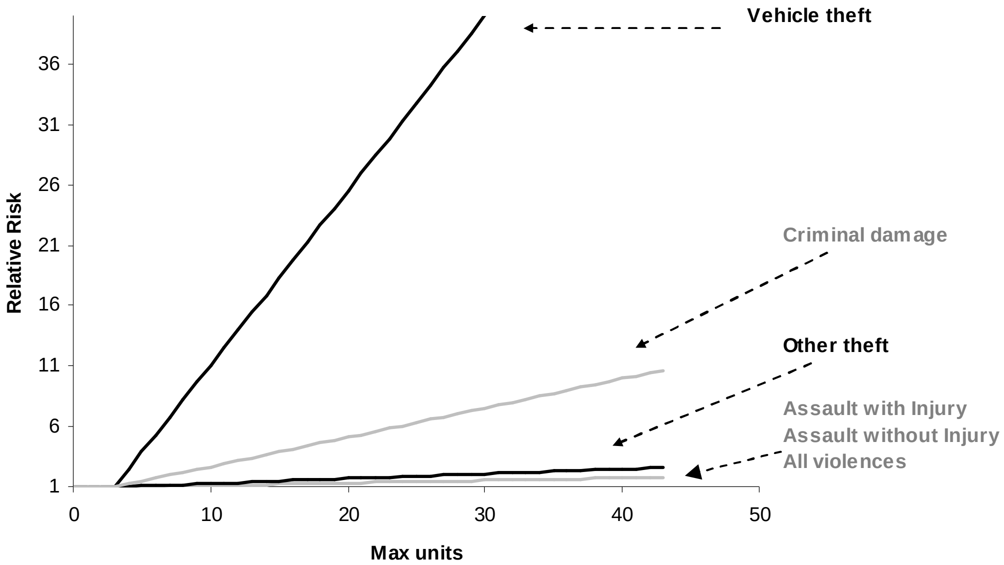


Figure 19: Relative risk functions in females aged less than 16 years of age

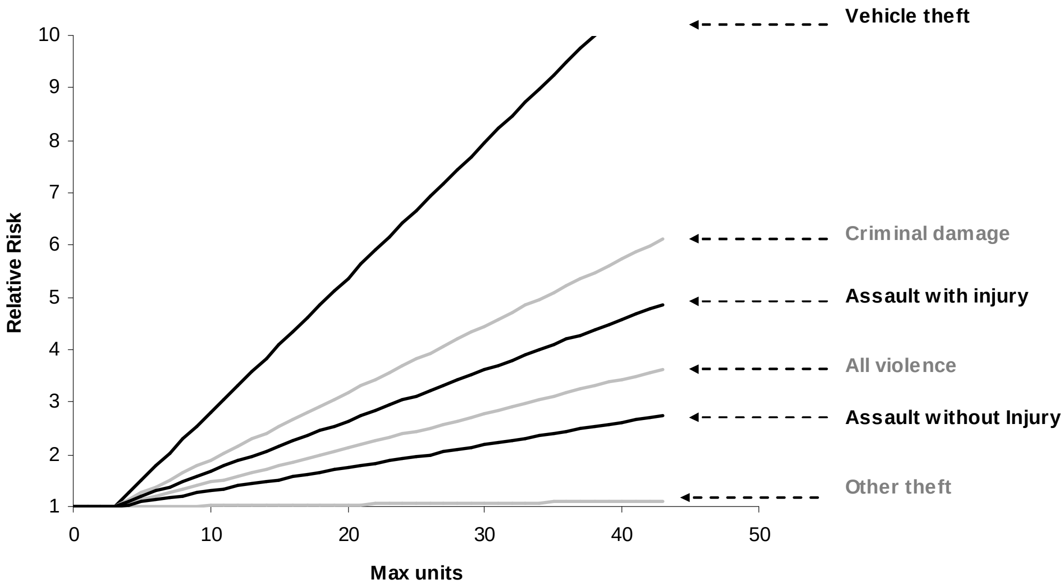


Figure 20: Relative risk functions in females aged 16 years to 25 years of age

2.6.4 CRIME MODEL STRUCTURE

As for the health model, the main mechanism is the PIF, which is calculated based on the consumption distribution at time 0 and time *t* and an estimated risk functions. The PIF is then applied directly to the baseline number of offences to give a new volume of crime for time *t*. The model uses the consumption distribution for the intake in the heaviest drinking day in the past week (peak consumption) since crime was assumed to be a consequence of acute drinking rather than chronic drinking.

Outcomes are presented in terms of number of offences and associated cost of crime and QALY impact to the victim. More details about unit costs of each type of crime are presented below in section 2.6.5.

Outcomes from both scenarios ("do nothing" and "policy implementation") are then compared to estimate the incremental effect of the implementation of the policy.

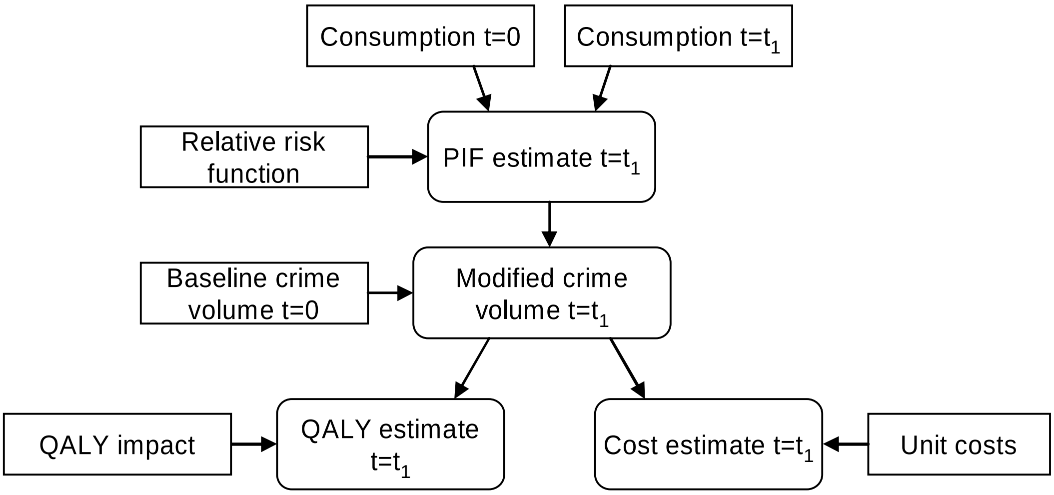


Figure 21: Model structure for the crime component of the model

2.6.5 VALUING THE IMPACT OF EACH TYPE OF CRIME (UNIT COSTS)

Unit costs of crime were extracted from Brand and Price (2000)[66] and Dubourg et al (2005)[67] as in the recent Home Office analysis[9]. Unit costs take into consideration several dimensions such as cost in anticipation of crime and cost to the justice system.

Costs also include the physical and emotional impact on direct victims. These are based on work by Dolan et al (2005)[68] to obtain estimates of the quality of life impact of different crimes (see Table 2.1 in Dubourg 2005[67]). Note that the valuation of a QALY loss due to crime used in this work follows discussion with Home Office experts and is £81,000 per QALY (based on

Carthy et al. 1999[69]). Costs also cover lost economic output of victims and health services costs.

One potential limitation in using unit cost for crimes reported from these studies is the possibility of double counting with other components of our model. Particularly, regarding QALYs associated with the victims, double counting may occur if the crime victims had also drunk alcohol and suffered from consequences of their alcohol intake (i.e. if they were counted as alcohol-related death and/or hospital admission). There is no data available to quantify these effects and we anticipate double counting in this regard to be relatively small. Finally, lost economic outputs from these studies included two dimensions: absenteeism and lost outputs due to premature deaths. While no double-counting was anticipated for absenteeism, the inclusion of the lost output due to premature deaths may overlap with the valuation of the QALY. To avoid such double counting, cost associated with lost output due to premature deaths for homicide was excluded from unit costs. While it was not possible to determine the proportion attributable to premature deaths for other crimes, it was anticipated that these proportion would be very low.

Unit costs used are summarised in Appendix 12 and crimes committed in future years have their value discounted at an annual rate of 3.5%.

2.7 CONSUMPTION TO "HARMS IN THE WORKPLACE"

The Cabinet Office report of 2003[3] examined 3 separate effects of alcohol on employment related issues. These costs were revised for inflation in the recent update by the DH/Home Office[9]. The three components were:

- Absence from work caused by alcohol (£2.04 billions)
- Unemployment caused by alcohol (£2.46 billions)
- Lost outputs due to early death caused by alcohol (£2.84 billions).

In our analysis, loss of outputs due to premature mortality was excluded to avoid double counting the social value of life years lost already estimated in the health and crime harms model.

The consumption to "harms in the workplace" is thus composed of two components: unemployment and absenteeism.

The absenteeism component is linked to the unemployment component in a dynamic approach such that a change in consumption is associated with a change in the working population and thus the absenteeism in this population.

2.7.1 UNEMPLOYMENT

2.7.1.1 Link between alcohol and unemployment

Few studies have reported on the association between excessive drinking and unemployment.

MacDonald and Shields (2004)[5] showed that "problem drinking", measured by a combination of psychological and physical symptoms or in terms of quantity and frequency of alcohol consumption, was negatively associated with the probability of being in work. This study analysed data from the Health Survey for England (1997 – 1998) and focused on males aged 22 to 64 years old. This study showed that being a problem drinker lead to a reduction in the probability of working[§] of between 7% and 31%. This evidence from was used by the Cabinet Office (2003) to estimate the impact of alcohol misuse on unemployment, assuming a reduction of the probability of working by 6.9% for men.

The recent Home Office estimation of alcohol misuse on unemployment updated figures from the Cabinet Office (2003) assuming the same reduction in probability of working for problem drinkers. MacDonald and Shields (2004) did not report figures for females. The same figure was thus used in the Cabinet Office estimate for both males and females.

2.7.1.2 Reduced probability of working and risk functions

Our analysis used the same assumption as in the Cabinet Office estimate, i.e. a reduced probability of working for "problem drinkers" of 6.9%, which was the most conservative estimate in the MacDonald and Shields (2004) paper and was based on a definition of problem drinking as daily drinking. The paper also reports results for a problem drinker variable based on mean weekly intake, with a higher effect. Since our model is based on the quantity of alcohol consumed rather than a frequency measure, the probability based on such variable may have been a better approximation. We chose to use 6.9% for consistency with the recent impact assessment of alcohol[9] for our base case. The reduced probability of working based on the quantity definition was explored in sensitivity analysis.

As for health and crime harms, it was necessary to develop risk functions to examine the impact of a small shift in consumption. While no AAF was available in the literature, it was possible to calculate the excessive risk of not working based on the mean participation rate[6], the proportion of problem drinkers[**] and the reduced probability of not working if someone is a "problem drinker"[5].

A risk function was then estimated using a similar method as described in section 2.3.2. As defined by MacDonald and Shields (2004)[5], the probability of working was assumed to be driven by chronic rather than acute drinking. Furthermore, the risk was assumed to start after a threshold of 7.1 units per day for males and 5.0 units per day for females (equivalent to 50 and 35 units per week respectively) based on the definition of "harmful drinker" in England.

Risk functions are presented in Figure 22 and Figure 23 for males and females respectively. The coefficients (or slope) are presented in Appendix 13.

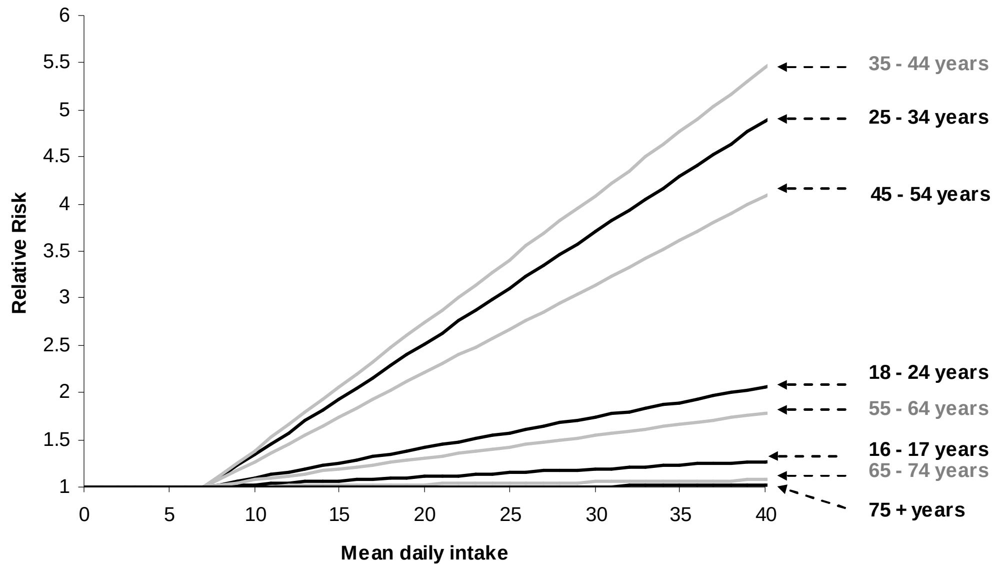


Figure 22: Risk functions for unemployment in males

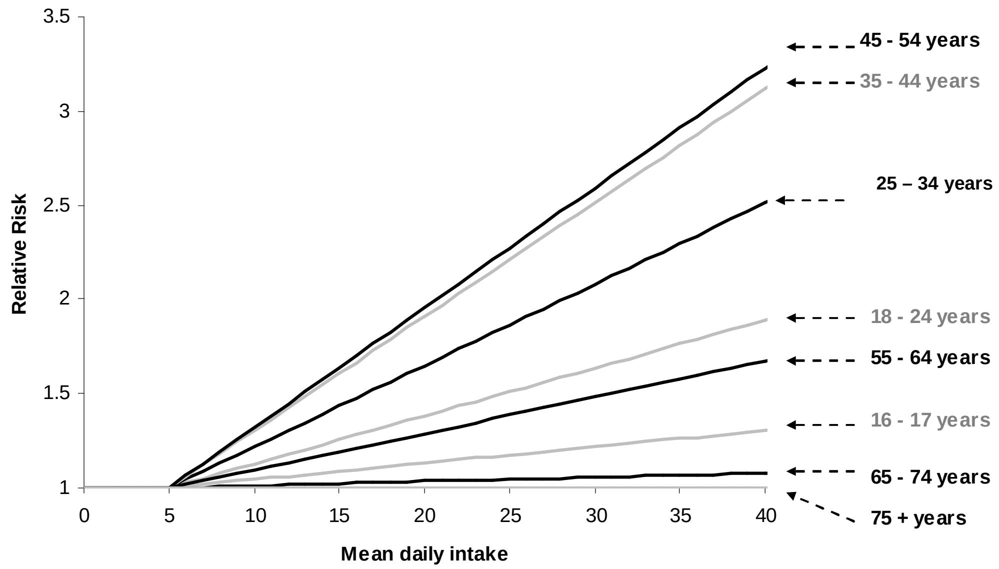


Figure 23: Risk functions for unemployment in females

2.7.1.3 Structure of the model for unemployment

The structure of the model is presented in Figure 26.

As for health and crimes, two scenarios were compared:

- “do nothing” scenario
- implementation of a policy.

For each scenario, the PIF is calculated based on the consumption distribution at time 0 and time *t*. The PIF was then applied to the “not working rate” and the eligible population to work (population of England aged 16 years to 64 years old) to calculate the number of unemployed individuals. Note that no time delay was assumed between changes in alcohol consumption and the risk of not working. The unemployment is then valued for both scenarios using the annual gross income for England, varied by age group and gender.

Finally, the difference between the two scenarios is computed to estimate the effect of the policy compared to the baseline.

2.7.2 ABSENTEEISM

2.7.2.1 Association between alcohol and absence from work

The original Cabinet Office (2003) work used the Whitehall 2 study[4] of civil servant health and employment to estimate the effects of alcohol on absenteeism (Table 21). The work assumes a relative risk of absenteeism of 1.20 and 1.19 if alcohol consumption is within certain limits (see Table 28 of Contract Research Report 422 / 2002). This is based on the relative risk of absence from work "due to injury".

Table 21: Reproduction of Table 28 from research report 422/2002 – rate ratios for spells of absence attributable to injury and for all spells by units of alcohol consumption in the last 7 days

	Rate ratios for men and women combined	
Units per Week Male / Female	Spells due to injury	Spells for all reasons
0	1.04	1.06
1-10 / 1-7	1.00	1.00
11-21 / 8-14	1.20	0.98
22-35/ 15+	1.19	0.93

There is an endogeneity problem with alcohol and absence from work, in that on the one hand people who drink too heavily can become absent from work (causal) but on the other hand people who are absent from work due to significant illness may be less likely to drink alcohol. Table 21 shows that this can be the case since the relative risks of "all absences" as opposed to "absence due to injury" actually slope in the opposite direction, i.e. people who drink more have *lower absence rates.* This is probably due to people with significant illnesses and higher absence rates drinking less alcohol.

The Cabinet Office (2003) analysis assumed that the relative risks seen for absence "due to injury" can apply to all alcohol related absence.

In searching the literature, we found one important non-UK study that enables some further analysis and assessment of the appropriateness of this assumption[70]. This article by Roche et al (2008)[70] examines absenteeism due to alcohol in Australia. It provides useful further evidence because it explicitly asks respondents whether their absence was caused by alcohol. Respondents suggest[††] that 3.5% of people took absence from work for one day or more in the previous three months as a consequence of their alcohol consumption compared with 39.7% due to illness/injury not due to alcohol.

In contrast to the Whitehall 2 study, the Roche et al (2008)[70] study also shows a positive slope for the relation between *all illness / injury absenteeism* and alcohol consumption. In particular, the risks of absence were 7.34 for people drinking at "high risk levels" (males >43, females >29 units per week) and 4.26 for people drinking at "risky" levels (males >29, females >15 units per week).

Table 22 : Proportion absent from work - reproduction of Table 5 page 745 Roche et al (2008)[70]

Age (years)	Male workers Estimated work-force (millions) (95% CI)	Proportion absent for ≥ 1 day (95% CI)	Female workers Estimated work-force (millions) (95% CI)	Proportion absent for ≥ 1 day (95% CI)
Alcohol related absenteeism				
14 – 19	0.182	7.2%	0.127	11.0%
	(0.149 – 0.214)	(3.9 – 12.9%)	(0.101 – 0.153)	(6.7 – 17.7%)
20 – 29	0.891	9.2%	0.686	5.3%
	(0.820 – 0.961)	(7.2 – 11.7%)	(0.636 – 0.737)	(4.1 – 6.9%)
30 – 39	1.141	4.2%	0.801	2.0%
	(1.071 – 1.2111)	(3.3 – 5.4%)	(0.748 – 0.855)	(1.4 – 2.9%)
40 – 49	1.146	2.6%	0.859	1.4%
	(1.070 – 1.222)	(1.6 – 4.0%)	(0.799 – 0.918)	(0.8 – 2.4%)
50 – 59	0.820	1.3%	0.537	0.1%
	(0.761 – 0.879)	(0.7 – 2.3%)	(0.498 – 0.577)	(0.0 – 0.3%)
60 +	0.181	0.3%	0.124	0.0%
	(0.156 – 0.207)	(0.0 – 2.4%)	(0.102 – 0.146)	
Total	4.361	4.2%	3.134	2.5%
	(4.196 – 4.526)	(3.6 – 5.0%)	(3.009 – 3.260)	(2.1 – 3.1%)
Illness/injury absenteeism				
14 – 19	0.175	59.3%	0.123	69.7%
	(0.143 – 0.208)	(50.5 – 67.7%)	(0.098 – 0.149)	(61.7 – 76.6%)
20 – 29	0.865	47.4%	0.664	55.2%
	(0.795 – 0.934)	(43.5 – 51.3%)	(0.614 – 0.713)	(51.9 – 58.5%)
30 – 39	1.065	40.7%	0.735	44.9%
	(0.998 – 1.132)	(37.9 – 43.6%)	(0.685 – 0.786)	(42.1 – 47.7%)
40 – 49	1.057	33.4%	0.784	35.6%
	(0.983 – 1.131)	(30.4 – 36.4%)	(0.728 – 0.839)	(32.5 – 38.7%)
50 – 59	0.747	27.0	0.473	30.3%
	(0.690 – 0.803)	(23.7 – 30.5%)	(0.435 – 0.511)	(26.7 – 34.1%)
60 +	0.156	18.0	0.112	23.8%
	(0.133 – 0.179)	(13.4 – 23.8%)	(0.091 – 0.132)	(17.1 – 32.2%)
Total	4.065	37.6%	2.890	42.6%
	(3.905 – 4.224)	(36.0 – 39.3%)	(2.771 – 3.010)	(41.0 – 44.2%)

2.7.2.2 Risk function and AAF

While findings from the Whitehall II study were England-specific, findings from Roche et al (2008) were used for our baseline due to the absence of a split by age and sex group in the Whitehall II study. Furthermore, the Whitehall study reported the relative risk for absenteeism due to injury which may not accurately reflect the relative risk of absenteeism due to alcohol.

Based on Roche et al's (2008) findings, it was possible to estimate an AAF for absenteeism by age and sex group. While Roche et al (2008) reported the proportion of individuals absent from work for more than 1 day due to alcohol or injury/illness in the Australian population; these figures were applied to England to calculate the AAF due to the lack of specific English data. Furthermore, adjustments were necessary to match with the age group distribution used in the model.

AAF for absenteeism were calculated as follow:

$$AAF = \frac{\text{Proportion absent for} \geq 1 \text{ day due to alcohol}}{(\text{Proportion absent for} \geq 1 \text{ day due to alcohol} + \text{Proportion absent for} \geq 1 \text{ day due to injury/illness})}$$

Thus, based on this calculation, the AAF for absenteeism for men and women were assumed to be 10.3% (4.2 / 4.2 + 36.7) and 5.5% (2.5 / (2.5 + 42.6) respectively.

Calculated AAF for absenteeism by age and sex group are reported in Table 23.

Table 23: Estimate AAF for absenteeism based on Roche et al (2008)

Age (years)	Male workers	Female workers
16 – 17	10.83%	13.63%
18 – 24	14.52%	10.45%
25 – 34	13.20%	6.80%
35 – 44	8.41%	4.05%
45 – 54	6.07%	2.23%
55 – 64	3.43%	0.18%
65 – 74	1.64%	0.00%
75+	1.64%	0.00%

RR functions were then calculated for each age/sex group derived from the AAF (Roche et al, 2008) using the methods described in section 2.3 assuming the English consumption distribution. Absenteeism due to alcohol was assumed to be a consequence of the acute drinking behaviour. This assumption is supported by Roche et al's (2008) findings. The risk was assumed to start after a threshold of 4 units for men and 3 units for women, as for other acute harms.

Calculated RR functions for absenteeism are presented in Figure 24 and Figure 25 for males and females respectively.

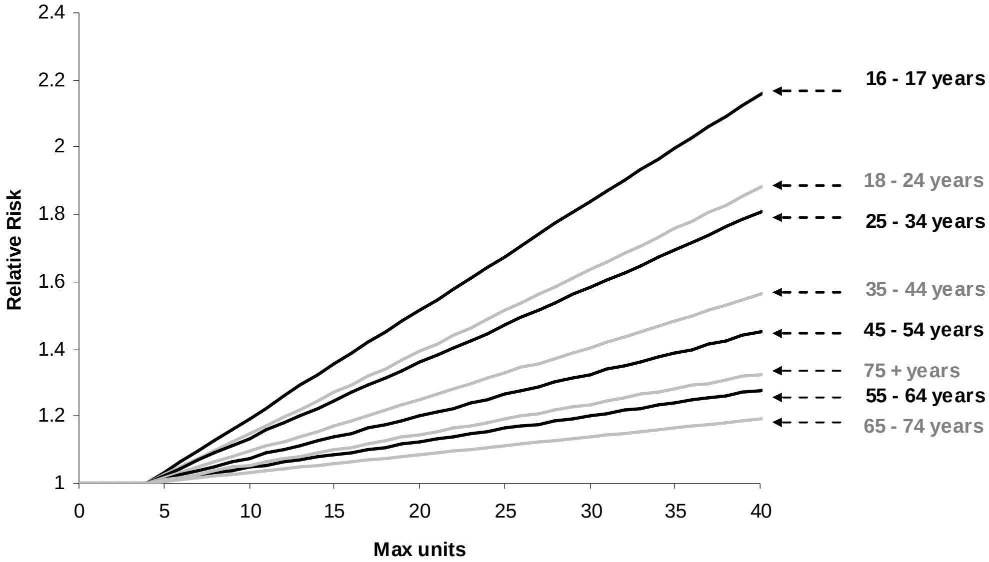


Figure 24: Risk functions for absenteeism in males

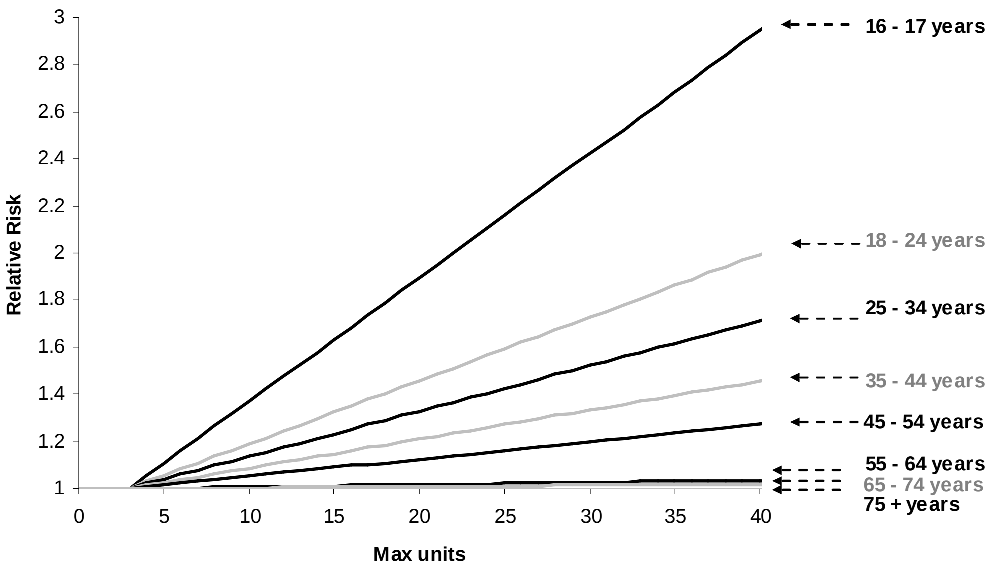


Figure 25: Risk functions for absenteeism in females

2.7.2.3 Model structure

The absenteeism model is linked to the unemployment component in a dynamic approach. Based on baseline consumption, consumption at time *t* and the risk functions derived above, a PIF is calculated and applied to the absence rate. Absenteeism is assumed to be related to acute drinking and so maximum daily intake is applied as the consumption measure and it is assumed that there is no time delay between exposure to alcohol and subsequent absenteeism.

The number of days absent from work is then calculated based on the absence rate, the mean number of days worked and the number of working individuals in each age-group/gender sub-group. Days absent from work are then valued using daily gross income.

Outcomes for the two scenarios – do nothing and policy implementation – are computed separately. The difference is then taken to estimate the incremental effect of the policy.

A simplified schematic of the model structure is presented in Figure 26.

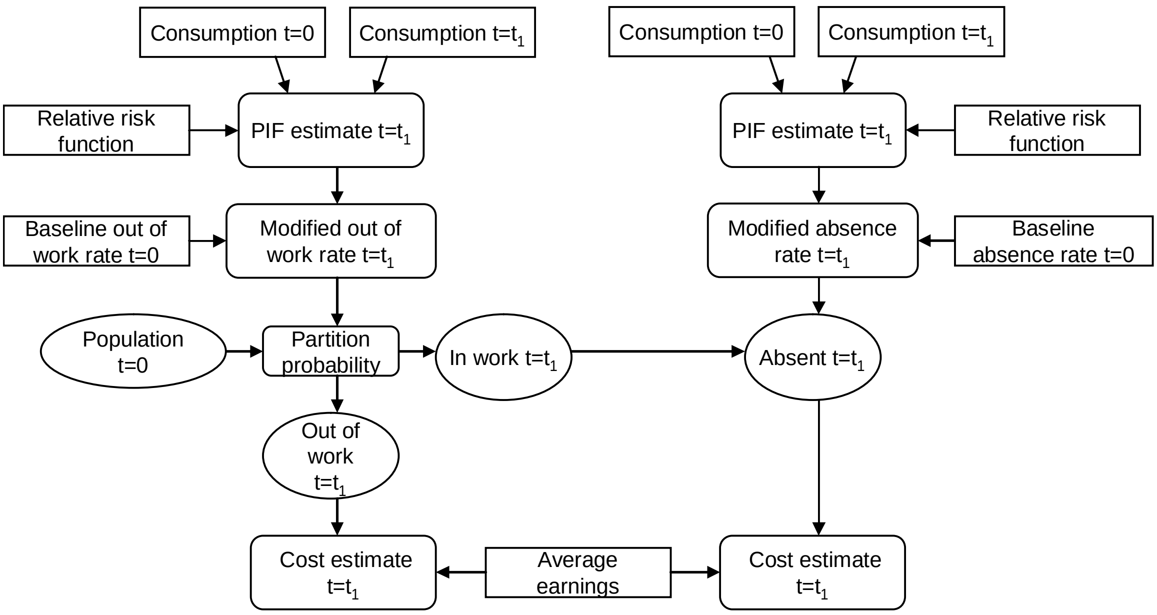


Figure 26: Simplified schematic of the consumption to "harms in the workplace" model

2.7.3 PARTICIPATION RATE, ANNUAL GROSS INCOME, ABSENCE RATE AND DAYS WORKED IN ENGLAND

Inputs to populate the "harms in the workplace" model were mainly extracted from the Labour Force Survey (LFS, 2006)[6] for the absence rate, the number of days work, the annual gross income and working rate. The Labour Force Survey (LFS) provides robust and reliable information on the workplace.

Absence rates were derived for 45,980[6] employed individuals aged 16 years old and over for whom data was available about the following variable: “In that week had days off sick/injured”. While the LFS only reports the absence rate the last week, it was assumed to be a proxy of the absence rate in England. The mean number of days scheduled to work was assumed to be a proxy of the mean number of working days and was derived from the Labour Force Survey 2006[6] for 46,063 employed individuals aged 16 years old and over. Gross annual earnings by age and sex groups were derived among 11,736 employed individuals aged 16 years and over for which data was available about the gross weekly earning. Finally, participation rates were extracted from the LFS (2006) for 78,161 individuals. Main inputs collected through this survey are presented in Table 24.

Table 24: Workplace inputs

	Absence rate		Days scheduled to work		Gross annual earnings		Working rate[1]	
Age (years)	Male	Female	Male	Female	Male	Female	Male	Female
16 – 17	2.82%	1.96%	2.94	2.29	£ 5,106	£ 3,264	35.2%	40.4%
18 – 24	3.15%	3.39%	4.27	3.88	£ 14,074	£ 11,790	66.9%	62.9%
25 – 34	2.31%	3.62%	4.67	3.99	£ 25,887	£ 19,454	89.2%	72.4%
35 – 44	2.46%	3.13%	4.63	4.13	£ 32,132	£ 18,975	89.9%	75.1%
45 – 54	1.99%	3.63%	4.37	3.75	£ 27,160	£ 15,869	87.2%	77.9%
55 – 64	2.52%	2.77%	3.34	2.83	£ 15,750	£ 7,636	67.9%	49.7%
65 – 74	1.47%	1.72%	3.11	2.29	£ 7,492	£ 2,802	15.7%	8.6%
75+	0.00%	2.04%	2.94	2.29	£ 5,106	£ 3,264	2.5%	1.1%

[1] The working rate was calculated using a similar definition as in MacDonald and Shields (2004) including both economically active and inactive population aged 16 years and over. Non-workers were derived from following variables in the LFS: ILO unemployed and inactive. Such a definition thus takes into consideration females taking care of their child and/or permanently sick individuals.

2.8 DIRECT ECONOMIC EFFECTS

2.8.1 POLICY IMPLEMENTATION COSTS TO GOVERNMENT

At this stage, the potential direct costs on government of implementation of each of the specific policies are excluded from the analysis.

2.8.2 CHANGES IN SALES VOLUME / VALUE FOR RETAILERS

The modelling of expected changes in purchasing of alcohol as a consequence of different policies provides results concerning potential reductions or shifts in purchasing patterns. The model produces estimates of changes in volumes of alcohol expected to be sold as a consequence of each policy. Combined with the price information this is used within the model to derive, for the country as a whole, the retail sales value (£) of different types of alcohol on- and off-trade.

These estimates are not broken down by type of retailer or particular named retailers. Nor do they make any estimates of profit or otherwise from alcohol for retailers since analysis of retailers' cost-base are not included in the modelling. Similarly, there is no quantified assessment here (beyond the retail sales overall) of the potential impact on different producers of alcohol, since direct information on their costs, the wholesale market, and the profit made by producers in selling on to retailers are not covered by the modelling.

2.8.3 CHANGES IN TAX REVENUE INCOME TO GOVERNMENT

Alcohol sales are divided in three main revenues:

- Retail sale
- Duty
- Value-added tax (VAT)

The amount of duty is different for each product category (beer, wine, spirit) and is calculated either based on the unit of alcohol or litre of product. Note that the duty may also be different within one alcohol category.

The average amount of duty (including the VAT associated with the duty) per litre of product was extracted from a recent analysis conducted by the DH[71]. For the purpose of our analysis, this figure was transformed into the amount of duty per unit of ethanol derived from the ABV used in the same study. Note that this study reported a duty for beer and cider. The duty for beer was thus weighted based on consumption data for beer and cider. Furthermore, the duty per unit of ethanol for alcopops was assumed to be similar to the duty per unit of ethanol for spirit (HMRC).

Average duty per unit of alcohol used in the model are presented is Table 25.

Table 25: Duty per unit of alcohol

	Duty (excluding VAT)
Beer	£ 0.129
Wine	£ 0.148
Spirit	£ 0.196
Alcopops	£ 0.196

The VAT is assumed to be 17.5% for both the duty or retail sales.

Thus, given data about the volume of sales (in units) and the value of sales (in £), it is possible to estimate the value of duty, the value of the VAT (associated with the duty and associated with the retail) and the value of retail.

2.8.4 EXCLUSION OF WIDER ECONOMIC EFFECTS

The important costs that are not considered here are the transitional costs. These include the effects on specific alcohol producers / retailers, and effect on advertising or media industry.

2.9 SENSITIVITY ANALYSES

Main parameters presenting uncertainties were tested in a one-way sensitivity analysis. A Probabilistic Sensitivity Analysis (PSA) could not be performed due to the short timelines for this project and little information about distribution to perform such analysis.

Since this study examined several price/promotion scenarios, ideally, a sensitivity analysis should be done for all scenarios analysed. However, such a task requires large amount of time which was not possible given the timelines. An alternative approach was thus undertaken to provide to the reader an overview about the degree of uncertainty for main parameters exploring the impact on one selected scenario. We judged that there was little additional benefit in examining further policies with sensitivity analyses.

Sensitivity analyses were conducted using the 40p minimum price policy.

The following key parameters were tested in our model:

- **Elasticity matrices**. These are a source of uncertainty since the matrices are different when they are calculated among all drinkers or separated per drinker categories. Two alternative scenarios were thus explored in sensitivity analysis using an elasticity matrix calculated among all drinkers and an elasticity matrix calculated per drinker categories (moderate, hazardous and harmful).

- **Binge regression models.** Regression coefficients from the binge model were tested in a one-way sensitivity analysis for two extreme scenarios assuming a steeper binge function (maximum slope in the 95^{th} CI and minimum constant) or a less steeper binge function (minimum slope in the 95^{th} CI and maximum constant). Age and sex covariates were assumed to be similar.

- **Potential benefits in terms of health harms associated with alcohol consumption.** These were included in our model in the base case (using risk functions). However, such potential benefits are subject to controversy. A sensitivity analysis was thus conducted excluding conditions with a potential benefit. Four conditions were excluded: cholelitiatis, diabetes, ischemic heart disease and ischemic stroke.

- **Time delay between alcohol exposure and the occurrence of the event.** We assumed in the base case a time lag of 10 years for both mortality and mortality based on published evidence (time lag between 5 and 15 years mainly). Sensitivity analyses were thus performed exploring a time lag of 5 years and 15 years respectively.

- **Crime.** First, a sensitivity analysis was conducted using a lesser multiplier for "less serious wounding", 1.8 versus 7.7 due to anticipated significant impact on results (i.e. Home Office analysis). Secondly, AAF for crime using Q1 (OCJS, 2005)[65] were estimated and used to derive risk functions. These new risk functions were tested in sensitivity analysis (against risk function derived from Q2).

- **Workplace.** Three parameters were explored in sensitivity analyses in the "consumption to harms in the workplace" model. Firstly, risk functions were derived from the Whitehall II study based on the excess risk of absenteeism due to alcohol. The excess risk was assumed to be similar between males and females. A second sensitivity analysis was performed assuming a higher impact of alcohol on unemployment (16.6% vs 6.9%) based on the definition of "problem drinker" assessed by the mean weekly intake of alcohol (MacDonald and Shields, 2004)[5]. Finally, a sensitivity analysis was conducted using a lower annual gross income for both unemployment and absenteeism. The gross income was tested using the 25th percentiles[6].

3 RESULTS

In this section the results are reported for

- General price increases
- Minimum price policies
- Off-trade discounting restrictions
- Some exploratory analyses of advertising restrictions.

3.1 EFFECTS OF PRICE CHANGE POLICIES

The model has been used to estimate impact on consumption and harms of 33 different policies relating to prices. Scenarios 1-9 examine general price increases, scenarios 10-26 examine minimum price policies, and scenarios 27-33 focus on off-trade discounting. We first take the reader through three example policy analyses (a general price rise of +10%, a minimum price of 40p and a restriction of off-trade price based promotions to no greater than 20%) to illustrate the model outputs presented in the tables and their interpretation. The rest of the section focuses on comparing results across all of the price-based policies.

3.1.1 EXAMPLE POLICY ANALYSIS: +10% GENERAL PRICE RISE IN ALL 16 CATEGORIES OF ALCOHOL (SCENARIO 2)

Table 26 shows the results for consumption changes, consumer spending and sales.

Overall weekly consumption reduces -4.4%: Consumption is estimated to reduce by on average 35.5 units per person per year, a change of -4.4%.

Consumption changes are greatest for harmful drinkers (-3.17 units per week).

Groups are impacted differentially:

11 to 18s	(-5.3%)
18 to 24 year old hazardous drinkers	(-6.0%).
Hazardous drinkers smaller reductions	(-4.7%)

Moderate drinkers are affected in a small way (-0.49 units per week).

Table 27 shows the effects of the 10% price increase policy scenario on health, crime and employment harms, as well as a financial valuation

Effects on health are estimated to be substantial with deaths estimated to reduce by 232 per annum within the first year and a full effect after 10 years of 1,681. Again deaths are differentially distributed across the groups, with just 3 saved in year 1 for 11-18s but 98 for hazardous, 96 for harmful and 38 for moderate drinkers. Illness also decreases with an estimated reduction of 1,800 acute and 5,800 chronic within year 1.

Hospital admissions are estimated to reduce by 10,100 in year 1, and a full effect after 10 years of 50,800 avoided admissions per annum.

Healthcare service costs are estimated to £43m in year 1, with a QALY gain valued at £119m

Crime is estimated to fall by 65,000 offences overall. The distribution of effect here across the groups is very different to that for health. For 11-18s, a reduction of 18,800, 18-24 hazardous 15,000, moderate 13,400, hazardous 29,900, harmful 12,900 is estimated.

The harm avoided in terms of victim quality of life is valued at £98m p.a. (note that QALYs are for victims and do not necessarily belong to the same population as the sub-group in which they are ‘saved’)

Direct crime costs are estimated to reduce by £70m p.a.

Workplace harms are reduced by 12,800 fewer unemployed people and 310,000 fewer sick days. Work absence are more equally distributed amongst the different drinking groups, with the overall reduction in estimated days of absence per annum occurring amongst harmful drinkers (65,000), hazardous drinkers (143,000) and moderate drinkers (97,000). For unemployment due to alcohol we only considered harmful drinkers, thus the 12,800 fewer unemployment cases estimated in the model occur all within this group.

Table 26 Results table for 10% general price increase (consumption effects)

Males and Females			Population Subgroups				Scenario	2
Consumption Patterns			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Baseline								
Mean consumption per person per week			12.63	4.08	27.01	4.58	26.90	69.82
n people			36,781,777	4,264,561	714,039	23,570,854	6,863,921	2,299,162
Mean consumption per drinker per week			15.79	12.50	27.01	5.65	26.90	69.82
n drinkers			29,431,779	1,393,062	714,039	19,092,355	6,863,921	2,299,162
% binge (>8 males, >6 females)			17.4%	8.5%	57.2%	8.2%	39.3%	68.1%
Mean scale of binge if binge occurs (units)			13.7	14.2	14.7	12.0	13.8	16.2
Volume sales (units per drinker per year)	Off-trade	Beer	126.8	69.1	153.4	32.1	190.7	758.1
		Wine	302.1	61.4	185.9	97.4	573.2	1,322.6
		Spirit	66.6	30.9	72.6	23.6	109.4	318.0
		RTD	9.0	11.4	16.4	3.2	8.8	57.4
	On-trade	Beer	226.9	253.2	548.0	89.0	369.5	960.4
		Wine	35.2	32.3	54.1	23.8	59.2	61.8
		Spirit	36.8	77.8	226.9	19.7	61.3	91.7
		RTD	20.0	115.7	151.2	6.0	30.5	70.6
	Total		823.3	651.8	1,408.3	294.8	1,402.5	3,640.7
Value sales (£ per drinker per year)	Off-trade	Beer	£ 45	£ 21	£ 55	£ 13	£ 69	£ 250
		Wine	£ 143	£ 27	£ 87	£ 47	£ 271	£ 619
		Spirit	£ 25	£ 10	£ 29	£ 10	£ 41	£ 114
		RTD	£ 7	£ 9	£ 13	£ 3	£ 7	£ 46
	On-trade	Beer	£ 212	£ 220	£ 539	£ 90	£ 341	£ 865
		Wine	£ 86	£ 95	£ 124	£ 61	£ 137	£ 139
		Spirit	£ 42	£ 79	£ 244	£ 25	£ 68	£ 100
		RTD	£ 29	£ 148	£ 227	£ 9	£ 44	£ 100
	Total		£ 590	£ 610	£ 1,319	£ 257	£ 979	£ 2,233
Absolute change								
Mean consumption per person per week			-0.55	-0.22	-1.62	-0.16	-1.26	-3.17
Mean consumption per drinker per week			-0.69	-0.66	-1.62	-0.20	-1.26	-3.17
% change in mean consumption			-4.4%	-5.3%	-6.0%	-3.5%	-4.7%	-4.5%
Change in volume of consumption (units per drinker per year)	Off-trade	Beer	-5.65	-3.19	-7.10	-1.16	-8.84	-35.00
		Wine	-11.72	-2.46	-7.33	-3.74	-22.24	-51.51
		Spirit	-3.81	-1.80	-4.33	-1.16	-6.53	-18.99
		RTD	-0.35	-0.44	-0.67	-0.10	-0.36	-2.35
	On-trade	Beer	-8.72	-10.19	-23.28	-2.34	-15.83	-41.12
		Wine	-1.10	-1.03	-1.94	-0.61	-2.13	-2.22
		Spirit	-3.85	-11.16	-33.93	-1.02	-8.37	-11.53
		RTD	-0.70	-4.10	-5.85	-0.15	-1.18	-2.73
	Total		-35.90	-34.36	-84.42	-10.28	-65.48	-165.46
Change in £ value of purchases (sales) (£ per drinker per year)	Off-trade	Beer	£2.29	£1.08	£2.70	£0.78	£3.38	£12.25
		Wine	£8.28	£1.53	£5.03	£2.74	£15.68	£35.76
		Spirit	£0.95	£0.38	£1.00	£0.46	£1.42	£3.92
		RTD	£0.41	£0.53	£0.70	£0.17	£0.38	£2.51
	On-trade	Beer	£12.38	£12.16	£29.02	£6.34	£18.19	£46.20
		Wine	£5.66	£6.01	£7.50	£4.38	£8.29	£8.39
		Spirit	£1.16	-£0.70	-£1.15	£1.56	£0.31	£1.11
		RTD	£1.77	£9.14	£13.07	£0.68	£2.52	£5.73
	Total		£32.89	£30.14	£57.86	£17.12	£50.16	£115.88
Effect of policy on "pocket" if drinkers did not change consumption (£ per drinker per year)	Off-trade	Beer	£4.48	£2.15	£5.52	£1.30	£6.92	£24.99
		Wine	£14.33	£2.71	£8.74	£4.75	£27.10	£61.90
		Spirit	£2.53	£1.03	£2.90	£1.00	£4.13	£11.41
		RTD	£0.71	£0.90	£1.28	£0.26	£0.69	£4.57
	On-trade	Beer	£21.25	£21.99	£53.94	£8.96	£34.09	£86.53
		Wine	£8.58	£9.49	£12.38	£6.10	£13.69	£13.87
		Spirit	£4.23	£7.85	£24.38	£2.46	£6.84	£10.05
		RTD	£2.87	£14.85	£22.74	£0.93	£4.40	£9.98
	Total		£58.97	£60.98	£131.87	£25.75	£97.87	£223.30
Total change in retailer received £m (after VAT+Duty)	Off-trade		£m 394.9	£m 5.9	£m 7.8	£m 85.6	£m 161.4	£m 143.9
	On-trade		£m 589.2	£m 37.7	£m 37.3	£m 222.4	£m 200.1	£m 139.5
	Total		£m 984.1	£m 43.6	£m 45.2	£m 308.0	£m 361.6	£m 283.5
Total Change in VAT & Duty Received	Off-trade		-£m 43.9	-£m 1.0	-£m 1.1	-£m 6.3	-£m 18.2	-£m 18.8
	On-trade		£m 27.9	-£m 0.7	-£m 2.7	£m 25.0	£m 1.0	£m 1.7
	Total		-£m 16.0	-£m 1.6	-£m 3.9	£m 18.8	-£m 17.2	-£m 17.1
% change in spend / sales	Off-trade		+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
	On-trade		+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
	Total		+5.6%	+4.9%	+4.4%	+6.6%	+5.1%	+5.2%
Total Change Pop'n Spend (Sales)	Off-trade		£m 351.0	£m 4.9	£m 6.7	£m 79.4	£m 143.2	£m 125.2
	On-trade		£m 617.1	£m 37.1	£m 34.6	£m 247.4	£m 201.1	£m 141.2
	Total		£m 968.1	£m 42.0	£m 41.3	£m 326.8	£m 344.3	£m 266.4

The societal value of these harm reductions is £7.8b in total (when discounted) over the 10-year period modelled. In the first year, the estimated societal value of the harm reduction is as follows: NHS cost reductions (£43m), value of QALYs saved (£119m), crime costs saved (£70m), value of crime QALYs saved (£98m) and employment related harms avoided (£330m).

The societal value of harm reductions varies by groups: with hazardous drinkers accounting for £2.0bn of the £7.8bn total value, harmful drinkers for £4.0bn and the moderate drinkers for £1.7bn.

Returning to Table 26, the spending and sales results are as follows:

Absolute reductions in consumption are biggest in off-trade wines , on-trade beer and off-trade beer. Spirits and RTDs have lower absolute changes in volume consumed.

The cost impact of the policy on consumers varies substantially between drinker types groups.

Overall:	£33 per drinker per annum.
Harmful drinkers:	£116 per annum
Moderate drinkers	£17 per annum.

If consumption did not change in response to price increases then the effect "on the pocket" would be

Harmful drinkers:	£223 per annum
Moderate drinkers	£26 per annum.

An overall increased spend by consumers is estimated of £968m per annum, two thirds of which is in the on-trade sector.

Overall VAT and duty changes by -£16m.

Table 27 Results table for 10% general price increase (harm effects)

Males and Females Harm Reductions Absolute change				Population Subgroups			Scenario 2	
			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Health Changes in Year 1	Deaths	Chronic	-125	0	0	-3	-50	-72
		Acute	-108	-3	-5	-35	-48	-24
		Total	-232	-3	-5	-38	-98	-96
	Sick	Chronic	-1,786	-19	-12	-234	-548	-996
		Acute	-5,768	-315	-328	-1,826	-2,569	-1,244
		Total	-7,554	-333	-339	-2,060	-3,117	-2,240
	Admissions	Chronic	-3,621	-33	-20	-431	-1,061	-2,116
		Acute	-6,518	-386	-412	-2,054	-2,908	-1,398
		Total	-10,140	-418	-432	-2,485	-3,968	-3,514
	QALYs per annum		-2,372	-138	-132	-680	-1,017	-618
	Value of 'saved' QALYs		-118,595,107	-6,878,589	-6,593,750	-34,022,559	-50,861,658	-30,895,265
	Cost (£)	Chronic	-10,090,156	-142,830	-90,151	-1,541,102	-3,319,507	-5,166,354
		Acute	-32,852,441	-1,763,953	-1,871,032	-10,383,436	-14,639,084	-7,098,992
		Total (£)	-42,942,598	-1,906,783	-1,961,183	-11,924,538	-17,958,590	-12,265,346
Health Changes per annum in Year 10	Deaths p.a.	Chronic	-1,569	0	-1	-35	-583	-951
		Acute	-112	-3	-5	-36	-50	-25
		Total	-1,681	-3	-6	-71	-633	-976
	Illnesses p.a.	Chronic	-21,599	-61	-76	-2,623	-6,272	-12,675
		Acute	-5,998	-296	-302	-1,904	-2,672	-1,299
		Total	-27,597	-357	-379	-4,527	-8,945	-13,974
	Admissions p.a.	Chronic	-44,094	-106	-134	-4,837	-12,195	-27,011
		Acute	-6,736	-363	-380	-2,129	-3,004	-1,452
		Total	-50,829	-469	-514	-6,967	-15,200	-28,463
	QALYs per annum		-11,467	-150	-156	-5,097	-3,231	-3,074
	Cost (£)	Chronic	-120,528,130	-471,069	-595,877	-17,222,180	-37,629,595	-65,447,767
		Acute	-34,157,631	-1,660,164	-1,727,877	-10,826,823	-15,224,698	-7,414,244
		Total (£)	-154,685,760	-2,131,232	-2,323,754	-28,049,003	-52,854,292	-72,862,011
Cumulative Health Change over 10 yrs	Discounted QALYs		-56,355	-1,354	-1,370	-21,738	-18,143	-15,892
	Discounted Costs		-772,858,585	-17,242,725	-18,277,514	-160,446,962	-281,050,650	-323,992,920
	Valye of Discounted QALYs		-2,817,756,389	-67,698,367	-68,503,631	-1,086,902,904	-907,135,050	-794,616,393
	Total Value of Health Changes		-3,590,614,974	-84,941,093	-86,781,145	-1,247,349,866	-1,188,185,700	-1,118,609,313
Crime Changes per annum	Volume	Violent	-15,535	-1,835	-4,268	-4,032	-7,467	-3,380
		Damage	-28,139	-5,486	-7,735	-6,314	-13,444	-6,088
		Theft/Oth	-21,234	-11,507	-2,954	-3,099	-8,956	-3,470
		Total	-64,908	-18,828	-14,957	-13,445	-29,867	-12,939
	Cost (£)	Violent	-44,111,672	-5,065,626	-11,708,880	-11,632,542	-21,131,422	-9,552,135
		Damage	-11,114,877	-2,166,821	-3,055,517	-2,494,071	-5,310,218	-2,404,881
		Theft/Oth	-14,369,309	-7,058,637	-2,160,168	-2,408,299	-6,198,445	-2,517,078
		Total (£)	-69,595,858	-14,291,084	-16,924,565	-16,534,912	-32,640,085	-14,474,094
	QALYs	Violent	-832	-91	-215	-219	-399	-181
		Damage	-164	-32	-45	-37	-78	-35
		Theft/Oth	-210	-83	-38	-38	-92	-40
	Total	Total	-1,206	-205	-298	-295	-570	-256
	Value of 'saved' QALYs		-97,697,326	-16,636,489	-24,110,393	-23,864,442	-46,146,368	-20,736,543
Employment Changes per annum	Volume	Absence days	-310,447	-15,026	-49,204	-97,293	-143,325	-64,755
		Unempl people	-12,828	-335	0	0	0	-12,828
	Cost (£)	Absence	-28,616,437	-464,339	-3,036,463	-9,405,479	-13,108,916	-5,942,981
		Unempl	-301,441,599	-1,464,313	0	0	0	-301,441,599
		Total (£)	-330,058,036	-1,928,651	-3,036,463	-9,405,479	-13,108,916	-307,384,579
Summary Financial Value Harm Reduction Year 1	Health Costs (£)		-42,942,598	-1,906,783	-1,961,183	-11,924,538	-17,958,590	-12,265,346
	Crime Costs (£)		-69,595,858	-14,291,084	-16,924,565	-16,534,912	-32,640,085	-14,474,094
	Employment Costs (£)		-330,058,036	-1,928,651	-3,036,463	-9,405,479	-13,108,916	-307,384,579
	Total Direct Costs (£)		-442,596,491	-18,126,519	-21,922,211	-37,864,929	-63,707,591	-334,124,019
	Health QALYs (£)		-118,595,107	-6,878,589	-6,593,750	-34,022,559	-50,861,658	-30,895,265
	Crime QALYs (£)		-97,697,326	-16,636,489	-24,110,393	-23,864,442	-46,146,368	-20,736,543
	Total Societal Value (£)		-658,888,923	-41,641,596	-52,626,354	-95,751,929	-160,715,616	-385,755,827
Cumul 10 year Summary Financial Value Harm Reduction	Health Costs (£)		-772,858,585	-17,242,725	-18,277,514	-160,446,962	-281,050,650	-323,992,920
	Crime Costs (£)		-578,801,281	-118,853,305	-140,754,931	-137,514,334	-271,454,703	-120,375,325
	Employment Costs (£)		-2,744,962,417	-16,039,832	-25,253,063	-78,221,659	-109,021,680	-2,556,396,228
	Total Direct Costs (£)		-4,096,622,282	-152,135,863	-184,285,508	-376,182,954	-661,527,032	-3,000,764,473
	Health QALYs (£)		-2,817,756,389	-67,698,367	-68,503,631	-1,086,902,904	-907,135,050	-794,616,393
	Crime QALYs (£)		-900,982,769	-153,424,770	-222,350,498	-220,082,289	-425,570,319	-191,236,225
	Total Societal Value (£)		-7,815,361,440	-373,259,000	-475,139,637	-1,683,168,148	-1,994,232,401	-3,986,617,091

3.1.2 EXAMPLE POLICY ANALYSIS: 40P MINIMUM PRICE (SCENARIO 15)

Table 28 shows the results for consumption changes, consumer spending and sales.

Overall weekly consumption reduces -2.6%: Consumption is estimated to reduce by on average 22 units per person per year.

Consumption changes are greatest for harmful drinkers (-3.15 units per week).

Groups are impacted differentially:
11 to 18s (-4.0%)
18 to 24 year old hazardous drinkers (-0.7%).
All-age hazardous drinkers have smaller reductions (-1.8%) but the absolute scale of reduction is much larger (-0.47 units per week).

Moderate drinkers are affected in a small way (-0.07 units per week).

Table 29 shows the effects of the policy scenario on health, crime and employment harms, as well as a financial valuation.

Effects on health are estimated to be substantial with deaths estimated to reduce by 157 within the first year and a full effect after 10 years of 1,381. Again deaths are differentially distributed across the groups, with just 2 saved in year 1 for 11-18s but 48 for hazardous, 98 for harmful and 12 for moderate drinkers. Illness also decreases with an estimated reduction in of 1,500 acute and 2,900 chronic within year 1.

Hospital admissions are estimated to reduce by 6,300 in year 1, and a full effect after 10 years of 40,800 avoided admissions per annum.

Healthcare service costs are estimated to change by £25m in year 1, with a QALY gain valued at £63m.

Crime is estimated to fall by 16,000 offences overall. The distribution of effect here across the groups is very different to that for health. For 11-18s, a reduction of 9,600, 18-24 hazardous 700, moderate 40, hazardous 6,100, and harmful 9,100 are estimated.

The harm avoided in terms of victim quality of life is valued at £21m.

Direct costs of crime are estimated to reduce by £17m.

Workplace harms are reduced by 12,400 fewer unemployed people and 100,000 fewer sick days.

Table 28: Results table for 40p minimum price (consumption effects)

Males and Females			Population Subgroups				Scenario	15
Consumption Patterns			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Baseline								
Mean consumption per person per week			12.63	4.08	27.01	4.58	26.90	69.82
n people			36,781,777	4,264,561	714,039	23,570,854	6,863,921	2,299,162
Mean consumption per drinker per week			15.79	12.50	27.01	5.65	26.90	69.82
n drinkers			29,431,779	1,393,062	714,039	19,092,355	6,863,921	2,299,162
% binge (>8 males, >6 females)			17.4%	8.5%	57.2%	8.2%	39.3%	68.1%
Mean scale of binge if binge occurs (units)			13.7	14.2	14.7	12.0	13.8	16.2
Volume sales (units per drinker per year)	Off-trade	Beer	126.8	69.1	153.4	32.1	190.7	758.1
		Wine	302.1	61.4	185.9	97.4	573.2	1,322.6
		Spirit	66.6	30.9	72.6	23.6	109.4	318.0
		RTD	9.0	11.4	16.4	3.2	8.8	57.4
	On-trade	Beer	226.9	253.2	548.0	89.0	369.5	960.4
		Wine	35.2	32.3	54.1	23.8	59.2	61.8
		Spirit	36.8	77.8	226.9	19.7	61.3	91.7
		RTD	20.0	115.7	151.2	6.0	30.5	70.6
	Total		823.3	651.8	1,408.3	294.8	1,402.5	3,640.7
Value sales (£ per drinker per year)	Off-trade	Beer	£ 45	£ 21	£ 55	£ 13	£ 69	£ 250
		Wine	£ 143	£ 27	£ 87	£ 47	£ 271	£ 619
		Spirit	£ 25	£ 10	£ 29	£ 10	£ 41	£ 114
		RTD	£ 7	£ 9	£ 13	£ 3	£ 7	£ 46
	On-trade	Beer	£ 212	£ 220	£ 539	£ 90	£ 341	£ 865
		Wine	£ 86	£ 95	£ 124	£ 61	£ 137	£ 139
		Spirit	£ 42	£ 79	£ 244	£ 25	£ 68	£ 100
		RTD	£ 29	£ 148	£ 227	£ 9	£ 44	£ 100
	Total		£ 590	£ 610	£ 1,319	£ 257	£ 979	£ 2,233
Absolute change								
Mean consumption per person per week			-0.33	-0.16	-0.18	-0.05	-0.47	-3.15
Mean consumption per drinker per week			-0.42	-0.50	-0.18	-0.07	-0.47	-3.15
% change in mean consumption			-2.6%	-4.0%	-0.7%	-1.2%	-1.8%	-4.5%
Change in volume of consumption (units per drinker per year)	Off-trade	Beer	-21.48	-18.16	-22.56	-2.40	-29.07	-160.12
		Wine	-1.50	-3.33	-2.66	-1.99	1.30	-6.75
		Spirit	-8.55	-9.61	-7.75	-1.81	-13.85	-48.52
		RTD	0.02	0.02	0.05	0.01	0.02	0.08
	On-trade	Beer	9.44	4.00	24.00	2.52	16.45	49.49
		Wine	0.14	0.12	0.35	0.03	0.36	0.35
		Spirit	0.05	0.10	-1.89	0.08	-0.16	0.38
		RTD	0.14	0.61	1.03	0.05	0.20	0.58
	Total		-21.75	-26.25	-9.42	-3.50	-24.74	-164.50
Change in £ value of purchases (sales) (£ per drinker per year)	Off-trade	Beer	£1.48	£0.50	£1.81	£0.74	£2.05	£6.40
		Wine	£8.39	£0.86	£5.80	£1.76	£17.00	£41.52
		Spirit	£0.77	-£0.46	£0.88	£0.41	£1.17	£3.36
		RTD	£0.04	£0.02	£0.04	£0.02	£0.02	£0.25
	On-trade	Beer	£10.02	£8.32	£28.05	£2.69	£17.33	£51.36
		Wine	£0.36	£0.36	£0.84	£0.11	£0.88	£0.95
		Spirit	£0.24	£0.37	£0.49	£0.16	£0.29	£0.78
		RTD	£0.22	£0.93	£1.77	£0.08	£0.34	£0.91
	Total		£21.52	£10.90	£39.69	£5.95	£39.07	£105.54
Effect of policy on "pocket" if drinkers did not change consumption (£ per drinker per year)	Off-trade	Beer	£10.11	£7.79	£10.91	£1.70	£13.74	£70.73
		Wine	£8.14	£2.11	£6.10	£2.50	£14.48	£39.72
		Spirit	£4.28	£3.40	£4.11	£1.16	£6.87	£23.20
		RTD	£0.02	£0.00	£0.00	£0.01	£0.01	£0.17
	On-trade	Beer	£0.74	£3.42	£2.43	£0.11	£1.19	£3.80
		Wine	£0.01	£0.00	£0.00	£0.01	£0.00	£0.05
		Spirit	£0.04	£0.09	£0.55	£0.02	£0.09	£0.06
		RTD	£0.00	£0.04	£0.05	£0.00	£0.01	£0.02
	Total		£23.34	£16.84	£24.16	£5.50	£36.39	£137.75
Total change in retailer received £m (after VAT+Duty)	Off-trade		£m 404.4	£m 7.6	£m 8.6	£m 65.7	£m 161.1	£m 172.2
	On-trade		£m 234.3	£m 10.9	£m 16.8	£m 42.4	£m 95.1	£m 90.5
	Total		£m 638.6	£m 18.5	£m 25.4	£m 108.1	£m 256.2	£m 262.7
Total Change in VAT & Duty Received	Off-trade		-£m 90.1	-£m 6.4	-£m 2.5	-£m 9.9	-£m 22.2	-£m 53.8
	On-trade		£m 84.9	£m 3.0	£m 5.4	£m 15.4	£m 34.2	£m 33.7
	Total		-£m 5.2	-£m 3.4	£m 2.9	£m 5.5	£m 12.0	-£m 20.1
% change in spend / sales	Off-trade		+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
	On-trade		+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
	Total		+3.6%	+1.8%	+3.0%	+2.3%	+4.0%	+4.7%
Total Change Pop'n Spend (Sales)	Off-trade		£m 314.3	£m 1.3	£m 6.1	£m 55.8	£m 138.9	£m 118.5
	On-trade		£m 319.2	£m 13.9	£m 22.2	£m 57.8	£m 129.3	£m 124.2
	Total		£m 633.5	£m 15.2	£m 28.3	£m 113.6	£m 268.2	£m 242.7

The societal value of these harm reductions is £5.4bn in total over the 10-year period modelled. In the first year, the estimated societal value of the harm reduction is as follows: NHS cost reductions (£25m), value of QALYs saved (£63m), crime costs saved (£17m), value of crime QALYs saved (£21m) and employment related harms avoided (£312m).

The societal value of harm reductions varies is again distributed differentially across the groups, with hazardous drinkers accounting for £0.7bn of the total value, harmful drinkers for £3.9bn and the moderate drinkers for £0.8bn.

Returning to Table 28, the spending and sales results are as follows:

Absolute reductions in consumption are largest in off-trade beers and off-trade spirits. There is a large absolute increase in the consumption of on-trade beers.

The cost impact of the policy on consumers varies substantially between drinker types groups.

Overall:	£22 per drinker per annum.
Harmful drinkers:	£106 per annum
Moderate drinkers	£6 per annum.

If consumption did not change in response to price increases then the effect "on the pocket" would be

Harmful drinkers:	£138 per annum
Moderate drinkers	£6 per annum.

An overall increased spend by consumers is estimated of £633m per annum, split approximately equally between off-trade and on-trade sectors.

Overall VAT and duty changes by -£5.2m.

Table 29: Results table for 40p minimum price (harm effects)

Males and Females						Scenario	15	
Harm Reductions				Population Subgroups				
Absolute change			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Health Changes in Year 1	Deaths	Chronic	-106	0	0	-2	-30	-75
		Acute	-51	-2	0	-10	-17	-23
		Total	-157	-2	0	-12	-48	-98
	Illness	Chronic	-1,520	-8	-1	-165	-319	-1,035
		Acute	-2,901	-168	-25	-605	-1,057	-1,233
		Total	-4,421	-177	-27	-770	-1,376	-2,268
	Admissions	Chronic	-3,115	-15	-3	-303	-614	-2,197
		Acute	-3,194	-207	-32	-644	-1,163	-1,377
		Total	-6,309	-221	-35	-948	-1,777	-3,574
	QALYs per annum		-1,263	-73	-12	-218	-419	-623
	Value of 'saved' QALYs		-63,144,310	-3,641,711	-585,742	-10,911,963	-20,927,405	-31,139,317
	Cost (£)	Chronic	-8,371,316	-61,090	-11,730	-1,083,900	-1,916,706	-5,363,294
		Acute	-16,317,580	-940,548	-131,280	-3,339,655	-5,932,331	-7,011,015
		Total (£)	-24,688,895	-1,001,639	-143,010	-4,423,556	-7,849,037	-12,374,309
Health Changes per annum in Year 10	Deaths p.a.	Chronic	-1,326	0	0	-16	-316	-995
		Acute	-54	-1	0	-12	-19	-24
		Total	-1,381	-2	0	-27	-334	-1,019
	Illnesses p.a.	Chronic	-18,116	-23	-26	-1,657	-3,287	-13,168
		Acute	-3,117	-158	-23	-693	-1,130	-1,288
		Total	-21,233	-181	-49	-2,350	-4,417	-14,456
	Admissions p.a.	Chronic	-37,438	-41	-45	-3,039	-6,346	-28,047
		Acute	-3,408	-194	-30	-736	-1,233	-1,431
		Total	-40,846	-235	-74	-3,774	-7,579	-29,478
	QALYs per annum		-8,474	-76	-22	-3,636	-1,767	-3,064
	Cost (£)	Chronic	-98,432,293	-175,878	-199,749	-10,836,427	-19,639,642	-67,927,110
		Acute	-17,536,090	-881,925	-121,388	-3,837,382	-6,338,927	-7,325,299
		Total (£)	-115,968,383	-1,057,803	-321,137	-14,673,809	-25,978,569	-75,252,408
Cumulative Health Change over 10 yrs	Discounted QALYs		-38,757	-693	-155	-13,728	-9,058	-15,921
	Discounted Costs		-545,957,918	-8,697,898	-1,893,992	-76,790,635	-135,447,567	-333,242,978
	Valye of Discounted QALYs		-1,937,855,254	-34,666,693	-7,732,303	-686,417,103	-452,924,341	-796,048,155
	Total Value of Health Changes		-2,483,813,172	-43,364,591	-9,626,296	-763,207,737	-588,371,908	-1,129,291,132
Crime Changes per annum	Volume	Violent	-3,184	-1,106	-214	-28	-1,113	-2,017
		Damage	-5,291	-3,028	-166	277	-1,882	-3,517
		Theft/Oth	-7,573	-5,394	-328	-208	-3,111	-3,592
		Total	-16,048	-9,528	-708	41	-6,106	-9,126
	Cost (£)	Violent	-9,458,670	-3,051,332	-661,896	-177,885	-3,297,971	-5,907,794
		Damage	-2,089,916	-1,196,064	-65,529	109,362	-743,266	-1,389,247
		Theft/Oth	-5,290,285	-3,469,428	-284,683	-191,463	-2,021,613	-2,675,683
		Total (£)	-16,838,871	-7,716,825	-1,012,108	-259,986	-6,062,850	-9,972,724
	QALYs	Violent	-173	-55	-11	-2	-59	-111
		Damage	-31	-18	-1	2	-11	-20
		Theft/Oth	-59	-40	-2	1	-25	-32
	Total	Total	-263	-112	-13	1	-95	-164
	Value of 'saved' QALYs		-21,296,307	-9,074,078	-1,064,778	79,420	-7,701,506	-13,266,895
Employment Changes per annum	Volume	Absence days	-100,358	-9,153	-4,630	-11,061	-34,661	-54,459
		Unempl people	-12,405	-381	0	0	0	-12,405
	Cost (£)	Absence	-9,611,389	-283,120	-270,303	-1,038,982	-3,194,350	-5,373,303
		Unempl	-302,782,644	-1,636,242	0	0	0	-302,782,644
		Total (£)	-312,394,033	-1,919,362	-270,303	-1,038,982	-3,194,350	-308,155,946
Summary Financial Value Harm Reduction Year 1	Health Costs (£)		-24,688,895	-1,001,639	-143,010	-4,423,556	-7,849,037	-12,374,309
	Crime Costs (£)		-16,838,871	-7,716,825	-1,012,108	-259,986	-6,062,850	-9,972,724
	Employment Costs (£)		-312,394,033	-1,919,362	-270,303	-1,038,982	-3,194,350	-308,155,946
	Total Direct Costs (£)		-353,921,799	-10,637,825	-1,425,421	-5,722,524	-17,106,237	-330,502,979
	Health QALYs (£)		-63,144,310	-3,641,711	-585,742	-10,911,963	-20,927,405	-31,139,317
	Crime QALYs (£)		-21,296,307	-9,074,078	-1,064,778	79,420	-7,701,506	-13,266,895
	Total Societal Value (£)		-438,362,416	-23,353,614	-3,075,942	-16,555,067	-45,735,148	-374,909,191
Cumul 10 year Summary Financial Value Harm Reduction	Health Costs (£)		-545,957,918	-8,697,898	-1,893,992	-76,790,635	-135,447,567	-333,242,978
	Crime Costs (£)		-140,042,240	-64,177,786	-8,417,301	-2,162,200	-50,422,330	-82,939,207
	Employment Costs (£)		-2,598,057,875	-15,962,573	-2,248,004	-8,640,804	-26,566,151	-2,562,811,382
	Total Direct Costs (£)		-3,284,058,033	-88,838,257	-12,559,298	-87,593,639	-212,436,047	-2,978,993,567
	Health QALYs (£)		-1,937,855,254	-34,666,693	-7,732,303	-686,417,103	-452,924,341	-796,048,155
	Crime QALYs (£)		-196,398,473	-83,682,819	-9,819,581	732,423	-71,024,709	-122,349,752
	Total Societal Value (£)		-5,418,311,761	-207,187,770	-30,111,182	-773,278,319	-736,385,097	-3,897,391,474

Example Policy Analysis: Restrict Off-Trade Discounting via Priced Based Promotion to no greater than 20% (Scenario 30)

Table 30 shows the results for consumption changes, consumer spending and sales.

Overall weekly consumption reduces -0.8%: Consumption is estimated to reduce by on average 6.5 units per person per year.

Consumption changes are greatest for harmful drinkers (-0.62 units per week)

Groups are impacted differentially:

11 to 18s	(-0.3%)
18 to 24 year old hazardous drinkers	(-0.2%).
Hazardous drinkers larger reductions	(-0.9%)

Moderate drinkers are affected in a small way (-0.03 units per week):

Table 31 shows the effects of the policy scenario on health, crime and employment harms, as well as a financial valuation

Effects on health are estimated to be substantial with deaths are estimated to reduce by 48 per annum within the first year and a full effect after 10 years of 374. Again deaths are differentially distributed across the groups, with 0 saved in year 1 for 11-18s but 22 for hazardous, 20 for harmful and 5 for moderate drinkers. Illness also decreases with an estimated reduction in of 1,000 acute and 400 chronic within year 1.

Hospital admissions are estimated to reduce by 1,900 in year 1, and a full effect after 10 years of 10,600 avoided admissions per annum.

Healthcare service costs are estimated to reduce by £8m in year 1, with a QALY gain valued at £21m.

Crime is estimated to fall by 3,700 offences overall. The distribution of effect here across the groups is very different to that for health. For 11-18s, a reduction of 720, 18-24 hazardous 340, moderate 840, hazardous 1,650, harmful 1,020 is estimated.

The harm avoided in terms of victim quality of life is valued at £6m p.a.

Direct costs of crime are estimated to reduce by £5m p.a.

Workplace harms are reduced by 2,400 fewer unemployed people and 38,000 fewer sick days.

Table 30: Results table for maximum 20% off-trade discount (consumption effects)

Males and Females				Population Subgroups			Scenario	30
Consumption Patterns			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Baseline								
Mean consumption per person per week			12.63	4.08	27.01	4.58	26.90	69.82
n people			36,781,777	4,264,561	714,039	23,570,854	6,863,921	2,299,162
Mean consumption per drinker per week			15.79	12.50	27.01	5.65	26.90	69.82
n drinkers			29,431,779	1,393,062	714,039	19,092,355	6,863,921	2,299,162
% binge (>8 males, >6 females)			17.4%	8.5%	57.2%	8.2%	39.3%	68.1%
Mean scale of binge if binge occurs (units)			13.7	14.2	14.7	12.0	13.8	16.2
Volume sales (units per drinker per year)	Off-trade	Beer	126.8	69.1	153.4	32.1	190.7	758.1
		Wine	302.1	61.4	185.9	97.4	573.2	1,322.6
		Spirit	66.6	30.9	72.6	23.6	109.4	318.0
		RTD	9.0	11.4	16.4	3.2	8.8	57.4
	On-trade	Beer	226.9	253.2	548.0	89.0	369.5	960.4
		Wine	35.2	32.3	54.1	23.8	59.2	61.8
		Spirit	36.8	77.8	226.9	19.7	61.3	91.7
		RTD	20.0	115.7	151.2	6.0	30.5	70.6
	Total		823.3	651.8	1,408.3	294.8	1,402.5	3,640.7
Value sales (£ per drinker per year)	Off-trade	Beer	£ 45	£ 21	£ 55	£ 13	£ 69	£ 250
		Wine	£ 143	£ 27	£ 87	£ 47	£ 271	£ 619
		Spirit	£ 25	£ 10	£ 29	£ 10	£ 41	£ 114
		RTD	£ 7	£ 9	£ 13	£ 3	£ 7	£ 46
	On-trade	Beer	£ 212	£ 220	£ 539	£ 90	£ 341	£ 865
		Wine	£ 86	£ 95	£ 124	£ 61	£ 137	£ 139
		Spirit	£ 42	£ 79	£ 244	£ 25	£ 68	£ 100
		RTD	£ 29	£ 148	£ 227	£ 9	£ 44	£ 100
	Total		£ 590	£ 610	£ 1,319	£ 257	£ 979	£ 2,233
Absolute change								
Mean consumption per person per week			-0.10	-0.01	-0.06	-0.02	-0.24	-0.62
Mean consumption per drinker per week			-0.12	-0.04	-0.06	-0.03	-0.24	-0.62
% change in mean consumption			-0.8%	-0.3%	-0.2%	-0.5%	-0.9%	-0.9%
Change in volume of consumption (units per drinker per year)	Off-trade	Beer	-1.21	-1.20	-1.22	-0.15	-1.66	-8.73
		Wine	-5.79	-1.35	-3.67	-1.47	-11.84	-26.03
		Spirit	-0.08	-0.05	-0.08	-0.02	-0.13	-0.42
		RTD	-0.01	-0.01	-0.02	-0.00	-0.01	-0.06
	On-trade	Beer	0.59	0.49	1.60	0.15	1.09	2.88
		Wine	0.01	0.01	0.02	0.00	0.02	0.02
		Spirit	0.02	0.03	0.12	0.01	0.03	0.06
		RTD	0.01	0.04	0.06	0.00	0.01	0.03
	Total		-6.47	-2.05	-3.19	-1.49	-12.48	-32.24
Change in £ value of purchases (sales) (£ per drinker per year)	Off-trade	Beer	£0.31	£0.23	£0.32	£0.08	£0.42	£1.91
		Wine	£2.26	£0.47	£1.29	£0.89	£4.10	£9.05
		Spirit	£0.04	£0.02	£0.04	£0.01	£0.06	£0.18
		RTD	£0.01	£0.01	£0.02	£0.01	£0.01	£0.08
	On-trade	Beer	£0.56	£0.43	£1.62	£0.15	£1.04	£2.68
		Wine	£0.02	£0.02	£0.04	£0.01	£0.04	£0.04
		Spirit	£0.02	£0.03	£0.15	£0.01	£0.04	£0.07
		RTD	£0.01	£0.05	£0.10	£0.00	£0.02	£0.05
	Total		£3.23	£1.27	£3.58	£1.16	£5.74	£14.06
Effect of policy on "pocket" if drinkers did not change consumption (£ per drinker per year)	Off-trade	Beer	£0.62	£0.52	£0.64	£0.12	£0.86	£4.10
		Wine	£5.16	£1.10	£3.14	£1.65	£10.02	£21.93
		Spirit	£0.07	£0.03	£0.07	£0.02	£0.11	£0.32
		RTD	£0.02	£0.02	£0.03	£0.01	£0.02	£0.12
	On-trade	Beer	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
		Wine	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
		Spirit	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
		RTD	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
	Total		£5.86	£1.68	£3.88	£1.80	£11.01	£26.47
Total change in retailer received £m (after VAT+Duty)	Off-trade		£m 95.7	£m 1.4	£m 1.5	£m 20.6	£m 40.5	£m 33.6
	On-trade		£m 13.0	£m 0.5	£m 1.0	£m 2.4	£m 5.6	£m 4.7
	Total		£m 108.8	£m 1.9	£m 2.5	£m 23.1	£m 46.1	£m 38.2
Total Change in VAT & Duty Received	Off-trade		-£m 18.8	-£m 0.4	-£m 0.3	-£m 1.8	-£m 8.9	-£m 7.8
	On-trade		£m 5.1	£m 0.2	£m 0.4	£m 0.9	£m 2.2	£m 1.9
	Total		-£m 13.7	-£m 0.1	£m 0.0	-£m 0.9	-£m 6.7	-£m 5.9
% change in spend / sales	Off-trade		+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
	On-trade		+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
	Total		+0.5%	+0.2%	+0.3%	+0.5%	+0.6%	+0.6%
Total Change Pop'n Spend (Sales)	Off-trade		£m 77.0	£m 1.0	£m 1.2	£m 18.9	£m 31.6	£m 25.8
	On-trade		£m 18.2	£m 0.8	£m 1.4	£m 3.3	£m 7.8	£m 6.5
	Total		£m 95.1	£m 1.8	£m 2.6	£m 22.2	£m 39.4	£m 32.3

The societal value of these harm reductions is £1.3bn in total over the 10-year period modelled. In the first year, the estimated societal value of the harm reduction is as follows: NHS cost reductions (£8m), value of QALYs saved (£21m), crime costs saved (£5m), value of crime QALYs saved (£6m) and employment related harms avoided (£58m).

The societal value of harm reductions varies by groups with hazardous drinkers accounting for £0.3bn of the total value, harmful drinkers for £0.7bn and the moderate drinkers for £0.3bn.

Returning to Table 30, the spending and sales results are as follows:

Absolute reductions in consumption are biggest in off-trade wines.

The cost impact of the policy on consumers varies substantially between drinker types groups.

Overall:	£3 per drinker per annum.
Harmful drinkers:	£14 per annum
Moderate drinkers	£1 per annum.

If consumption did not change in response to price increases then the effect "on the pocket" would be

Harmful drinkers:	£26 per annum
Moderate drinkers	£2 per annum.

An overall increased spend by consumers is estimated of £95m per annum 20% of which is in the on-trade sector.

Overall VAT and duty changes by -£14m.

Table 31: Results table for maximum 20% off-trade discount (harm effects)

Males and Females							Scenario	30
Harm Reductions				Population Subgroups				
Absolute change			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Health Changes in Year 1	Deaths	Chronic	-29	0	0	-1	-13	-15
		Acute	-19	0	0	-5	-9	-5
		Total	-48	0	0	-5	-22	-20
	Illnes	Chronic	-385	-1	0	-40	-139	-206
		Acute	-1,040	-14	-11	-266	-492	-279
		Total	-1,426	-15	-11	-306	-631	-485
	Admissions	Chronic	-780	-1	-1	-74	-268	-438
		Acute	-1,146	-18	-13	-295	-543	-303
		Total	-1,925	-19	-14	-369	-811	-741
	QALYs per annum		-426	-6	-5	-99	-196	-130
	Value of 'saved' QALYs		-21,317,868	-314,722	-231,641	-4,931,543	-9,785,510	-6,508,627
	Cost (£)	Chronic	-2,153,213	-5,238	-3,775	-264,100	-826,168	-1,060,961
		Acute	-5,857,571	-79,289	-57,099	-1,497,057	-2,778,821	-1,559,409
		Total (£)	-8,010,783	-84,527	-60,874	-1,761,158	-3,604,989	-2,620,370
Health Changes per annum in Year 10	Deaths p.a.	Chronic	-354	0	0	-6	-148	-200
		Acute	-20	0	0	-5	-10	-5
		Total	-374	0	0	-11	-158	-206
	Illnesses p.a.	Chronic	-4,606	-2	-3	-440	-1,566	-2,599
		Acute	-1,108	-13	-10	-280	-526	-298
		Total	-5,714	-15	-13	-720	-2,092	-2,897
	Admissions p.a.	Chronic	-9,386	-4	-5	-812	-3,035	-5,538
		Acute	-1,213	-17	-12	-309	-577	-322
		Total	-10,599	-20	-17	-1,121	-3,612	-5,860
	QALYs per annum		-2,384	-6	-5	-1,059	-694	-629
	Cost (£)	Chronic	-25,470,701	-15,204	-22,822	-2,883,774	-9,259,227	-13,321,103
		Acute	-6,236,599	-74,201	-52,764	-1,576,951	-2,971,785	-1,666,867
		Total (£)	-31,707,300	-89,405	-75,587	-4,460,725	-12,231,012	-14,987,970
Cumulative Health Change over 10 yrs	Discounted QALYs		-11,321	-59	-48	-4,229	-3,795	-3,280
	Discounted Costs		-155,019,690	-735,012	-586,122	-24,953,796	-62,634,719	-67,208,927
	Valye of Discounted QALYs		-566,045,145	-2,943,815	-2,406,467	-211,429,598	-189,744,191	-163,975,036
	Total Value of Health Changes		-721,064,836	-3,678,827	-2,992,589	-236,383,394	-252,378,909	-231,183,963
Crime Changes per annum	Volume	Violent	-1,036	-90	-98	-266	-469	-278
		Damage	-1,421	-221	-124	-327	-628	-404
		Theft/Oth	-1,282	-408	-113	-251	-549	-336
		Total	-3,738	-720	-336	-844	-1,646	-1,019
	Cost (£)	Violent	-3,102,763	-253,697	-287,572	-803,270	-1,410,446	-825,487
		Damage	-561,300	-87,428	-49,093	-129,209	-247,920	-159,576
		Theft/Oth	-1,002,564	-274,910	-95,709	-215,262	-421,631	-266,349
		Total (£)	-4,666,627	-616,035	-432,374	-1,147,740	-2,079,997	-1,251,413
	QALYs	Violent	-58	-4	-5	-15	-27	-15
		Damage	-8	-1	-1	-2	-4	-2
		Theft/Oth	-13	-3	-1	-3	-6	-3
	Total	Total	-79	-9	-7	-20	-36	-21
	Value of 'saved' QALYs		-6,391,794	-709,069	-536,334	-1,581,549	-2,899,523	-1,716,987
Employment Changes per annum	Volume	Absence days	-37,896	-833	-1,651	-10,628	-17,920	-9,144
		Unempl people	-2,386	-33	0	0	0	-2,386
	Cost (£)	Absence	-3,815,614	-24,934	-98,118	-1,072,347	-1,831,384	-905,896
		Unempl	-54,604,634	-132,220	0	0	0	-54,604,634
		Total (£)	-58,420,247	-157,154	-98,118	-1,072,347	-1,831,384	-55,510,530
Summary Financial Value Harm Reduction Year 1	Health Costs (£)		-8,010,783	-84,527	-60,874	-1,761,158	-3,604,989	-2,620,370
	Crime Costs (£)		-4,666,627	-616,035	-432,374	-1,147,740	-2,079,997	-1,251,413
	Employment Costs (£)		-58,420,247	-157,154	-98,118	-1,072,347	-1,831,384	-55,510,530
	Total Direct Costs (£)		-71,097,658	-857,716	-591,366	-3,981,245	-7,516,371	-59,382,313
	Health QALYs (£)		-21,317,868	-314,722	-231,641	-4,931,543	-9,785,510	-6,508,627
	Crime QALYs (£)		-6,391,794	-709,069	-536,334	-1,581,549	-2,899,523	-1,716,987
	Total Societal Value (£)		-98,807,320	-1,881,506	-1,359,341	-10,494,337	-20,201,404	-67,607,927
Cumul 10 year Summary Financial Value Harm Reduction	Health Costs (£)		-155,019,690	-735,012	-586,122	-24,953,796	-62,634,719	-67,208,927
	Crime Costs (£)		-38,810,499	-5,123,318	-3,595,884	-9,545,303	-17,298,516	-10,407,505
	Employment Costs (£)		-485,858,138	-1,306,986	-816,009	-8,918,286	-15,230,902	-461,659,169
	Total Direct Costs (£)		-679,688,327	-7,165,316	-4,998,014	-43,417,385	-95,164,136	-539,275,600
	Health QALYs (£)		-566,045,145	-2,943,815	-2,406,467	-211,429,598	-189,744,191	-163,975,036
	Crime QALYs (£)		-58,946,304	-6,539,168	-4,946,175	-14,585,341	-26,739,938	-15,834,371
	Total Societal Value (£)		-1,304,679,776	-16,648,299	-12,350,656	-269,432,324	-311,648,264	-719,085,007

3.1.3 CONSUMPTION, SPENDING AND SALES EFFECTS ACROSS ALL POLICIES

Table 32 shows the model estimates for overall changes in consumption, spending and sales for the population of England for the 33 pricing policy scenarios examined. Equivalent tables for population subgroups under 18s, 18 to 24 year old hazardous drinkers, and the moderate, hazardous and harmful drinkers are shown in section 3.1.7 (Table 37 to Table 41 on pages 138 to 142).

Changes in consumption

Greater general price increases lead to larger consumption reductions: As general prices are increased further, estimated reductions in consumption become larger (e.g. +1%, +10% and +25% price rise gives -0.4%, -4.4% and -11.3% estimated consumption change respectively – scenarios 1-3).

Targeted price changes only on low priced products are less effective than across the board price changes: as they affect only part of the market (<30p per unit off trade, <80p on-trade) and therefore produce smaller consumption changes than across the board price changes (e.g. +10% price rise in lower priced products gives estimated consumption change of -0.2% off-trade and -0.5% for on-trade – scenarios 4 and 6).

Targeting low priced products causes some switching: if only low priced products have price increases then the reductions in consumption are estimated to occur mostly in beers and spirits (e.g. scenario 5), with some switching estimated towards wine consumption. This is due to small positive cross-price elasticities in the econometric model, so that if for example cheaper beers are increased in price, then there is a small increase in purchasing of wine as a substitution.

Increasing levels of minimum pricing show steep increases in effectiveness: if a minimum price per unit of alcohol is implemented, the effects on consumption become larger as the threshold minimum price per unit increases. As the minimum price increases in 5p increments larger and larger reductions in consumption are estimated (e.g. 20p gives -0.1% and 25p gives -0.3%, a difference of -0.2% from scenario 11 to 12, whereas 35p gives -1.4% and 40p gives -2.6%, a difference of -1.2% from scenario 14 to 15).

Table 32 Summary of estimated effects of price policies on consumption, spending and sales on all England population (Scenarios 1 to 33)

SUMMARY - TOTAL	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)		
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	%change in price per unit consumed	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
1 General Price +1%	-0.4%	-1.4	-1.2	-0.8	-0.1	-3.5	+41.9	+62.7	-3.7	+3.6	+104.4	+0.6%	+1.0%	+3.55	+5.90
2 General Price +10%	-4.4%	-14.4	-12.8	-7.7	-1.0	-35.9	+394.9	+589.2	-43.9	+27.9	+968.1	+5.6%	+10.4%	+32.89	+58.97
3 General Price +25%	-11.3%	-37.2	-33.5	-19.3	-2.6	-92.7	+882.5	+1308.5	-137.4	+36.0	+2089.6	+12.0%	+26.2%	+71.00	+147.44
4 Low Priced Off Trade Products +10%	-0.2%	-0.9	+0.0	-1.1	+0.0	-1.9	+61.4	+29.7	-6.5	+11.7	+96.3	+0.6%	+0.8%	+3.27	+2.31
5 Low Priced Off Trade Products +25%	-0.6%	-2.2	+0.0	-2.6	+0.0	-4.7	+141.6	+74.3	-18.6	+29.3	+226.5	+1.3%	+1.9%	+7.70	+5.78
6 Low Priced On Trade Products +10%	-0.5%	-2.3	+1.3	-3.2	-0.1	-4.3	+12.5	+76.5	+11.1	-21.4	+78.6	+0.5%	+1.0%	+2.67	+5.29
7 Low Priced On Trade Products +25%	-1.3%	-5.8	+3.2	-8.1	-0.2	-10.8	+31.2	+147.7	+27.7	-61.6	+145.0	+0.8%	+2.2%	+4.93	+13.22
8 All Low Priced Products +10%	-0.8%	-3.2	+1.3	-4.3	-0.0	-6.2	+74.0	+106.5	+4.5	-9.7	+175.2	+1.0%	+1.8%	+5.95	+7.60
9 All Low Priced Products +25%	-1.9%	-8.2	+3.3	-10.8	-0.1	-15.8	+173.2	+223.5	+8.8	-32.7	+372.9	+2.1%	+4.1%	+12.67	+19.00
10 Minimum Price 15p (Off and On Trade)	-0.0%	-0.1	+0.0	-0.1	+0.0	-0.1	+8.2	+6.1	-0.6	+2.4	+16.1	+0.1%	+0.1%	+0.55	+0.28
11 Minimum Price 20p " "	-0.1%	-0.8	+0.3	-0.3	+0.0	-0.7	+26.5	+16.5	-2.4	+6.4	+47.1	+0.3%	+0.4%	+1.60	+0.96
12 Minimum Price 25p	-0.3%	-2.4	+0.9	-0.6	+0.0	-2.1	+63.6	+37.1	-6.6	+14.0	+108.1	+0.6%	+0.9%	+3.67	+2.47
13 Minimum Price 30p	-0.6%	-4.9	+1.7	-2.0	+0.1	-5.2	+138.7	+82.3	-18.5	+30.7	+233.2	+1.3%	+2.0%	+7.92	+5.93
14 Minimum Price 35p	-1.4%	-7.9	+1.1	-4.7	+0.1	-11.4	+255.6	+153.2	-45.7	+56.5	+419.6	+2.4%	+3.9%	+14.26	+12.76
15 Minimum Price 40p	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+6.5%	+21.52	+23.34
16 Minimum Price 45p	-4.5%	-17.2	-6.8	-13.2	+0.2	-37.0	+579.3	+325.1	-155.5	+114.6	+863.6	+5.0%	+9.9%	+29.34	+38.04
17 Minimum Price 50p	-6.9%	-23.2	-15.4	-18.4	+0.2	-56.8	+755.9	+425.1	-243.3	+145.2	+1082.8	+6.2%	+14.1%	+36.79	+56.31
18 Minimum Price 60p	-12.8%	-35.8	-40.0	-30.0	+0.2	-105.6	+1022.7	+643.8	-478.1	+205.3	+1393.7	+8.0%	+23.9%	+47.35	+100.38
19 Minimum Price 70p " "	-18.6%	-41.1	-70.5	-42.0	+0.2	-153.4	+1180.2	+881.9	-720.3	+255.9	+1597.7	+9.2%	+34.2%	+54.28	+150.68
20 Minimum Price 20p Off and 60p On Trade	-0.6%	-3.2	+1.4	-2.9	-0.0	-4.7	+37.3	+84.0	+7.1	-12.4	+116.0	+0.7%	+1.2%	+3.94	+5.56
21 Minimum Price 30p Off and 80p On Trade	-2.1%	-12.5	+5.5	-10.3	-0.1	-17.4	+176.9	+251.6	+14.3	-37.0	+405.9	+2.3%	+4.5%	+13.79	+21.59
22 Minimum Price 40p Off and 100p On Trade	-5.4%	-33.0	+7.0	-18.6	-0.3	-44.8	+492.0	+640.3	-19.8	-20.3	+1092.1	+6.3%	+12.4%	+37.11	+65.19
23 30p Minimum Price Beers Only	-0.5%	-7.5	+3.2	+0.2	+0.0	-4.2	+81.4	+40.0	-8.8	+14.2	+126.8	+0.7%	+1.2%	+4.31	+3.72
24 30p Minimum Price Wines Only	-0.1%	+1.5	-2.5	+0.1	+0.0	-0.8	+29.1	+24.5	-5.4	+9.8	+58.0	+0.3%	+0.4%	+1.97	+1.31
25 30p Minimum Price Spirits Only	-0.0%	+1.1	+1.0	-2.3	+0.0	-0.2	+27.7	+17.2	-4.2	+6.5	+47.2	+0.3%	+0.3%	+1.60	+0.91
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0%	+0.0%	+0.00	+0.00
27 Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.0	-0.0	+0.0	-0.0	+0.7	+0.2	-0.1	+0.1	+0.9	+0.0%	+0.0%	+0.03	+0.04
28 Ban Off Trade Discounting if > 40%	-0.1%	-0.1	-1.0	+0.0	+0.0	-1.0	+15.4	+2.2	-2.9	+0.8	+15.5	+0.1%	+0.2%	+0.53	+0.92
29 Ban Off Trade Discounting if > 30%	-0.3%	-0.2	-2.4	+0.0	+0.0	-2.7	+40.5	+5.6	-7.6	+2.2	+40.7	+0.2%	+0.6%	+1.38	+2.43
30 Ban Off Trade Discounting if > 20%	-0.8%	-0.6	-5.8	-0.1	-0.0	-6.5	+95.7	+13.0	-18.8	+5.1	+95.1	+0.5%	+1.3%	+3.23	+5.86
31 Ban Off Trade Discounting if > 10%	-1.6%	-1.5	-11.2	-0.4	-0.0	-13.1	+190.6	+26.8	-39.2	+10.5	+188.6	+1.1%	+2.7%	+6.41	+11.96
32 Total Ban Off Trade Discounting	-2.8%	-3.2	-18.4	-1.4	-0.1	-23.0	+331.0	+51.0	-71.0	+20.0	+331.0	+1.9%	+4.8%	+11.25	+21.31
33 Ban Off Trade Discount if Reg Price <30p	-0.0%	-0.5	+0.2	-0.0	+0.0	-0.4	+10.5	+4.4	-0.9	+1.7	+15.8	+0.1%	+0.1%	+0.54	+0.39

Minimum pricing affects beers and spirits: changes in minimum price produce bigger estimated changes in consumption of beers and spirits, and have lesser effects on wine and RTDs (e.g. 40p minimum price gives estimated changes of -12.0 units per drinker per year for beer and -8.5 for spirits but only -1.4 for wines and a very small switching effect increase of +0.2 for RTDs in scenario 15).

Higher minimum prices reduce switching effects: The substitution effects towards wine estimated for lower minimum prices (e.g. 25p minimum implies a +0.9 units per annum per drinker increase in wine consumption) are reversed as the minimum price threshold is increased and price rises in wine itself are estimated to reduce consumption.

Differential minimum pricing for on-trade and off-trade leads to substantial reductions in consumption: Implementing differential minimum prices for on-trade and off-trade has substantial additional effects. For example, a minimum price of 30p gives an estimated -0.6% consumption change, but a minimum price of 30p off- and 80p on-trade gives an estimated consumption change of -2.1% (compare scenario 13 to 21).

Minimum prices targeted at particular beverages are only effective for beer: a minimum price of 30p applied just to beers would have effects similar to the overall minimum price of 30p with an estimated 0.5% reduction in consumption (compare scenarios 13 and 23), whereas a targeted 30p minimum price per unit for just wines, or just spirits or just RTDs would lead to very small changes in consumption, estimated at -0.1% or smaller (scenarios 24-26).

Ban of off-trade 'buy one get one free' offers has small effects: Changes in consumption are estimated to be marginal if only very substantial discounts are restricted. Banning discounts if they are >50% affects only a small proportion of products and produces a negligible change.

Tighter restrictions on off-trade discounting have increasing effects: Increasing restriction of off-trade discounting does have increasing effects in a similar way to minimum pricing (e.g. restrictions to 40%, 30%, 20% and 10% discounting give estimated consumption changes of -0.1%, -0.3%, -1.6%, -2.8% respectively).

Tighter restrictions on off-trade discounting affect wine consumption: Increasingly tight restrictions on discounting affect wine more than beers and spirits (e.g. banning discounts over 10% gives estimated consumption changes of -1.5 units per drinker per year for beers, but -11.2 units for wine – scenario 31).

A total ban on discounting reduces consumption by 23 units per year. This would give an estimated change in consumption of -2.8%, which is of a similar order of magnitude to a 40p minimum price policy (compare scenarios 32 and 15).

Bans on discounts only for lower-priced alcohol are not effective in reducing consumption: a targeted ban on discounting only focussed on products with a regular low price below 30p has negligible effects because so few of those products are discounted (scenario 33).

Changes in Consumer Spending

Price increases are not matched by consumption reductions and spending is estimated to increase: Estimated reductions in consumption do not match the increases in prices (since the elasticities are less than -1.0). Hence as prices increase, even though consumption decreases somewhat, spending overall does increase. For example, with a +1% price increase, consumption is estimated to change by -0.4% and overall spending to increase by +0.6% (scenario 1).

Changes in spending per drinker for each policy are broadly proportionate to the price increase: The estimated change in spending per drinker per annum (2nd column from the right in Table 32) becomes higher as prices increase. For example, a 30p minimum price policy implies an average increase in spending of £7.92 per year for each drinker (scenario 13), whereas a minimum price of 40p implies an increase of £21.52 per year.

Changes in spending affect mostly harmful drinkers, with hazardous drinkers somewhat affected and moderate drinkers affected least: As shown earlier, spending increases are very different for the three consumption groups. Table 37 to Table 41 (pages 138 to 142) show the results for each policy. Harmful drinkers are estimated to incur the greatest spending increases and moderate drinkers incur generally very small increases (e.g. +£38.38 per annum for harmful and +£8.44 for hazardous versus +£1.20 per annum for the 30p minimum price scenario 13).

If drinkers did not change consumption in response to price changes, the effect “on the pocket” of spending per drinker would be somewhat higher for most policies (final column of Table 32). For example, a +10% price increase leads to increased spending of £32.89 per drinker if consumption is reduced as expected, but if drinkers were to maintain current consumption the increase would be £58.97. This is not the case for every policy because switching effects, particularly between on- and off-trade in the very low minimum price scenarios (e.g. 20p scenario 11), mean that some drinkers would purchase more expensive products.

Changes in Sales and Tax/Duty

Annual retail sales value is estimated to increase: The model predicts increases in both off-trade and on-trade retail receipts (excluding duty and VAT) for every price increasing policy. The greater the price increase the greater the retail receipts. For example, the 30p minimum price option is estimated to increase off-trade receipts per annum by +£139m versus +£404m for a 40p minimum price option. There are similar increases (e.g. +£82m for 30p versus +£234m for 40p) in the on-trade.

Effects on tax and duty are estimated to be relatively small and vary according to whether on- or off-trade is most affected: Since the minimum price policies affect mostly off-trade sales, the duty and tax paid from this sector is estimated to decrease (e.g. -£90m tax and duty from off-trade for 40p minimum price) but this can be partly or, in some cases, totally compensated for by increased duty and tax from the on-trade sector as some switching is estimated to occur (e.g. +£85m tax and duty from off-trade for 40p minimum price). The picture varies by policy because the duty is applied to the volume of sales on a per unit basis (which in most scenarios is reducing), but the VAT applies to the monetary value of the sales (which is increasing).

3.1.4 HEALTH, CRIME AND EMPLOYMENT HARM EFFECTS ACROSS ALL POLICIES

Table 33 shows the results of each pricing scenario in terms of estimated changes in health, crime and employment alcohol related harm and Table 34 shows the percentage changes from our model estimated baseline of alcohol attributable harms. Table 42 to Table 46 (pages 143 to 147) show a similarly structured table of harm reductions. They separate the priority groups of 11-18s, 18 to 24 year old hazardous drinkers and the moderate, hazardous and harmful drinker groups.

As prices increase, the modelling estimates that more deaths are avoided: for example, a move from a 30p to a 40p minimum price per unit changes the estimated year 1 deaths avoided from just 30 (-0.9%) to 157 (-4.5%). The full effects of chronic disease risk reductions on deaths are modelled to take 10 years to full effect, and the results show the deaths per annum avoided in year 10 are approximately 10 times higher than in year 1. The changes in deaths for each policy are broadly in proportion to the changes in consumption (see Figure 27).

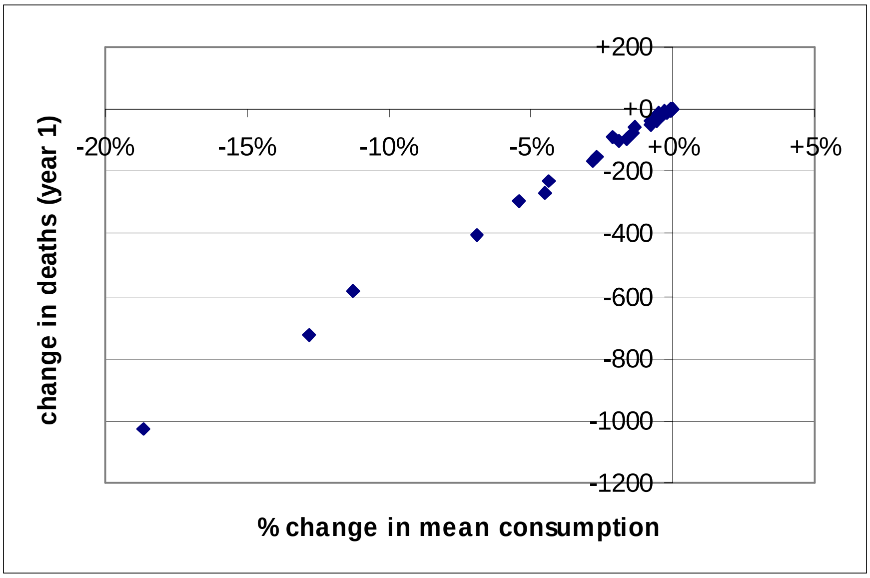


Figure 27: Relationship of estimated change in deaths (year 1) to estimated change in consumption across different policies.

Deaths avoided occur disproportionately in harmful drinkers: Harmful drinkers have both a higher mortality risk and respond to policy changes with larger absolute changes in consumption than moderate and hazardous drinkers. Policies that target price increases at low priced alcohol target the harmful drinkers particularly. For example, of the 302 deaths avoided per annum at full effect by a 30p minimum price, 263 (81%) are in the harmful group. This proportion varies substantially by policy.

Policies with bigger price increases reduce consumption in moderate and hazardous drinkers, and do reduce deaths in these groups also: e.g. in scenario 2 (+10% price increase) the full effect of deaths in harmful drinkers avoided was 976 (58% of all deaths avoided), but there are also significant reductions in the moderate (71) and hazardous (633) drinking groups.

Table 33 Summary of estimated effects of policies on health, crime and employment alcohol related harms: England population (Scenarios 1 to 33)

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
1 General Price +1%	-23	-0.2	-0.6	-1.0	-0.2	-169	-2.2	-0.6	-5.1	-5.7	-1.5	-2.8	-2.1	-6.4	-0.1	-30.5	-1.3
2 General Price +10%	-232	-1.8	-5.8	-10.1	-2.4	-1681	-21.6	-6.0	-50.8	-56.4	-15.5	-28.1	-21.2	-64.9	-1.2	-310.4	-12.8
3 General Price +25%	-585	-4.4	-14.7	-25.6	-6.0	-4180	-53.4	-15.3	-125.8	-141.6	-39.9	-72.2	-54.2	-166.3	-3.1	-798.1	-31.9
4 Low Priced Off Trade Products +10%	-13	-0.2	-0.1	-0.4	-0.0	-129	-1.8	-0.1	-3.7	-2.8	-0.1	-0.1	-0.5	-0.7	-0.0	-6.2	-1.2
5 Low Priced Off Trade Products +25%	-35	-0.4	-0.5	-1.3	-0.2	-332	-4.4	-0.5	-9.7	-8.4	-0.2	-0.2	-1.3	-1.8	-0.0	-15.8	-3.1
6 Low Priced On Trade Products +10%	-22	-0.2	-0.7	-1.2	-0.3	-152	-2.3	-0.7	-5.5	-5.9	-4.0	-8.0	-7.2	-19.2	-0.3	-53.8	-1.2
7 Low Priced On Trade Products +25%	-58	-0.5	-1.8	-3.0	-0.7	-396	-5.7	-1.8	-13.9	-15.5	-10.1	-20.0	-18.2	-48.3	-0.8	-135.5	-3.0
8 All Low Priced Products +10%	-39	-0.3	-1.0	-1.9	-0.4	-296	-4.1	-1.0	-9.6	-10.0	-4.1	-8.1	-7.8	-20.0	-0.3	-60.4	-2.4
9 All Low Priced Products +25%	-99	-0.9	-2.6	-4.7	-1.1	-751	-10.3	-2.7	-24.1	-25.4	-10.4	-20.5	-19.7	-50.6	-0.8	-153.5	-6.1
10 Minimum Price 15p (Off and On Trade)	+1	-0.0	+0.1	+0.1	+0.1	-1	-0.1	+0.2	-0.1	+0.4	+0.1	+0.2	-0.0	+0.3	+0.0	+0.3	-0.1
11 Minimum Price 20p " "	-2	-0.0	+0.1	+0.0	+0.0	-32	-0.7	+0.1	-1.2	-0.4	+0.1	+0.2	-0.4	-0.0	+0.0	-1.8	-0.5
12 Minimum Price 25p	-8	-0.1	+0.1	-0.2	+0.0	-108	-1.9	+0.1	-3.8	-2.3	-0.1	-0.1	-1.1	-1.3	-0.0	-8.0	-1.6
13 Minimum Price 30p	-30	-0.4	-0.4	-1.2	-0.2	-302	-4.5	-0.4	-9.9	-8.0	-0.6	-1.0	-2.3	-3.8	-0.0	-21.3	-3.8
14 Minimum Price 35p	-78	-0.8	-1.3	-3.1	-0.6	-714	-9.8	-1.4	-21.9	-19.7	-1.5	-2.4	-4.5	-8.4	-0.1	-49.1	-7.3
15 Minimum Price 40p	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-12.4
16 Minimum Price 45p	-268	-2.5	-5.2	-10.8	-2.2	-2288	-29.4	-5.5	-66.6	-65.3	-6.2	-10.3	-12.4	-28.9	-0.5	-183.7	-19.1
17 Minimum Price 50p	-406	-3.7	-8.1	-16.4	-3.4	-3393	-43.2	-8.6	-97.9	-98.2	-10.3	-17.1	-18.5	-45.8	-0.8	-296.9	-27.1
18 Minimum Price 60p	-728	-6.3	-15.3	-29.7	-6.4	-5875	-74.1	-16.3	-168.8	-175.4	-20.9	-34.3	-33.2	-88.4	-1.7	-590.3	-43.4
19 Minimum Price 70p " "	-1034	-8.8	-22.6	-42.7	-9.4	-8104	-102.9	-24.1	-234.4	-248.8	-31.7	-51.7	-49.3	-132.7	-2.5	-888.3	-55.0
20 Minimum Price 20p Off and 60p On Trade	-19	-0.2	-0.6	-1.1	-0.3	-124	-2.0	-0.6	-5.0	-5.5	-5.0	-10.7	-10.2	-25.9	-0.4	-58.8	-2.0
21 Minimum Price 30p Off and 80p On Trade	-92	-0.8	-2.6	-4.7	-1.1	-700	-10.3	-2.6	-24.4	-25.3	-13.3	-27.2	-27.2	-67.6	-1.1	-181.2	-7.5
22 Minimum Price 40p Off and 100p On Trade	-294	-2.6	-7.1	-13.4	-3.0	-2295	-30.8	-7.5	-71.9	-74.5	-24.2	-48.9	-48.1	-121.2	-2.0	-380.4	-19.1
23 30p Minimum Price Beers Only	-13	-0.2	+0.2	-0.3	+0.0	-171	-3.1	+0.3	-6.3	-3.7	-1.1	-2.2	-1.2	-4.5	-0.1	-25.2	-3.7
24 30p Minimum Price Wines Only	-8	-0.1	-0.1	-0.2	-0.0	-70	-0.8	-0.1	-1.6	-1.7	+0.5	+1.1	-0.4	+1.2	+0.0	+0.1	+0.1
25 30p Minimum Price Spirits Only	-1	-0.1	+0.2	+0.1	+0.1	-37	-0.6	+0.2	-1.0	-0.0	+0.1	+0.1	-0.7	-0.5	+0.0	+3.8	-0.1
26 30p Minimum Price Alcopops (RTDs) Only	+0	+0.0	+0.0	+0.0	+0.0	+0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
27 Ban Off Trade Discounting if > 50%	+0	-0.0	+0.0	+0.0	+0.0	-1	-0.0	+0.0	-0.0	+0.1	-0.0	-0.0	-0.0	-0.0	+0.0	-0.1	-0.0
28 Ban Off Trade Discounting if > 40%	-8	-0.1	-0.2	-0.3	-0.1	-60	-0.7	-0.2	-1.7	-1.8	-0.1	-0.2	-0.2	-0.5	-0.0	-5.6	-0.4
29 Ban Off Trade Discounting if > 30%	-20	-0.2	-0.4	-0.8	-0.2	-156	-1.9	-0.5	-4.4	-4.7	-0.4	-0.6	-0.5	-1.5	-0.0	-15.4	-1.0
30 Ban Off Trade Discounting if > 20%	-48	-0.4	-1.0	-1.9	-0.4	-374	-4.6	-1.1	-10.6	-11.3	-1.0	-1.4	-1.3	-3.7	-0.1	-37.9	-2.4
31 Ban Off Trade Discounting if > 10%	-95	-0.8	-2.1	-3.8	-0.8	-749	-9.3	-2.2	-21.4	-22.7	-2.2	-3.0	-2.7	-7.9	-0.2	-77.9	-4.8
32 Total Ban Off Trade Discounting	-165	-1.4	-3.5	-6.7	-1.5	-1299	-16.2	-3.8	-37.3	-39.4	-4.0	-5.7	-4.8	-14.4	-0.3	-138.4	-8.5
33 Ban Off Trade Discount if Reg Price <30p	+0	-0.0	+0.1	+0.1	+0.0	-12	-0.3	+0.2	-0.5	+0.2	-0.1	-0.2	-0.1	-0.4	-0.0	-2.1	-0.3

Table 34 Summary of % change estimated in alcohol related health, crime and employment harms: England population (Scenarios 1 to 33)

% CHANGE FROM MODELLED BASELINE SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. discounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
Baseline Alcohol Attributable Harm (Estimated by Modelling zero consumption)	+3490	+27	+146	+220	+58	+12196	+323	+148	+792	+976	+483	+863	+585	+1931	+37	+9456	+107
Policy Scenario																	
1 General Price +1%	-0.7%	-0.7%	-0.4%	-0.5%	-0.4%	-1.4%	-0.7%	-0.4%	-0.6%	-0.6%	-0.3%	-0.3%	-0.4%	-0.3%	-0.3%	-0.3%	-1.2%
2 General Price +10%	-6.7%	-6.5%	-4.0%	-4.6%	-4.1%	-13.8%	-6.7%	-4.1%	-6.4%	-5.8%	-3.2%	-3.3%	-3.6%	-3.4%	-3.3%	-3.3%	-12.0%
3 General Price +25%	-16.8%	-16.2%	-10.1%	-11.6%	-10.4%	-34.3%	-16.5%	-10.4%	-15.9%	-14.5%	-8.3%	-8.4%	-9.3%	-8.6%	-8.3%	-8.4%	-29.8%
4 Low Priced Off Trade Products +10%	-0.4%	-0.6%	-0.0%	-0.2%	-0.1%	-1.1%	-0.5%	-0.1%	-0.5%	-0.3%	-0.0%	-0.0%	-0.1%	-0.0%	-0.0%	-0.1%	-1.1%
5 Low Priced Off Trade Products +25%	-1.0%	-1.4%	-0.3%	-0.6%	-0.4%	-2.7%	-1.4%	-0.4%	-1.2%	-0.9%	-0.0%	-0.0%	-0.2%	-0.1%	-0.0%	-0.2%	-2.9%
6 Low Priced On Trade Products +10%	-0.6%	-0.7%	-0.5%	-0.5%	-0.5%	-1.2%	-0.7%	-0.4%	-0.7%	-0.6%	-0.8%	-0.9%	-1.2%	-1.0%	-0.9%	-0.6%	-1.1%
7 Low Priced On Trade Products +25%	-1.7%	-1.8%	-1.2%	-1.4%	-1.3%	-3.2%	-1.8%	-1.2%	-1.7%	-1.6%	-2.1%	-2.3%	-3.1%	-2.5%	-2.1%	-1.4%	-2.8%
8 All Low Priced Products +10%	-1.1%	-1.3%	-0.7%	-0.8%	-0.7%	-2.4%	-1.3%	-0.7%	-1.2%	-1.0%	-0.9%	-0.9%	-1.3%	-1.0%	-0.9%	-0.6%	-2.3%
9 All Low Priced Products +25%	-2.8%	-3.2%	-1.8%	-2.1%	-1.9%	-6.2%	-3.2%	-1.8%	-3.0%	-2.6%	-2.2%	-2.4%	-3.4%	-2.6%	-2.2%	-1.6%	-5.7%
10 Minimum Price 15p (Off and On Trade)	+0.0%	-0.0%	+0.1%	+0.1%	+0.1%	-0.0%	-0.0%	+0.1%	-0.0%	+0.0%	+0.0%	+0.0%	-0.0%	+0.0%	+0.0%	+0.0%	-0.0%
11 Minimum Price 20p " "	-0.0%	-0.2%	+0.1%	+0.0%	+0.1%	-0.3%	-0.2%	+0.1%	-0.2%	-0.0%	+0.0%	+0.0%	-0.1%	-0.0%	+0.0%	-0.0%	-0.5%
12 Minimum Price 25p	-0.2%	-0.5%	+0.1%	-0.1%	+0.0%	-0.9%	-0.6%	+0.1%	-0.5%	-0.2%	-0.0%	-0.0%	-0.2%	-0.1%	-0.0%	-0.1%	-1.5%
13 Minimum Price 30p	-0.9%	-1.3%	-0.3%	-0.5%	-0.3%	-2.5%	-1.4%	-0.3%	-1.2%	-0.8%	-0.1%	-0.1%	-0.4%	-0.2%	-0.1%	-0.2%	-3.5%
14 Minimum Price 35p	-2.2%	-2.9%	-0.9%	-1.4%	-1.0%	-5.9%	-3.0%	-1.0%	-2.8%	-2.0%	-0.3%	-0.3%	-0.8%	-0.4%	-0.3%	-0.5%	-6.8%
15 Minimum Price 40p	-4.5%	-5.6%	-2.0%	-2.9%	-2.2%	-11.3%	-5.6%	-2.1%	-5.2%	-4.0%	-0.7%	-0.6%	-1.3%	-0.8%	-0.7%	-1.1%	-11.6%
16 Minimum Price 45p	-7.7%	-9.1%	-3.6%	-4.9%	-3.8%	-18.8%	-9.1%	-3.8%	-8.4%	-6.7%	-1.3%	-1.2%	-2.1%	-1.5%	-1.4%	-1.9%	-17.8%
17 Minimum Price 50p	-11.6%	-13.4%	-5.5%	-7.4%	-5.9%	-27.8%	-13.3%	-5.8%	-12.4%	-10.1%	-2.1%	-2.0%	-3.2%	-2.4%	-2.2%	-3.1%	-25.3%
18 Minimum Price 60p	-20.9%	-23.0%	-10.5%	-13.5%	-11.0%	-48.2%	-22.9%	-11.1%	-21.3%	-18.0%	-4.3%	-4.0%	-5.7%	-4.6%	-4.5%	-6.2%	-40.5%
19 Minimum Price 70p " "	-29.6%	-32.2%	-15.5%	-19.4%	-16.2%	-66.5%	-31.8%	-16.3%	-29.6%	-25.5%	-6.6%	-6.0%	-8.4%	-6.9%	-6.7%	-9.4%	-51.3%
20 Minimum Price 20p Off and 60p On Trade	-0.5%	-0.6%	-0.4%	-0.5%	-0.5%	-1.0%	-0.6%	-0.4%	-0.6%	-0.6%	-1.0%	-1.2%	-1.7%	-1.3%	-1.1%	-0.6%	-1.8%
21 Minimum Price 30p Off and 80p On Trade	-2.6%	-3.1%	-1.8%	-2.2%	-1.9%	-5.7%	-3.2%	-1.8%	-3.1%	-2.6%	-2.8%	-3.1%	-4.6%	-3.5%	-2.9%	-1.9%	-7.0%
22 Minimum Price 40p Off and 100p On Trade	-8.4%	-9.4%	-4.9%	-6.1%	-5.2%	-18.8%	-9.5%	-5.1%	-9.1%	-7.6%	-5.0%	-5.7%	-8.2%	-6.3%	-5.3%	-4.0%	-17.8%
23 30p Minimum Price Beers Only	-0.4%	-0.8%	+0.1%	-0.1%	+0.0%	-1.4%	-0.9%	+0.2%	-0.8%	-0.4%	-0.2%	-0.3%	-0.2%	-0.2%	-0.2%	-0.3%	-3.5%
24 30p Minimum Price Wines Only	-0.2%	-0.3%	-0.1%	-0.1%	-0.1%	-0.6%	-0.2%	-0.1%	-0.2%	-0.2%	+0.1%	+0.1%	-0.1%	+0.1%	+0.1%	+0.0%	+0.1%
25 30p Minimum Price Spirits Only	-0.0%	-0.2%	+0.1%	+0.0%	+0.1%	-0.3%	-0.2%	+0.1%	-0.1%	-0.0%	+0.0%	+0.0%	-0.1%	-0.0%	+0.0%	+0.0%	-0.1%
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
27 Ban Off Trade Discounting if > 50%	+0.0%	-0.0%	+0.0%	+0.0%	+0.0%	-0.0%	-0.0%	+0.0%	-0.0%	+0.0%	-0.0%	-0.0%	-0.0%	-0.0%	+0.0%	-0.0%	-0.0%
28 Ban Off Trade Discounting if > 40%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	-0.5%	-0.2%	-0.1%	-0.2%	-0.2%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.1%	-0.3%
29 Ban Off Trade Discounting if > 30%	-0.6%	-0.6%	-0.3%	-0.4%	-0.3%	-1.3%	-0.6%	-0.3%	-0.6%	-0.5%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.9%
30 Ban Off Trade Discounting if > 20%	-1.4%	-1.4%	-0.7%	-0.9%	-0.7%	-3.1%	-1.4%	-0.8%	-1.3%	-1.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.4%	-2.2%
31 Ban Off Trade Discounting if > 10%	-2.7%	-2.8%	-1.4%	-1.7%	-1.5%	-6.1%	-2.9%	-1.5%	-2.7%	-2.3%	-0.5%	-0.4%	-0.5%	-0.4%	-0.4%	-0.8%	-4.5%
32 Total Ban Off Trade Discounting	-4.7%	-5.0%	-2.4%	-3.0%	-2.5%	-10.7%	-5.0%	-2.5%	-4.7%	-4.0%	-0.8%	-0.7%	-0.8%	-0.7%	-0.8%	-1.5%	-7.9%
33 Ban Off Trade Discounting if Regular Price <	+0.0%	-0.1%	+0.1%	+0.0%	+0.1%	-0.1%	-0.1%	+0.1%	-0.1%	+0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.3%

As prices increase, alcohol attributable hospital admissions are estimated to reduce: Targeting only very cheap alcohol e.g. a 15p minimum price is estimated to have negligible effects on hospital admissions, with a reduction of around 100 p.a. (Table 33 scenario 10). Increasing the prices of cheap off-trade alcohol by 10% or 25%, increasing prices of cheap on-trade alcohol by 10%, introducing a 20p minimum unit price or banning discounts at the 40% level all have very small effects (e.g. 0.2% reduction for 20p). Policy options leading to greater price rises do begin to have larger effects e.g. a 40p minimum price gives an estimated change of around 40,000 admissions per annum at the full effect (-5.2%).

Crime harms are estimated to reduce as prices are increased: a minimum price of 30p is estimated to reduce total crimes by around 3,800 whereas for 40p the reduction is estimated at 16,000 per annum. For the 40p scenario, violent crimes are estimated to fall by 3,200, criminal damage by 5,300 and thefts, robberies and other crimes by 7,600.

Crime harms are estimated to reduce particularly for 11-18s because they are disproportionately involved in alcohol related crime and are affected significantly by targeting price rises at low priced products: For example, of the 16,000 total crimes per annum reduction for the 40p minimum price scenario, 9,500 (around 60%) of the estimated reduction is in crimes committed by 11 to 18s (see Table 42).

Crime related harms are estimated to reduce proportionately less than health related harms overall: For example, for the 40p minimum price, deaths in year 1 are estimated to change by -4.5%, whilst crimes are estimated to change by -0.8%. This is because firstly, the crime harms are more related to level of maximum daily use of alcohol i.e. binge than to mean consumption, and secondly, because the cross-sectional evidence from GHS suggests that for harmful drinkers, scale of binge decreases by around 5% for every 10% reduction in mean consumption.

Absence from work is estimated to reduce as prices are increased: a minimum price of 30p is estimated to reduce days absent from work by around 21,000 per annum whereas for 40p the reduction is estimated at 100,000.

Absence reductions are particularly focussed on hazardous and harmful drinkers: e.g. for 40p, the 100,000 estimated reduction in days absence includes 35,000 days for hazardous and 54,000 days for harmful drinkers.

Unemployment due to alcohol problems is focussed on harmful drinkers and is estimated to reduce as prices increase: e.g. 3,800 avoided unemployment cases for 30p versus 12,400 for 40p minimum price.

Unemployment harm reduces proportionately more than health or crime harms: This is because only harmful drinkers are assumed in the modelling to be at increased risk of unemployment, and these drinkers reduce their consumption in absolute terms the most. For example, alcohol related unemployment is estimated to change by -11.5% for 40p whilst health harms change by around -2% to -5% and alcohol related crimes by less than -1%.

Figure 28 shows that the policies which are most effective from a health and employment perspective do not necessarily correspond to the most effective policies for crime reduction. This is because different sub-groups in the population having different elasticities, preferred beverages and preferred price points. For example, young male drinkers (who commit a disproportionately high volume of total crime) have a high proportion of their purchases in on-trade beer and therefore are less affected by policies targeting cheap alcohol than other groups.

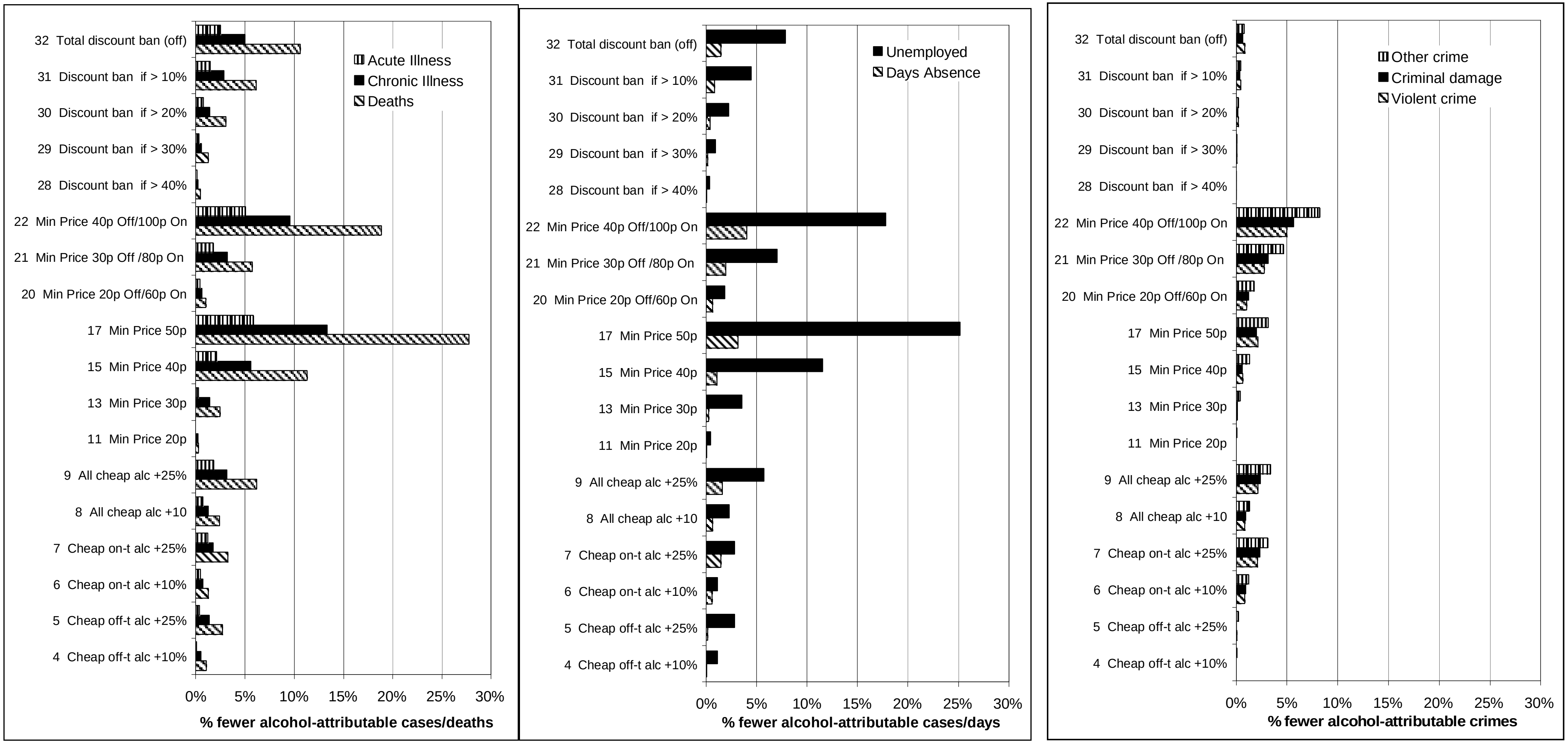


Figure 28: Health harms, employment harms and crime harms summary

3.1.5 FINANCIAL VALUATION OF HARM REDUCTIONS FOR PRICE CHANGE POLICIES

The financial value of harm reductions has been estimated for each policy incorporating

- Costs to healthcare services
- Costs to the criminal justice system
- Costs of days of absence
- Costs of lost productivity due to employment absence
- A financial value of the health gain (per quality adjusted life year - QALY)
- A financial value of the crime impacts on quality of life (per quality adjusted life year of the crime victims)

This has been done for year 1 after the proposed policy is introduced and also cumulatively over the 10 year time horizon (accounting for discounting of costs and QALY benefits).

Table 35 shows the results summary for the England population, Table 36 the % changes from modelled baseline, and Table 47 through to Table 51 (pages 148 to 152) show the results for the priority groups.

The financial value of harm reductions becomes larger as prices are increased: The overall cumulative discounted financial value of harm changes over 10 years for a 30p minimum price is estimated at -£1,410m, which is a £1.4 billion reduction in harms. This gets larger for example with the 40p minimum price policy, with an estimate of -£5,418m, more than trebling the value of the harm avoided.

The largest financially valued component of harm reductions is in the estimated unemployment reductions. For example, just over half of the total £1.4 billion harm reduction in the 30p minimum pricing scenario is from unemployment-related reductions (-£812m). The reason for this being the largest component is that most of the policies disproportionately affect harmful drinkers, who in turn are at substantially increased risk of unemployment.

Healthcare costs are reduced as prices are increased: e.g. NHS costs avoided due to reduced illness and admissions are estimated to change by -£115m for the 30p minimum price and -546m for 40p.

The financial value of mortality and morbidity avoided using the QALY measure also improves as prices are increased: e.g. the value of QALY loss avoided changes from -£401m for the 30p minimum price to -£1,938 for 40p.

Crime costs are also estimated to reduce as prices increase: e.g. costs of crime for 30p minimum price change by -£31m compared with -£140m over 10 years for 40p. Similarly the value of the loss victim quality of life changes from -£34m to -£196m.

The financial value of harm reduction comes mostly from reductions in consumption and associated harm for harmful drinkers: Table 47 to Table 51 show that, for example, the -£1.4 billion harm reduction estimated for the 30p minimum price option includes within it -£0.08bn for 11 to 18 year olds (mostly through crime reductions), -£0.1bn for moderate drinkers, -£0.1bn for hazardous, and -£1.2bn for harmful drinkers.

Table 35 Summary of financial valuation of pricing policies on health, crime and employment alcohol related harms: England population (Scen 1 to 33)

SUMMARY - TOTAL	Value of harm reduction in year 1 (£ millions								Cumulative discounted value of harm reduction over 10 years (£m							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1 General Price +1%	-4.3	-6.9	-2.8	-30.2	-44.1	-11.8	-9.6	-65.6	-77	-57	-23	-251	-409	-283	-89	-780
2 General Price +10%	-42.9	-69.6	-28.6	-301.4	-442.6	-118.6	-97.7	-658.9	-773	-579	-238	-2,507	-4,097	-2,818	-901	-7,815
3 General Price +25%	-109.0	-178.4	-73.7	-754.0	-1,115.1	-301.8	-250.6	-1,667.5	-1,941	-1,484	-613	-6,271	-10,308	-7,081	-2,311	-19,700
4 Low Priced Off Trade Products +10%	-1.1	-.6	-.6	-28.8	-31.1	-1.9	-.1	-33.1	-42	-5	-5	-240	-292	-142	-1	-435
5 Low Priced Off Trade Products +25%	-4.7	-1.8	-1.5	-72.2	-80.1	-10.9	-1.2	-92.3	-122	-15	-12	-600	-750	-421	-11	-1,182
6 Low Priced On Trade Products +10%	-4.8	-19.1	-3.9	-24.6	-52.4	-14.1	-25.6	-92.0	-84	-159	-33	-204	-480	-296	-236	-1,011
7 Low Priced On Trade Products +25%	-12.8	-48.1	-9.8	-61.2	-131.9	-37.4	-64.4	-233.7	-218	-400	-82	-509	-1,208	-773	-594	-2,576
8 All Low Priced Products +10%	-7.7	-19.9	-4.5	-53.7	-85.9	-21.2	-26.5	-133.6	-142	-166	-38	-447	-793	-501	-244	-1,538
9 All Low Priced Products +25%	-19.5	-50.5	-11.5	-135.6	-217.0	-54.1	-67.0	-338.1	-359	-420	-96	-1,127	-2,002	-1,270	-618	-3,890
10 Minimum Price 15p (Off and On Trade)	+0.8	+.3	-.0	-2.3	-1.2	+2.6	+.9	+2.3	+5	+3	-	-19	-12	+21	+8	+18
11 Minimum Price 20p " "	+0.5	+.1	-.2	-14.3	-14.0	+1.7	+1.0	-11.2	-8	+1	-2	-119	-128	-21	+9	-139
12 Minimum Price 25p	-0.2	-1.1	-.8	-43.3	-45.5	+.1	-.4	-45.8	-34	-9	-7	-361	-411	-113	-4	-528
13 Minimum Price 30p	-4.1	-3.7	-2.1	-97.6	-107.4	-9.9	-3.7	-120.9	-115	-31	-17	-812	-975	-401	-34	-1,410
14 Minimum Price 35p	-11.9	-8.5	-4.7	-182.1	-207.1	-30.0	-9.8	-246.9	-281	-70	-39	-1,514	-1,904	-986	-90	-2,981
15 Minimum Price 40p	-24.7	-16.8	-9.6	-302.8	-353.9	-63.1	-21.3	-438.4	-546	-140	-80	-2,518	-3,284	-1,938	-196	-5,418
16 Minimum Price 45p	-43.0	-30.9	-17.6	-461.7	-553.2	-111.0	-40.8	-705.0	-915	-257	-147	-3,840	-5,159	-3,264	-376	-8,799
17 Minimum Price 50p	-66.0	-49.6	-28.6	-649.6	-793.7	-171.6	-66.8	-1,032.2	-1,373	-413	-238	-5,402	-7,426	-4,909	-616	-12,951
18 Minimum Price 60p	-122.3	-97.4	-57.1	-1,033.9	-1,310.6	-321.6	-133.7	-1,765.9	-2,452	-810	-475	-8,599	-12,335	-8,769	-1,233	-22,337
19 Minimum Price 70p " "	-178.2	-147.0	-85.3	-1,298.2	-1,708.7	-471.1	-201.6	-2,381.4	-3,500	-1,223	-710	-10,797	-16,229	-12,440	-1,859	-30,528
20 Minimum Price 20p Off and 60p On Trade	-4.6	-24.1	-4.0	-41.5	-74.2	-13.8	-33.2	-121.2	-77	-200	-34	-345	-656	-273	-306	-1,235
21 Minimum Price 30p Off and 80p On Trade	-19.4	-64.8	-13.3	-172.6	-270.1	-55.5	-87.7	-413.4	-357	-539	-111	-1,436	-2,442	-1,264	-809	-4,515
22 Minimum Price 40p Off and 100p On Trade	-55.2	-117.7	-31.0	-457.6	-661.5	-150.4	-160.1	-972.0	-1,047	-979	-258	-3,806	-6,090	-3,724	-1,476	-11,291
23 30p Minimum Price Beers Only	-0.1	-4.7	-2.7	-99.7	-107.2	+.0	-6.9	-114.0	-52	-39	-23	-829	-942	-185	-63	-1,190
24 30p Minimum Price Wines Only	-0.9	+1.3	+.0	+2.8	+3.2	-2.1	+2.8	+3.9	-24	+11	+	+23	+11	-83	+26	-46
25 30p Minimum Price Spirits Only	+0.8	-.1	+.6	+.0	+1.4	+3.2	+1.2	+5.8	-4	-1	+5	+	+	-2	+11	+10
26 30p Minimum Price Alcopops (RTDs) Only	+0.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0
27 Ban Off Trade Discounting if > 50%	+0.2	+.0	-.0	-.3	-.0	+.8	+.1	+.9	+1	+	-	-2	-1	+6	+1	+6
28 Ban Off Trade Discounting if > 40%	-1.3	-.7	-.6	-8.2	-10.7	-3.4	-.9	-15.0	-25	-6	-5	-68	-103	-90	-8	-201
29 Ban Off Trade Discounting if > 30%	-3.3	-1.9	-1.5	-22.3	-29.1	-8.8	-2.5	-40.5	-64	-16	-13	-186	-279	-235	-23	-537
30 Ban Off Trade Discounting if > 20%	-8.0	-4.7	-3.8	-54.6	-71.1	-21.3	-6.4	-98.8	-155	-39	-32	-454	-680	-566	-59	-1,305
31 Ban Off Trade Discounting if > 10%	-15.9	-9.8	-7.9	-111.5	-145.1	-42.5	-13.5	-201.1	-311	-81	-65	-928	-1,385	-1,134	-124	-2,644
32 Total Ban Off Trade Discounting	-27.6	-17.7	-14.0	-197.5	-256.8	-73.6	-24.6	-355.0	-541	-147	-116	-1,643	-2,447	-1,968	-227	-4,642
33 Ban Off Trade Discount if Reg Price <30p	+0.7	-.3	-.2	-8.3	-8.1	+2.3	-.1	-6.0	+1	-3	-2	-69	-72	+8	-1	-65

Table 36 Summary of % change in financial valuation harm reductions across pricing policies: England population (Scenarios 1 to 33)

% CHANGE FROM MODELLED BASELINE SUMMARY - TOTAL	Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)							
	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
Baseline Alcohol Attributable Harm (Estimated by Modelling zero consumption)	+1005	+2111	+872	+2568	+6556	+2911	+3002	+12469	+15280	+17556	+7252	+21355	+61443	+48796	+27690	+137929
Policy Scenario																
1 General Price +1%	-0.4%	-0.3%	-0.3%	-1.2%	-0.7%	-0.4%	-0.3%	-0.5%	-0.5%	-0.3%	-0.3%	-1.2%	-0.7%	-0.6%	-0.3%	-0.6%
2 General Price +10%	-4.3%	-3.3%	-3.3%	-11.7%	-6.8%	-4.1%	-3.3%	-5.3%	-5.1%	-3.3%	-3.3%	-11.7%	-6.7%	-5.8%	-3.3%	-5.7%
3 General Price +25%	-10.8%	-8.5%	-8.4%	-29.4%	-17.0%	-10.4%	-8.3%	-13.4%	-12.7%	-8.5%	-8.4%	-29.4%	-16.8%	-14.5%	-8.3%	-14.3%
4 Low Priced Off Trade Products +10%	-0.1%	-0.0%	-0.1%	-1.1%	-0.5%	-0.1%	-0.0%	-0.3%	-0.3%	-0.0%	-0.1%	-1.1%	-0.5%	-0.3%	-0.0%	-0.3%
5 Low Priced Off Trade Products +25%	-0.5%	-0.1%	-0.2%	-2.8%	-1.2%	-0.4%	-0.0%	-0.7%	-0.8%	-0.1%	-0.2%	-2.8%	-1.2%	-0.9%	-0.0%	-0.9%
6 Low Priced On Trade Products +10%	-0.5%	-0.9%	-0.4%	-1.0%	-0.8%	-0.5%	-0.9%	-0.7%	-0.6%	-0.9%	-0.4%	-1.0%	-0.8%	-0.6%	-0.9%	-0.7%
7 Low Priced On Trade Products +25%	-1.3%	-2.3%	-1.1%	-2.4%	-2.0%	-1.3%	-2.1%	-1.9%	-1.4%	-2.3%	-1.1%	-2.4%	-2.0%	-1.6%	-2.1%	-1.9%
8 All Low Priced Products +10%	-0.8%	-0.9%	-0.5%	-2.1%	-1.3%	-0.7%	-0.9%	-1.1%	-0.9%	-0.9%	-0.5%	-2.1%	-1.3%	-1.0%	-0.9%	-1.1%
9 All Low Priced Products +25%	-1.9%	-2.4%	-1.3%	-5.3%	-3.3%	-1.9%	-2.2%	-2.7%	-2.3%	-2.4%	-1.3%	-5.3%	-3.3%	-2.6%	-2.2%	-2.8%
10 Minimum Price 15p (Off and On Trade)	+0.1%	+0.0%	-0.0%	-0.1%	-0.0%	+0.1%	+0.0%	+0.0%	+0.0%	+0.0%	-0.0%	-0.1%	-0.0%	+0.0%	+0.0%	+0.0%
11 Minimum Price 20p " "	+0.0%	+0.0%	-0.0%	-0.6%	-0.2%	+0.1%	+0.0%	-0.1%	-0.0%	+0.0%	-0.0%	-0.6%	-0.2%	-0.0%	+0.0%	-0.1%
12 Minimum Price 25p	-0.0%	-0.1%	-0.1%	-1.7%	-0.7%	+0.0%	-0.0%	-0.4%	-0.2%	-0.1%	-0.1%	-1.7%	-0.7%	-0.2%	-0.0%	-0.4%
13 Minimum Price 30p	-0.4%	-0.2%	-0.2%	-3.8%	-1.6%	-0.3%	-0.1%	-1.0%	-0.8%	-0.2%	-0.2%	-3.8%	-1.6%	-0.8%	-0.1%	-1.0%
14 Minimum Price 35p	-1.2%	-0.4%	-0.5%	-7.1%	-3.2%	-1.0%	-0.3%	-2.0%	-1.8%	-0.4%	-0.5%	-7.1%	-3.1%	-2.0%	-0.3%	-2.2%
15 Minimum Price 40p	-2.5%	-0.8%	-1.1%	-11.8%	-5.4%	-2.2%	-0.7%	-3.5%	-3.6%	-0.8%	-1.1%	-11.8%	-5.3%	-4.0%	-0.7%	-3.9%
16 Minimum Price 45p	-4.3%	-1.5%	-2.0%	-18.0%	-8.4%	-3.8%	-1.4%	-5.7%	-6.0%	-1.5%	-2.0%	-18.0%	-8.4%	-6.7%	-1.4%	-6.4%
17 Minimum Price 50p	-6.6%	-2.4%	-3.3%	-25.3%	-12.1%	-5.9%	-2.2%	-8.3%	-9.0%	-2.4%	-3.3%	-25.3%	-12.1%	-10.1%	-2.2%	-9.4%
18 Minimum Price 60p	-12.2%	-4.6%	-6.5%	-40.3%	-20.0%	-11.0%	-4.5%	-14.2%	-16.0%	-4.6%	-6.5%	-40.3%	-20.1%	-18.0%	-4.5%	-16.2%
19 Minimum Price 70p " "	-17.7%	-7.0%	-9.8%	-50.6%	-26.1%	-16.2%	-6.7%	-19.1%	-22.9%	-7.0%	-9.8%	-50.6%	-26.4%	-25.5%	-6.7%	-22.1%
20 Minimum Price 20p Off and 60p On Trade	-0.5%	-1.1%	-0.5%	-1.6%	-1.1%	-0.5%	-1.1%	-1.0%	-0.5%	-1.1%	-0.5%	-1.6%	-1.1%	-0.6%	-1.1%	-0.9%
21 Minimum Price 30p Off and 80p On Trade	-1.9%	-3.1%	-1.5%	-6.7%	-4.1%	-1.9%	-2.9%	-3.3%	-2.3%	-3.1%	-1.5%	-6.7%	-4.0%	-2.6%	-2.9%	-3.3%
22 Minimum Price 40p Off and 100p On Trade	-5.5%	-5.6%	-3.6%	-17.8%	-10.1%	-5.2%	-5.3%	-7.8%	-6.9%	-5.6%	-3.6%	-17.8%	-9.9%	-7.6%	-5.3%	-8.2%
23 30p Minimum Price Beers Only	-0.0%	-0.2%	-0.3%	-3.9%	-1.6%	+0.0%	-0.2%	-0.9%	-0.3%	-0.2%	-0.3%	-3.9%	-1.5%	-0.4%	-0.2%	-0.9%
24 30p Minimum Price Wines Only	-0.1%	+0.1%	+0.0%	+0.1%	+0.0%	-0.1%	+0.1%	+0.0%	-0.2%	+0.1%	+0.0%	+0.1%	+0.0%	-0.2%	+0.1%	-0.0%
25 30p Minimum Price Spirits Only	+0.1%	-0.0%	+0.1%	+0.0%	+0.0%	+0.1%	+0.0%	+0.0%	-0.0%	-0.0%	+0.1%	+0.0%	+0.0%	-0.0%	+0.0%	+0.0%
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
27 Ban Off Trade Discounting if > 50%	+0.0%	+0.0%	-0.0%	-0.0%	-0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	-0.0%	-0.0%	-0.0%	+0.0%	+0.0%	+0.0%
28 Ban Off Trade Discounting if > 40%	-0.1%	-0.0%	-0.1%	-0.3%	-0.2%	-0.1%	-0.0%	-0.1%	-0.2%	-0.0%	-0.1%	-0.3%	-0.2%	-0.2%	-0.0%	-0.1%
29 Ban Off Trade Discounting if > 30%	-0.3%	-0.1%	-0.2%	-0.9%	-0.4%	-0.3%	-0.1%	-0.3%	-0.4%	-0.1%	-0.2%	-0.9%	-0.5%	-0.5%	-0.1%	-0.4%
30 Ban Off Trade Discounting if > 20%	-0.8%	-0.2%	-0.4%	-2.1%	-1.1%	-0.7%	-0.2%	-0.8%	-1.0%	-0.2%	-0.4%	-2.1%	-1.1%	-1.2%	-0.2%	-0.9%
31 Ban Off Trade Discounting if > 10%	-1.6%	-0.5%	-0.9%	-4.3%	-2.2%	-1.5%	-0.4%	-1.6%	-2.0%	-0.5%	-0.9%	-4.3%	-2.3%	-2.3%	-0.4%	-1.9%
32 Total Ban Off Trade Discounting	-2.7%	-0.8%	-1.6%	-7.7%	-3.9%	-2.5%	-0.8%	-2.8%	-3.5%	-0.8%	-1.6%	-7.7%	-4.0%	-4.0%	-0.8%	-3.4%
33 Ban Off Trade Discounting if Reg Price <30p	+0.1%	-0.0%	-0.0%	-0.3%	-0.1%	+0.1%	-0.0%	-0.0%	+0.0%	-0.0%	-0.0%	-0.3%	-0.1%	+0.0%	-0.0%	-0.0%

Figure 29 shows the total 10-year financial savings in £millions (shown as positive in this figure) associated with a selected subset of pricing policies.

It is clear that the savings increase steeply the higher the minimum price selected. A move from a 30p unit price via 35p to 40p corresponds to more than a tripling of the saving (from £1.4bn to £3.0bn and £5.4bn over the 10-year period).

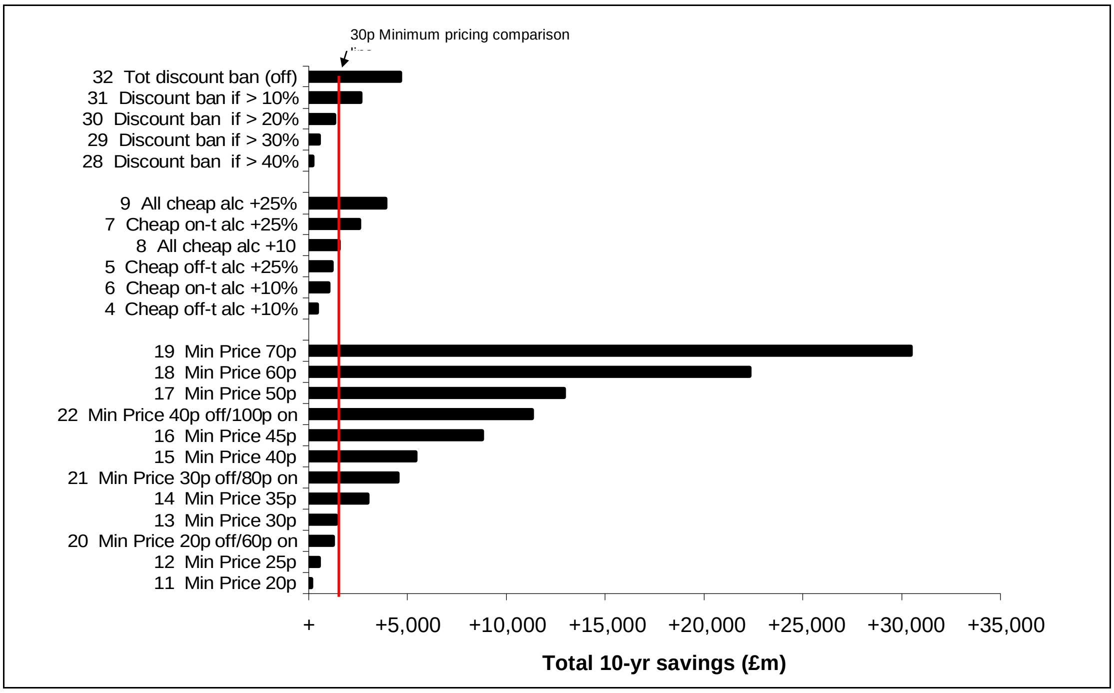


Figure 29 Comparison of financial harm saved across selected policies.

Introducing minimum unit prices in the on-trade as well as the off-trade is estimated to makes policies substantially more effective: because such policies would target lower priced alcohol in the on-trade as well as in the off-trade, mitigating some substitution effects from off-trade to on-trade. Adding an 80p on-trade minimum unit price to a 30p off-trade unit price changes the savings from £1.4bn to £4.5bn.

Policies targeting cheap alcohol and leading to a price increase of 10% in low priced alcohol, for example scenario 8, only have a relatively small effect, similar in scale to a 25p-30p minimum unit price. Policies targeting cheap alcohol specifically in the off-trade and leading to a 25% increase are only marginally more effective. However, policies leading to a 25% price increase for cheap alcohol in both on-trade and off-trade are estimated to be as effective as a 35-40p minimum unit price.

Finally, policies restricting off-trade discounts over a certain level are only effective if they cover a substantial proportion of the market. Bans on 50% and 40% discounts have small effects on harm reduction. A ban on any promotions larger than “20% off” is only as effective as a minimum unit price of 30p. Banning promotions larger than “10% off” would have a comparable impact to the minimum unit price of 35p. A total ban on price-based promotions is estimated to be still somewhat less effective than a 40p per unit minimum price.

3.1.6 DIFFERENTIAL EFFECTS OF DIFFERENT POLICIES ON MODERATE, HAZARDOUS AND HARMFUL DRINKERS

In this section, we present findings on the scale of effects for moderate, hazardous and harmful drinkers. An important question is whether those who are most affected in terms of additional expenditure on alcohol as a consequence of a policy are also those who benefit the most. Considerations for policy makers include: Which groups benefit most from the policy change in terms of avoided health harm? And, which groups are most affected in terms of their consumer expenditure?

Figure 30 shows the reductions of annual hospital admissions saved (at 10 years, i.e. after the full policy effect has been achieved) for the three consumption groups' moderate, hazardous and harmful for a selected subset of pricing policy options). Hospital admissions have been chosen as an exemplar here, but the pattern of savings is similar for other morbidity indicators. It is clear that, regardless of the policy scenario, the vast majority of avoided hospital admissions are those for harmful drinkers, followed by hazardous drinkers, and with small reductions for moderate drinkers.

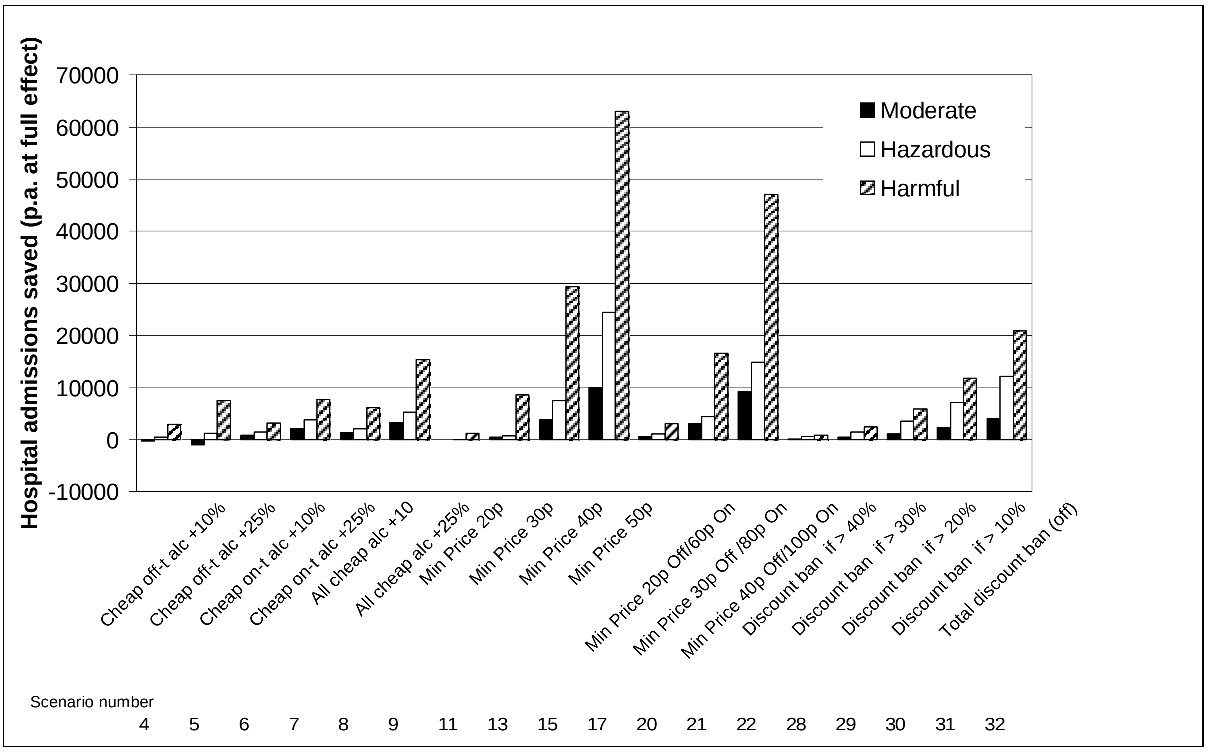


Figure 30: Hospital admissions saved per year for moderate, hazardous and harmful drinkers

Figure 31 shows a similar pattern across consumption groups for how much extra per year they each would spend on alcohol. Most of the extra spending is accounted for by harmful drinkers. The extra spending for moderate drinkers varies from £0.19 to £14 per year depending on the policy option, with most policies in the range of £2 to £5. Note that this is taking into consideration a reduction in consumption after prices change. If everyone chose to continue to drink at the same level, the extra costs would typically be around £5 per year, with a range of between £0.59 and £21. For hazardous and harmful drinkers, the additional annual expenditure is significantly more and varies substantially by policy option: For the highest impact policy analysed, hazardous drinkers are estimated to spend an additional £68 (£107 if they had not changed consumption) and harmful drinkers £169 (or £309 without consumption change).

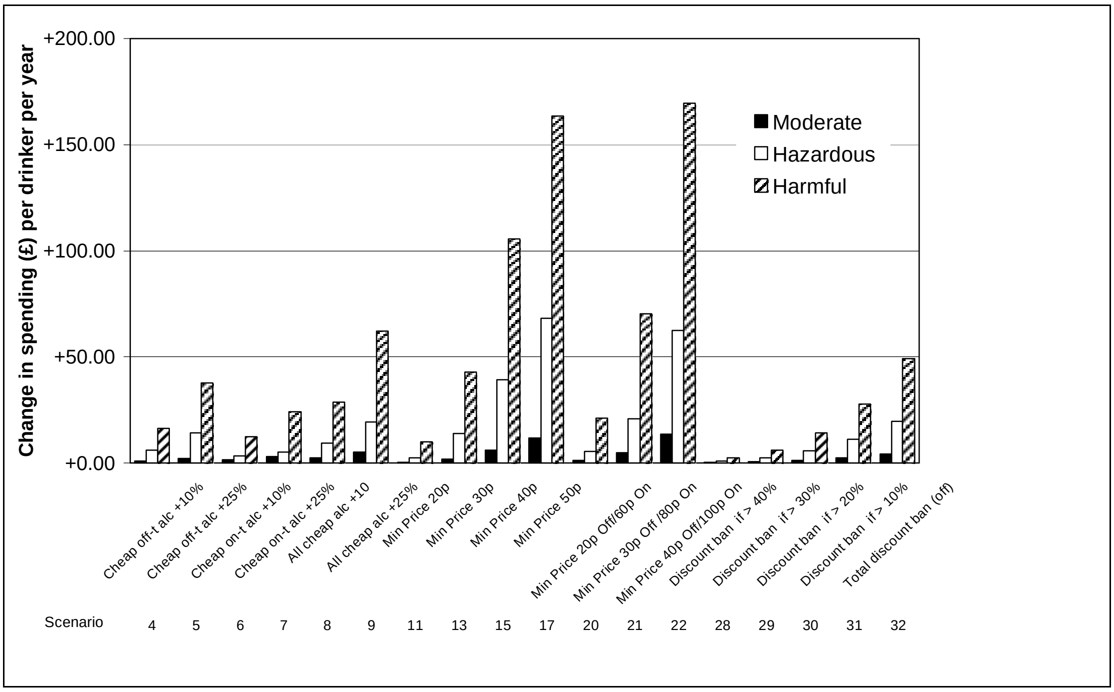


Figure 31: Extra spending on alcohol, per drinker per year, after policy change

3.1.7 SUMMARY TABLES FOR CONSUMPTION ANALYSIS OF PRICING POLICIES BY PRIORITY GROUP

Table 37 Summary of estimated effects of price policies on consumption, spending and sales – 11 to 18 year old drinkers

SUMMARY - 11 TO 18	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
1 General Price +1%	-0.5%	-1.3	-0.3	-1.3	-0.5	-3.4	+0.6	+4.1	-0.1	-0.0	+4.6	+0.5%	+3.29	+6.10
2 General Price +10%	-5.3%	-13.4	-3.5	-13.0	-4.5	-34.4	+5.9	+37.7	-1.0	-0.7	+42.0	+4.9%	+30.14	+60.98
3 General Price +25%	-13.4%	-34.4	-9.0	-32.6	-11.4	-87.4	+13.2	+82.1	-2.7	-4.1	+88.4	+10.4%	+63.45	+152.45
4 Low Priced Off Trade Products +10%	-0.4%	-1.4	-0.1	-1.1	+0.1	-2.5	+1.6	+0.9	-0.6	+0.4	+2.3	+0.3%	+1.63	+1.49
5 Low Priced Off Trade Products +25%	-1.0%	-3.6	-0.2	-2.7	+0.1	-6.3	+3.5	+2.3	-1.6	+1.0	+5.2	+0.6%	+3.76	+3.73
6 Low Priced On Trade Products +10%	-2.3%	-4.1	+0.3	-10.2	-0.7	-14.7	+0.1	+3.2	+0.1	-3.8	-0.3	-0.0%	-0.24	+8.91
7 Low Priced On Trade Products +25%	-5.7%	-10.3	+0.8	-25.7	-1.7	-36.9	+0.3	+3.5	+0.3	-10.4	-6.2	-0.7%	-4.46	+22.28
8 All Low Priced Products +10%	-2.6%	-5.6	+0.2	-11.3	-0.6	-17.3	+1.7	+4.2	-0.5	-3.4	+2.0	+0.2%	+1.40	+10.40
9 All Low Priced Products +25%	-6.7%	-14.1	+0.5	-28.4	-1.5	-43.5	+3.8	+5.9	-1.2	-9.5	-0.9	-0.1%	-0.66	+26.01
10 Minimum Price 15p (Off and On Trade)	-0.0%	+0.1	-0.4	-0.1	+0.0	-0.3	+0.2	+0.2	-0.1	+0.1	+0.4	+0.0%	+0.30	+0.16
11 Minimum Price 20p " "	-0.3%	+0.3	-1.1	-1.0	+0.1	-1.7	+0.9	+0.7	-0.5	+0.3	+1.5	+0.2%	+1.06	+0.79
12 Minimum Price 25p	-0.8%	-1.5	-1.7	-2.2	+0.2	-5.2	+2.3	+1.8	-1.3	+0.7	+3.5	+0.4%	+2.53	+2.57
13 Minimum Price 30p	-1.7%	-4.9	-2.2	-4.2	+0.3	-11.0	+4.2	+3.9	-2.7	+1.3	+6.7	+0.8%	+4.84	+5.79
14 Minimum Price 35p	-2.8%	-9.2	-2.8	-6.7	+0.5	-18.3	+6.0	+7.1	-4.5	+2.1	+10.7	+1.3%	+7.70	+10.58
15 Minimum Price 40p	-4.0%	-14.2	-3.2	-9.5	+0.6	-26.2	+7.6	+10.9	-6.4	+3.0	+15.2	+1.8%	+10.90	+16.84
16 Minimum Price 45p	-5.5%	-19.5	-3.9	-13.2	+0.7	-36.0	+9.0	+15.3	-8.6	+3.7	+19.5	+2.3%	+14.01	+24.67
17 Minimum Price 50p	-7.3%	-25.3	-5.5	-17.1	+0.7	-47.3	+9.8	+20.4	-11.1	+4.5	+23.5	+2.8%	+16.88	+34.04
18 Minimum Price 60p	-10.7%	-37.1	-10.5	-23.1	+0.7	-70.0	+10.4	+30.4	-15.9	+5.5	+30.5	+3.6%	+21.87	+55.52
19 Minimum Price 70p " "	-14.2%	-43.0	-16.7	-33.2	+0.5	-92.4	+11.3	+38.9	-19.5	+4.7	+35.4	+4.2%	+25.40	+80.34
20 Minimum Price 20p Off and 60p On Trade	-2.9%	-11.4	-0.8	-6.4	-0.5	-19.1	+1.1	+10.5	-0.3	-2.4	+8.9	+1.0%	+6.39	+16.26
21 Minimum Price 30p Off and 80p On Trade	-8.9%	-28.8	-1.3	-26.4	-1.7	-58.2	+4.6	+15.2	-2.2	-9.7	+7.9	+0.9%	+5.68	+42.77
22 Minimum Price 40p Off and 100p On Trade	-16.1%	-58.8	-1.4	-40.7	-4.4	-105.2	+8.7	+27.6	-5.5	-15.3	+15.5	+1.8%	+11.14	+96.05
23 30p Minimum Price Beers Only	-0.9%	-6.6	+0.3	+0.1	+0.1	-6.0	+2.3	+2.4	-1.0	+0.6	+4.3	+0.5%	+3.07	+3.67
24 30p Minimum Price Wines Only	-0.2%	+1.0	-2.8	+0.1	+0.1	-1.6	+0.5	+1.0	-0.6	+0.4	+1.3	+0.2%	+0.93	+0.69
25 30p Minimum Price Spirits Only	-0.5%	+0.7	+0.4	-4.4	+0.0	-3.3	+1.4	+0.6	-1.0	+0.2	+1.2	+0.1%	+0.84	+1.42
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0%	+0.00	+0.00
27 Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.0	-0.0	+0.0	-0.0	+0.0	+0.0	-0.0	+0.0	+0.0	+0.0%	+0.02	+0.02
28 Ban Off Trade Discounting if > 40%	-0.0%	-0.1	-0.2	-0.0	+0.0	-0.3	+0.2	+0.1	-0.1	+0.0	+0.3	+0.0%	+0.20	+0.25
29 Ban Off Trade Discounting if > 30%	-0.1%	-0.3	-0.6	-0.0	+0.0	-0.9	+0.6	+0.2	-0.2	+0.1	+0.8	+0.1%	+0.55	+0.71
30 Ban Off Trade Discounting if > 20%	-0.3%	-0.7	-1.3	-0.0	+0.0	-2.0	+1.4	+0.5	-0.4	+0.2	+1.8	+0.2%	+1.27	+1.68
31 Ban Off Trade Discounting if > 10%	-0.6%	-1.4	-2.5	-0.1	+0.0	-4.0	+2.7	+1.1	-0.7	+0.4	+3.5	+0.4%	+2.53	+3.41
32 Total Ban Off Trade Discounting	-1.1%	-2.6	-4.0	-0.4	-0.0	-7.0	+4.8	+2.0	-1.3	+0.8	+6.4	+0.8%	+4.61	+6.23
33 Ban Off Trade Discount if Reg Price <30p	-0.1%	-0.7	-0.0	-0.1	+0.0	-0.8	+0.4	+0.2	-0.2	+0.1	+0.6	+0.1%	+0.40	+0.40

Table 38 Summary of estimated effects of price policies on consumption, spending and sales – 18 to 24 year old hazardous drinkers

SUMMARY - HAZARDOUS 18 to 24	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
1 General Price +1%	-0.6%	-3.0	-0.9	-3.8	-0.7	-8.3	+0.8	+4.1	-0.1	-0.2	+4.6	+0.5%	+6.50	+13.19
2 General Price +10%	-6.0%	-30.4	-9.3	-38.3	-6.5	-84.4	+7.8	+37.3	-1.1	-2.7	+41.3	+4.4%	+57.86	+131.87
3 General Price +25%	-15.4%	-79.2	-24.2	-96.6	-16.4	-216.4	+17.4	+77.5	-3.4	-10.1	+81.4	+8.6%	+114.03	+329.68
4 Low Priced Off Trade Products +10%	+0.0%	+1.8	-0.4	-0.9	+0.1	+0.6	+1.3	+2.3	-0.2	+0.9	+4.2	+0.5%	+5.94	+2.13
5 Low Priced Off Trade Products +25%	+0.1%	+4.4	-0.9	-2.3	+0.3	+1.5	+3.0	+5.7	-0.6	+2.2	+10.3	+1.1%	+14.39	+5.33
6 Low Priced On Trade Products +10%	-2.4%	-4.6	+0.9	-30.0	-0.6	-34.3	+0.3	+0.6	+0.2	-5.5	-4.4	-0.5%	-6.20	+14.11
7 Low Priced On Trade Products +25%	-6.1%	-11.4	+2.2	-75.7	-1.5	-86.4	+0.7	-4.1	+0.6	-14.8	-17.7	-1.9%	-24.80	+35.27
8 All Low Priced Products +10%	-2.4%	-2.9	+0.5	-30.9	-0.5	-33.7	+1.6	+2.9	+0.0	-4.6	-0.2	-0.0%	-0.24	+16.24
9 All Low Priced Products +25%	-6.1%	-7.4	+1.3	-78.1	-1.2	-85.3	+3.7	+1.6	-0.0	-12.7	-7.4	-0.8%	-10.36	+40.60
10 Minimum Price 15p (Off and On Trade)	-0.0%	-0.3	+0.1	+0.1	+0.0	-0.0	+0.2	+0.3	-0.0	+0.1	+0.7	+0.1%	+0.92	+0.35
11 Minimum Price 20p " "	+0.0%	-0.2	+0.1	+0.2	+0.1	+0.2	+0.7	+1.2	-0.1	+0.5	+2.3	+0.2%	+3.20	+1.13
12 Minimum Price 25p	+0.0%	-0.4	+0.4	+0.2	+0.2	+0.4	+1.5	+2.6	-0.2	+1.0	+4.8	+0.5%	+6.79	+2.48
13 Minimum Price 30p	-0.0%	-0.2	+0.5	-1.4	+0.4	-0.6	+3.1	+5.4	-0.5	+1.9	+9.9	+1.1%	+13.85	+5.94
14 Minimum Price 35p	-0.2%	+1.5	-0.5	-4.7	+0.8	-2.9	+5.6	+10.7	-1.3	+3.6	+18.5	+2.0%	+25.97	+13.02
15 Minimum Price 40p	-0.7%	+1.4	-2.3	-9.6	+1.1	-9.4	+8.6	+16.8	-2.5	+5.4	+28.3	+3.0%	+39.69	+24.16
16 Minimum Price 45p	-1.6%	-0.1	-6.1	-18.2	+1.4	-23.0	+12.0	+23.5	-4.2	+6.9	+38.2	+4.1%	+53.46	+39.76
17 Minimum Price 50p	-3.0%	-3.0	-11.7	-28.7	+1.7	-41.8	+15.1	+30.6	-6.4	+8.2	+47.5	+5.0%	+66.58	+59.03
18 Minimum Price 60p	-6.4%	-8.9	-27.6	-55.7	+2.1	-90.2	+18.9	+45.1	-12.0	+10.0	+61.9	+6.6%	+86.75	+104.24
19 Minimum Price 70p " "	-10.5%	-7.6	-47.8	-95.2	+2.3	-148.3	+20.5	+56.8	-17.5	+9.1	+68.8	+7.3%	+96.37	+157.61
20 Minimum Price 20p Off and 60p On Trade	-2.8%	-9.7	+1.7	-31.4	-0.4	-39.9	+1.1	+3.8	+0.3	-5.5	-0.3	-0.0%	-0.35	+21.23
21 Minimum Price 30p Off and 80p On Trade	-7.2%	-22.7	+4.3	-82.1	-1.4	-101.8	+4.2	+4.5	+0.4	-14.5	-5.4	-0.6%	-7.53	+61.17
22 Minimum Price 40p Off and 100p On Trade	-9.8%	-50.7	+4.6	-88.9	-2.9	-137.9	+10.8	+29.5	-0.8	-12.1	+27.3	+2.9%	+38.27	+151.84
23 30p Minimum Price Beers Only	-0.1%	-4.9	+2.8	+0.7	+0.3	-1.1	+1.9	+3.2	-0.3	+1.2	+5.9	+0.6%	+8.26	+3.75
24 30p Minimum Price Wines Only	+0.1%	+3.5	-2.8	+0.2	+0.1	+1.0	+0.8	+1.7	-0.1	+0.7	+3.0	+0.3%	+4.22	+1.41
25 30p Minimum Price Spirits Only	-0.0%	+1.2	+0.5	-2.2	+0.0	-0.5	+0.5	+0.5	-0.1	+0.1	+1.0	+0.1%	+1.36	+0.77
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0%	+0.00	+0.00
27 Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.0	+0.0	+0.0	-0.0	+0.0	+0.0	-0.0	+0.0	+0.0	+0.0%	+0.04	+0.03
28 Ban Off Trade Discounting if > 40%	-0.0%	+0.1	-0.6	+0.0	+0.0	-0.5	+0.2	+0.2	-0.0	+0.1	+0.4	+0.0%	+0.57	+0.58
29 Ban Off Trade Discounting if > 30%	-0.1%	+0.2	-1.5	+0.0	+0.0	-1.3	+0.6	+0.4	-0.1	+0.2	+1.1	+0.1%	+1.52	+1.57
30 Ban Off Trade Discounting if > 20%	-0.2%	+0.4	-3.7	+0.0	+0.0	-3.2	+1.5	+1.0	-0.3	+0.4	+2.6	+0.3%	+3.58	+3.88
31 Ban Off Trade Discounting if > 10%	-0.5%	+0.4	-7.0	-0.3	+0.1	-6.8	+3.1	+2.0	-0.7	+0.8	+5.2	+0.6%	+7.31	+8.18
32 Total Ban Off Trade Discounting	-0.9%	+0.2	-11.4	-1.2	-0.0	-12.5	+5.8	+3.9	-1.4	+1.5	+9.7	+1.0%	+13.60	+15.41
33 Ban Off Trade Discount if Reg Price <30p	-0.0%	-0.1	+0.1	+0.0	+0.0	-0.0	+0.2	+0.3	-0.0	+0.1	+0.6	+0.1%	+0.81	+0.31

Table 39 Summary of estimated effects of price policies on consumption, spending and sales – moderate drinkers

SUMMARY - MODERATE	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
1 General Price +1%	-0.3%	-0.3	-0.4	-0.2	-0.0	-1.0	+9.0	+23.1	-0.5	+2.7	+34.2	+0.7%	+1.79	+2.57
2 General Price +10%	-3.5%	-3.5	-4.4	-2.2	-0.2	-10.3	+85.6	+222.4	-6.3	+25.0	+326.8	+6.6%	+17.12	+25.75
3 General Price +25%	-8.9%	-9.0	-11.0	-5.5	-0.6	-26.1	+195.4	+521.3	-19.6	+55.8	+753.0	+15.3%	+39.44	+64.37
4 Low Priced Off Trade Products +10%	-0.1%	+0.1	-0.3	-0.2	+0.0	-0.4	+9.5	+5.8	-1.0	+2.2	+16.5	+0.3%	+0.86	+0.59
5 Low Priced Off Trade Products +25%	-0.3%	+0.3	-0.7	-0.6	+0.0	-0.9	+22.2	+14.5	-2.8	+5.5	+39.4	+0.8%	+2.06	+1.49
6 Low Priced On Trade Products +10%	-0.4%	-0.6	+0.2	-0.8	+0.0	-1.2	+1.0	+25.7	+0.9	-0.8	+26.8	+0.5%	+1.40	+2.00
7 Low Priced On Trade Products +25%	-1.0%	-1.6	+0.5	-2.0	+0.0	-3.0	+2.6	+57.2	+2.2	-3.2	+58.8	+1.2%	+3.08	+5.01
8 All Low Priced Products +10%	-0.5%	-0.5	-0.1	-1.0	+0.0	-1.6	+10.6	+31.5	-0.1	+1.5	+43.4	+0.9%	+2.27	+2.60
9 All Low Priced Products +25%	-1.3%	-1.3	-0.2	-2.5	+0.0	-4.0	+24.8	+72.1	-0.7	+2.3	+98.5	+2.0%	+5.16	+6.50
10 Minimum Price 15p (Off and On Trade)	-0.0%	-0.0	-0.0	-0.0	+0.0	-0.0	+1.1	+0.7	-0.1	+0.3	+2.0	+0.0%	+0.11	+0.06
11 Minimum Price 20p " "	-0.0%	-0.0	+0.0	-0.0	+0.0	-0.1	+3.1	+2.4	-0.2	+0.9	+6.2	+0.1%	+0.33	+0.18
12 Minimum Price 25p	-0.1%	-0.1	+0.0	-0.1	+0.0	-0.2	+7.1	+5.6	-0.4	+2.1	+14.4	+0.3%	+0.75	+0.43
13 Minimum Price 30p	-0.2%	-0.0	-0.2	-0.4	+0.0	-0.5	+18.3	+14.2	-1.7	+5.2	+36.0	+0.7%	+1.89	+1.20
14 Minimum Price 35p	-0.6%	+0.1	-0.9	-0.9	+0.0	-1.6	+38.2	+27.4	-4.9	+10.0	+70.8	+1.4%	+3.71	+2.87
15 Minimum Price 40p	-1.2%	+0.1	-2.0	-1.7	+0.1	-3.5	+65.7	+42.4	-9.9	+15.4	+113.6	+2.3%	+5.95	+5.50
16 Minimum Price 45p	-2.2%	-0.1	-3.7	-2.7	+0.1	-6.5	+102.5	+59.7	-17.0	+21.1	+166.3	+3.4%	+8.71	+9.39
17 Minimum Price 50p	-3.5%	-0.4	-6.1	-3.9	+0.1	-10.4	+145.4	+79.1	-26.4	+27.3	+225.4	+4.6%	+11.81	+14.45
18 Minimum Price 60p	-7.1%	-1.5	-12.7	-6.8	+0.1	-20.9	+233.2	+123.9	-53.2	+40.0	+343.8	+7.0%	+18.01	+27.39
19 Minimum Price 70p " "	-11.3%	-3.0	-20.4	-10.1	+0.2	-33.4	+296.2	+178.4	-89.7	+52.7	+437.6	+8.9%	+22.92	+42.71
20 Minimum Price 20p Off and 60p On Trade	-0.3%	-0.4	+0.1	-0.6	+0.0	-0.8	+3.9	+18.0	+0.5	+0.1	+22.5	+0.5%	+1.18	+1.39
21 Minimum Price 30p Off and 80p On Trade	-1.3%	-1.6	+0.4	-2.6	+0.1	-3.8	+21.3	+70.4	+0.8	+0.7	+93.3	+1.9%	+4.88	+6.31
22 Minimum Price 40p Off and 100p On Trade	-3.9%	-4.8	-0.7	-6.0	+0.1	-11.5	+72.6	+183.9	-4.5	+7.1	+259.1	+5.3%	+13.57	+20.60
23 30p Minimum Price Beers Only	-0.1%	-0.6	+0.3	+0.1	+0.0	-0.2	+8.0	+7.4	-0.4	+2.7	+17.8	+0.4%	+0.93	+0.56
24 30p Minimum Price Wines Only	-0.1%	+0.2	-0.6	+0.0	+0.0	-0.4	+5.8	+2.5	-0.9	+0.9	+8.3	+0.2%	+0.43	+0.42
25 30p Minimum Price Spirits Only	+0.0%	+0.3	+0.2	-0.5	+0.0	+0.0	+4.3	+3.8	-0.5	+1.4	+9.0	+0.2%	+0.47	+0.23
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0%	+0.00	+0.00
27 Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.0	-0.0	-0.0	-0.0	+0.1	+0.1	-0.0	+0.0	+0.2	+0.0%	+0.01	+0.01
28 Ban Off Trade Discounting if > 40%	-0.1%	+0.0	-0.2	+0.0	+0.0	-0.2	+3.3	+0.4	-0.3	+0.2	+3.6	+0.1%	+0.19	+0.28
29 Ban Off Trade Discounting if > 30%	-0.2%	+0.0	-0.6	+0.0	+0.0	-0.6	+8.7	+1.0	-0.7	+0.4	+9.4	+0.2%	+0.49	+0.74
30 Ban Off Trade Discounting if > 20%	-0.5%	-0.0	-1.5	-0.0	+0.0	-1.5	+20.6	+2.4	-1.8	+0.9	+22.2	+0.5%	+1.16	+1.80
31 Ban Off Trade Discounting if > 10%	-1.0%	-0.1	-2.9	-0.1	+0.0	-3.1	+41.7	+5.0	-3.9	+1.9	+44.7	+0.9%	+2.34	+3.71
32 Total Ban Off Trade Discounting	-1.8%	-0.2	-4.8	-0.4	-0.0	-5.4	+73.8	+10.0	-7.3	+3.7	+80.1	+1.6%	+4.20	+6.70
33 Ban Off Trade Discount if Reg Price <30p	-0.0%	-0.0	-0.0	-0.0	+0.0	-0.0	+1.2	+0.8	-0.1	+0.3	+2.2	+0.0%	+0.12	+0.07

Table 40 Summary of estimated effects of price policies on consumption, spending and sales – hazardous drinkers

SUMMARY - HAZARDOUS	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
1 General Price +1%	-0.5%	-2.4	-2.4	-1.5	-0.2	-6.4	+17.2	+21.7	-1.5	+0.4	+37.8	+0.6%	+5.50	+9.79
2 General Price +10%	-4.7%	-24.7	-24.4	-14.9	-1.5	-65.5	+161.4	+200.1	-18.2	+1.0	+344.3	+5.1%	+50.16	+97.87
3 General Price +25%	-12.1%	-64.0	-64.3	-37.6	-3.9	-169.8	+358.2	+428.3	-58.2	-12.4	+715.9	+10.7%	+104.30	+244.66
4 Low Priced Off Trade Products +10%	-0.1%	-0.4	+0.7	-1.7	+0.0	-1.4	+23.8	+12.8	-0.8	+5.0	+40.7	+0.6%	+5.93	+3.50
5 Low Priced Off Trade Products +25%	-0.2%	-1.1	+1.7	-4.2	+0.1	-3.5	+55.1	+31.9	-2.9	+12.5	+96.6	+1.4%	+14.07	+8.75
6 Low Priced On Trade Products +10%	-0.6%	-4.2	+2.8	-7.1	-0.2	-8.7	+6.3	+24.5	+5.4	-12.5	+23.6	+0.4%	+3.44	+8.85
7 Low Priced On Trade Products +25%	-1.6%	-10.6	+7.1	-18.0	-0.4	-21.9	+15.6	+40.9	+13.6	-35.2	+34.9	+0.5%	+5.09	+22.11
8 All Low Priced Products +10%	-0.7%	-4.7	+3.5	-8.8	-0.1	-10.1	+30.1	+37.4	+4.6	-7.6	+64.5	+1.0%	+9.39	+12.35
9 All Low Priced Products +25%	-1.8%	-12.0	+8.8	-22.2	-0.3	-25.8	+70.9	+73.4	+10.6	-22.9	+132.0	+2.0%	+19.23	+30.86
10 Minimum Price 15p (Off and On Trade)	-0.0%	-0.3	+0.3	-0.2	+0.0	-0.2	+3.1	+1.9	-0.0	+0.7	+5.6	+0.1%	+0.81	+0.42
11 Minimum Price 20p " "	-0.0%	-1.2	+0.9	-0.3	+0.0	-0.6	+9.7	+5.5	-0.1	+2.1	+17.2	+0.3%	+2.51	+1.36
12 Minimum Price 25p	-0.1%	-3.0	+2.4	-0.8	+0.1	-1.4	+23.3	+13.5	-0.2	+5.1	+41.7	+0.6%	+6.08	+3.42
13 Minimum Price 30p	-0.3%	-5.4	+4.8	-3.0	+0.1	-3.6	+52.4	+31.8	-1.7	+11.9	+94.3	+1.4%	+13.75	+8.44
14 Minimum Price 35p	-0.7%	-8.1	+5.0	-7.5	+0.2	-10.4	+99.5	+61.2	-8.4	+22.5	+174.8	+2.6%	+25.47	+19.08
15 Minimum Price 40p	-1.8%	-12.6	+1.7	-14.0	+0.2	-24.7	+161.1	+95.1	-22.2	+34.2	+268.2	+4.0%	+39.07	+36.39
16 Minimum Price 45p	-3.5%	-18.8	-7.9	-22.4	+0.3	-48.8	+236.2	+133.0	-45.4	+46.2	+370.0	+5.5%	+53.90	+61.41
17 Minimum Price 50p	-5.9%	-26.4	-24.2	-31.7	+0.3	-82.0	+314.0	+174.2	-78.8	+58.5	+467.8	+7.0%	+68.16	+93.11
18 Minimum Price 60p	-12.1%	-43.7	-73.0	-53.0	+0.3	-169.4	+432.2	+263.0	-175.4	+81.8	+601.6	+9.0%	+87.65	+170.67
19 Minimum Price 70p " "	-18.5%	-49.9	-134.5	-75.2	+0.3	-259.4	+494.0	+356.3	-280.7	+99.4	+669.1	+10.0%	+97.48	+259.17
20 Minimum Price 20p Off and 60p On Trade	-0.6%	-5.5	+3.5	-6.7	-0.1	-8.8	+15.4	+27.3	+4.7	-9.6	+37.9	+0.6%	+5.51	+9.21
21 Minimum Price 30p Off and 80p On Trade	-1.9%	-19.3	+13.6	-21.3	-0.3	-27.3	+72.2	+81.8	+15.0	-26.0	+143.0	+2.1%	+20.83	+35.13
22 Minimum Price 40p Off and 100p On Trade	-4.5%	-50.7	+20.5	-32.7	-0.7	-63.6	+205.4	+228.0	+13.2	-18.3	+428.4	+6.4%	+62.42	+106.66
23 30p Minimum Price Beers Only	-0.1%	-9.2	+6.9	+0.3	+0.0	-2.0	+29.8	+16.8	+1.2	+6.1	+53.9	+0.8%	+7.86	+4.85
24 30p Minimum Price Wines Only	-0.1%	+2.1	-4.2	+0.1	+0.0	-2.0	+11.5	+8.0	-2.4	+3.2	+20.3	+0.3%	+2.96	+2.22
25 30p Minimum Price Spirits Only	+0.0%	+1.8	+2.1	-3.5	+0.0	+0.4	+11.0	+7.0	-0.5	+2.5	+20.0	+0.3%	+2.91	+1.37
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0%	+0.00	+0.00
27 Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.1	+0.0	+0.0	-0.1	+0.3	+0.1	-0.0	+0.0	+0.3	+0.0%	+0.05	+0.06
28 Ban Off Trade Discounting if > 40%	-0.1%	-0.0	-2.0	+0.0	+0.0	-2.0	+6.6	+0.9	-1.4	+0.4	+6.5	+0.1%	+0.95	+1.76
29 Ban Off Trade Discounting if > 30%	-0.4%	-0.2	-5.0	+0.0	+0.0	-5.2	+17.3	+2.4	-3.7	+1.0	+17.0	+0.3%	+2.48	+4.60
30 Ban Off Trade Discounting if > 20%	-0.9%	-0.6	-11.8	-0.1	+0.0	-12.5	+40.5	+5.6	-8.9	+2.2	+39.4	+0.6%	+5.74	+11.01
31 Ban Off Trade Discounting if > 10%	-1.8%	-1.5	-22.9	-0.8	-0.0	-25.2	+79.9	+11.6	-18.5	+4.5	+77.5	+1.2%	+11.29	+22.33
32 Total Ban Off Trade Discounting	-3.1%	-3.7	-37.2	-2.5	-0.1	-43.5	+136.3	+21.8	-33.0	+8.5	+133.6	+2.0%	+19.46	+39.13
33 Ban Off Trade Discount if Reg Price <30p	-0.0%	-0.6	+0.4	-0.0	+0.0	-0.2	+3.8	+1.8	+0.1	+0.7	+6.4	+0.1%	+0.94	+0.53

Table 41 Summary of estimated effects of price policies on consumption, spending and sales – harmful drinkers

SUMMARY - HARMFUL	**Mean annual consumption per drinker (units)**						**Total spending on alcohol (£ millions)**						**Per drinker (£ p)**	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
1 General Price +1%	-0.4%	-7.4	-5.2	-3.0	-0.5	-16.2	+15.3	+15.1	-1.6	+0.4	+29.2	+0.6%	+12.69	+22.33
2 General Price +10%	-4.5%	-76.1	-53.7	-30.5	-5.1	-165.5	+143.9	+139.5	-18.8	+1.7	+266.4	+5.2%	+115.88	+223.30
3 General Price +25%	-11.8%	-197.2	-141.9	-76.9	-12.8	-428.8	+319.9	+299.3	-57.8	-6.3	+555.1	+10.8%	+241.43	+558.26
4 Low Priced Off Trade Products +10%	-0.4%	-10.2	+0.5	-6.2	+0.1	-15.9	+27.0	+10.5	-4.3	+4.3	+37.5	+0.7%	+16.32	+13.54
5 Low Priced Off Trade Products +25%	-1.1%	-25.6	+1.1	-15.6	+0.2	-40.0	+61.8	+26.3	-11.8	+10.6	+87.0	+1.7%	+37.83	+33.84
6 Low Priced On Trade Products +10%	-0.4%	-10.3	+6.3	-9.4	-0.3	-13.8	+5.1	+24.3	+4.7	-5.8	+28.3	+0.6%	+12.33	+21.28
7 Low Priced On Trade Products +25%	-0.9%	-25.7	+15.8	-23.8	-0.8	-34.6	+12.7	+47.5	+11.8	-16.9	+55.1	+1.1%	+23.97	+53.20
8 All Low Priced Products +10%	-0.8%	-20.7	+6.8	-15.7	-0.2	-29.9	+32.2	+35.0	+0.4	-1.5	+66.0	+1.3%	+28.70	+34.81
9 All Low Priced Products +25%	-2.1%	-52.7	+16.8	-39.5	-0.6	-75.9	+74.8	+74.4	-0.2	-6.4	+142.6	+2.8%	+62.01	+87.04
10 Minimum Price 15p (Off and On Trade)	-0.0%	-0.2	-0.2	-0.6	+0.0	-0.9	+4.0	+3.5	-0.5	+1.4	+8.4	+0.2%	+3.63	+1.78
11 Minimum Price 20p " "	-0.2%	-5.9	+1.0	-1.3	+0.1	-6.2	+13.2	+8.3	-1.8	+3.3	+23.0	+0.4%	+10.01	+6.45
12 Minimum Price 25p	-0.5%	-20.4	+4.0	-3.3	+0.2	-19.5	+31.6	+17.0	-5.2	+6.5	+50.0	+1.0%	+21.75	+16.82
13 Minimum Price 30p	-1.3%	-44.4	+8.5	-11.1	+0.3	-46.7	+65.0	+34.1	-13.4	+13.0	+98.8	+1.9%	+42.97	+38.38
14 Minimum Price 35p	-2.6%	-73.5	+5.9	-27.0	+0.5	-94.1	+113.6	+60.6	-29.5	+22.8	+167.5	+3.3%	+72.86	+78.31
15 Minimum Price 40p	-4.5%	-110.6	-6.4	-48.1	+0.7	-164.5	+172.2	+90.5	-53.8	+33.7	+242.7	+4.7%	+105.54	+137.75
16 Minimum Price 45p	-7.1%	-154.5	-32.2	-73.5	+0.7	-259.4	+234.6	+123.5	-87.2	+45.0	+315.8	+6.2%	+137.37	+215.93
17 Minimum Price 50p	-10.3%	-203.3	-72.4	-101.1	+0.8	-376.0	+290.0	+159.5	-130.4	+56.6	+375.7	+7.3%	+163.39	+309.46
18 Minimum Price 60p	-17.7%	-298.9	-185.5	-161.0	+0.7	-644.7	+350.5	+237.7	-238.9	+79.4	+428.7	+8.4%	+186.46	+526.30
19 Minimum Price 70p " "	-24.1%	-334.1	-324.5	-218.1	-0.1	-876.8	+382.4	+321.9	-336.9	+99.5	+466.9	+9.1%	+203.08	+768.97
20 Minimum Price 20p Off and 60p On Trade	-0.6%	-17.3	+6.2	-10.3	+0.0	-21.4	+17.5	+31.2	+2.1	-2.5	+48.3	+0.9%	+20.99	+26.47
21 Minimum Price 30p Off and 80p On Trade	-2.5%	-80.1	+26.7	-36.0	-0.3	-89.6	+80.3	+88.4	+0.1	-6.9	+161.8	+3.2%	+70.38	+103.66
22 Minimum Price 40p Off and 100p On Trade	-6.9%	-210.3	+34.2	-72.6	-1.0	-249.8	+208.0	+207.5	-24.8	-0.8	+390.0	+7.6%	+169.61	+308.68
23 30p Minimum Price Beers Only	-1.2%	-61.3	+17.6	+0.8	+0.1	-42.7	+41.8	+14.0	-8.9	+4.9	+51.8	+1.0%	+22.54	+26.84
24 30p Minimum Price Wines Only	-0.0%	+11.9	-13.7	+0.5	+0.2	-1.0	+11.7	+14.0	-2.1	+5.7	+29.3	+0.6%	+12.74	+6.64
25 30p Minimum Price Spirits Only	-0.1%	+5.3	+4.5	-12.4	+0.0	-2.6	+11.3	+6.1	-2.3	+2.4	+17.5	+0.3%	+7.61	+4.91
26 30p Minimum Price Alcopops (RTDs) Only	+0.0%	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0%	+0.00	+0.00
27 Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.2	+0.0	+0.0	-0.2	+0.3	+0.1	-0.0	+0.0	+0.4	+0.0%	+0.16	+0.18
28 Ban Off Trade Discounting if > 40%	-0.1%	-0.6	-4.3	+0.0	+0.0	-4.9	+5.3	+0.8	-1.2	+0.3	+5.3	+0.1%	+2.29	+4.08
29 Ban Off Trade Discounting if > 30%	-0.4%	-2.3	-10.9	-0.0	-0.0	-13.2	+14.1	+2.0	-3.1	+0.8	+13.8	+0.3%	+5.99	+10.85
30 Ban Off Trade Discounting if > 20%	-0.9%	-5.8	-26.0	-0.4	-0.0	-32.2	+33.6	+4.7	-7.8	+1.9	+32.3	+0.6%	+14.06	+26.47
31 Ban Off Trade Discounting if > 10%	-1.8%	-13.1	-50.3	-2.3	-0.1	-65.8	+67.0	+9.5	-16.3	+3.8	+64.0	+1.2%	+27.83	+54.21
32 Total Ban Off Trade Discounting	-3.2%	-26.2	-82.6	-7.1	-0.8	-116.7	+117.5	+17.9	-29.7	+7.2	+112.9	+2.2%	+49.10	+97.67
33 Ban Off Trade Discount if Reg Price <30p	-0.1%	-4.5	+0.9	-0.2	+0.0	-3.8	+5.2	+1.6	-0.8	+0.7	+6.8	+0.1%	+2.94	+2.59

3.1.8 SUMMARY TABLES FOR HEALTH, CRIME AND EMPLOYMENT HARMS ANALYSES OF PRICING POLICIES BY PRIORITY GROUP

Table 42 Summary of estimated effects of policies on health, crime and employment alcohol related harm – 11 to 18 year olds

SUMMARY - 11 TO 18	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
1 General Price +1%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.5	-1.1	-1.9	-0.0	-1.5	-0.0
2 General Price +10%	-3	-0.0	-0.3	-0.4	-0.1	-3	-0.1	-0.3	-0.5	-1.4	-1.8	-5.5	-11.5	-18.8	-0.2	-15.0	-0.3
3 General Price +25%	-8	-0.0	-0.8	-1.1	-0.4	-8	-0.2	-0.8	-1.2	-3.5	-4.7	-14.0	-29.3	-47.9	-0.5	-38.2	-0.7
4 Low Priced Off Trade Products +10%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.4	-0.7	-0.0	-0.7	-0.0
5 Low Priced Off Trade Products +25%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.6	-1.0	-1.9	-0.0	-1.9	-0.1
6 Low Priced On Trade Products +10%	-1	-0.0	-0.1	-0.2	-0.1	-1	-0.0	-0.1	-0.2	-0.6	-0.8	-2.4	-4.9	-8.0	-0.1	-6.1	-0.1
7 Low Priced On Trade Products +25%	-3	-0.0	-0.3	-0.4	-0.1	-3	-0.1	-0.3	-0.5	-1.4	-1.9	-5.9	-12.4	-20.2	-0.2	-15.2	-0.3
8 All Low Priced Products +10%	-1	-0.0	-0.1	-0.2	-0.1	-1	-0.0	-0.1	-0.2	-0.6	-0.9	-2.6	-5.4	-8.8	-0.1	-6.8	-0.2
9 All Low Priced Products +25%	-3	-0.0	-0.4	-0.5	-0.2	-3	-0.1	-0.3	-0.6	-1.6	-2.2	-6.6	-13.5	-22.2	-0.2	-17.2	-0.4
10 Minimum Price 15p (Off and On Trade)	-0	-0.0	+0.0	+0.0	+0.0	-0	-0.0	+0.0	+0.0	+0.0	-0.0	-0.0	-0.1	-0.1	+0.0	-0.1	-0.0
11 Minimum Price 20p " "	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.4	-0.6	-0.0	-0.6	-0.0
12 Minimum Price 25p	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.5	-1.1	-1.8	-0.0	-1.8	-0.1
13 Minimum Price 30p	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.1	-0.2	-0.4	-1.1	-2.0	-3.6	-0.0	-3.7	-0.2
14 Minimum Price 35p	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.2	-0.5	-0.7	-2.0	-3.5	-6.2	-0.1	-6.2	-0.3
15 Minimum Price 40p	-2	-0.0	-0.2	-0.2	-0.1	-2	-0.0	-0.2	-0.2	-0.7	-1.1	-3.0	-5.4	-9.5	-0.1	-9.2	-0.4
16 Minimum Price 45p	-2	-0.0	-0.2	-0.3	-0.1	-2	-0.0	-0.2	-0.4	-1.0	-1.6	-4.4	-8.1	-14.1	-0.2	-13.0	-0.5
17 Minimum Price 50p	-3	-0.0	-0.3	-0.5	-0.1	-3	-0.1	-0.3	-0.5	-1.4	-2.2	-6.1	-11.3	-19.6	-0.2	-17.6	-0.6
18 Minimum Price 60p	-6	-0.0	-0.5	-0.7	-0.2	-6	-0.1	-0.5	-0.8	-2.3	-3.4	-9.6	-18.4	-31.4	-0.4	-27.6	-0.7
19 Minimum Price 70p " "	-8	-0.0	-0.8	-1.0	-0.3	-8	-0.1	-0.7	-1.1	-3.2	-4.6	-13.2	-26.3	-44.1	-0.5	-37.6	-0.9
20 Minimum Price 20p Off and 60p On Trade	-2	-0.0	-0.2	-0.3	-0.1	-2	-0.0	-0.2	-0.3	-0.9	-1.1	-3.6	-7.7	-12.5	-0.1	-9.1	-0.1
21 Minimum Price 30p Off and 80p On Trade	-6	-0.0	-0.5	-0.7	-0.2	-6	-0.1	-0.5	-0.8	-2.3	-3.2	-9.8	-20.0	-33.0	-0.4	-25.4	-0.5
22 Minimum Price 40p Off and 100p On Trade	-10	-0.1	-1.0	-1.3	-0.4	-10	-0.2	-0.9	-1.4	-4.1	-5.8	-17.5	-35.1	-58.4	-0.6	-45.5	-0.8
23 30p Minimum Price Beers Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.3	-0.7	-0.7	-1.7	-0.0	-2.0	-0.1
24 30p Minimum Price Wines Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.5	-0.7	-0.0	-0.8	+0.0
25 30p Minimum Price Spirits Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.3	-0.8	-1.1	-0.0	-0.9	-0.1
26 30p Minimum Price Alcopops (RTDs) Only	+0	+0.0	+0.0	+0.0	+0.0	+0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
27 Ban Off Trade Discounting if > 50%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
28 Ban Off Trade Discounting if > 40%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.0	-0.1	-0.0
29 Ban Off Trade Discounting if > 30%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.0	-0.4	-0.0
30 Ban Off Trade Discounting if > 20%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.4	-0.7	-0.0	-0.8	-0.0
31 Ban Off Trade Discounting if > 10%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.4	-0.8	-1.5	-0.0	-1.6	-0.1
32 Total Ban Off Trade Discounting	-0	-0.0	-0.1	-0.1	-0.0	-0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.8	-1.5	-2.6	-0.0	-2.8	-0.1
33 Ban Off Trade Discount if Reg Price <30p	-0	-0.0	+0.0	+0.0	+0.0	-0	-0.0	+0.0	+0.0	+0.0	-0.0	-0.1	-0.1	-0.2	-0.0	-0.3	-0.0

Table 43 Summary of estimated effects of policies on health, crime and employment alcohol related harm – 18 to 24 year old hazardous drinkers

SUMMARY - HAZARDOUS 18 to 24	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. discounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
1 General Price +1%	-1	-0.0	-0.0	-0.0	-0.0	-1	-0.0	-0.0	-0.1	-0.1	-0.4	-0.8	-0.3	-1.5	-0.0	-4.8	+0.0
2 General Price +10%	-5	-0.0	-0.3	-0.4	-0.1	-6	-0.1	-0.3	-0.5	-1.4	-4.3	-7.7	-3.0	-15.0	-0.3	-49.2	+0.0
3 General Price +25%	-13	-0.0	-0.8	-1.1	-0.3	-15	-0.2	-0.8	-1.3	-3.5	-11.0	-19.9	-7.6	-38.4	-0.8	-126.2	+0.0
4 Low Priced Off Trade Products +10%	+0	+0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	+0.0	+0.0	+0.1	+0.2	+0.0	+0.3	+0.0	+0.6	+0.0
5 Low Priced Off Trade Products +25%	+0	+0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	+0.0	+0.0	+0.2	+0.5	+0.1	+0.8	+0.0	+1.4	+0.0
6 Low Priced On Trade Products +10%	-2	-0.0	-0.1	-0.2	-0.1	-2	-0.0	-0.1	-0.2	-0.6	-1.7	-2.9	-1.2	-5.8	-0.1	-19.7	+0.0
7 Low Priced On Trade Products +25%	-5	-0.0	-0.3	-0.4	-0.1	-6	-0.1	-0.3	-0.5	-1.4	-4.2	-7.4	-3.0	-14.6	-0.3	-49.7	+0.0
8 All Low Priced Products +10%	-2	-0.0	-0.1	-0.2	-0.1	-2	-0.0	-0.1	-0.2	-0.5	-1.6	-2.7	-1.2	-5.5	-0.1	-19.2	+0.0
9 All Low Priced Products +25%	-5	-0.0	-0.3	-0.4	-0.1	-5	-0.1	-0.3	-0.5	-1.4	-4.0	-6.9	-3.0	-13.9	-0.3	-48.6	+0.0
10 Minimum Price 15p (Off and On Trade)	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	+0.0
11 Minimum Price 20p " "	+0	+0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.1	+0.0	+0.2	+0.0
12 Minimum Price 25p	+0	+0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	-0.0	+0.0	+0.0	+0.1	+0.0	+0.2	+0.0	+0.3	+0.0
13 Minimum Price 30p	+0	-0.0	+0.0	+0.0	+0.0	-0	-0.0	+0.0	-0.0	-0.0	+0.0	+0.1	-0.0	+0.1	+0.0	-0.1	+0.0
14 Minimum Price 35p	+0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	+0.0	+0.2	-0.1	+0.1	+0.0	-1.1	+0.0
15 Minimum Price 40p	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.1	-0.2	-0.2	-0.2	-0.3	-0.7	-0.0	-4.6	+0.0
16 Minimum Price 45p	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.2	-0.4	-0.8	-1.1	-0.8	-2.7	-0.1	-12.2	+0.0
17 Minimum Price 50p	-2	-0.0	-0.1	-0.2	-0.1	-2	-0.1	-0.1	-0.3	-0.7	-1.6	-2.5	-1.5	-5.6	-0.1	-22.7	+0.0
18 Minimum Price 60p	-4	-0.0	-0.3	-0.4	-0.1	-5	-0.1	-0.3	-0.6	-1.5	-3.8	-6.2	-3.1	-13.1	-0.3	-49.9	+0.0
19 Minimum Price 70p " "	-7	-0.0	-0.5	-0.7	-0.2	-9	-0.2	-0.5	-0.9	-2.4	-6.2	-10.1	-5.2	-21.5	-0.4	-82.1	+0.0
20 Minimum Price 20p Off and 60p On Trade	-3	-0.0	-0.2	-0.2	-0.1	-3	-0.0	-0.1	-0.3	-0.7	-2.2	-4.2	-1.4	-7.8	-0.2	-23.9	+0.0
21 Minimum Price 30p Off and 80p On Trade	-6	-0.0	-0.4	-0.5	-0.2	-7	-0.1	-0.4	-0.7	-1.7	-5.0	-8.8	-3.6	-17.3	-0.3	-58.7	+0.0
22 Minimum Price 40p Off and 100p On Trade	-8	-0.0	-0.5	-0.7	-0.2	-10	-0.2	-0.5	-0.9	-2.4	-6.9	-12.5	-4.8	-24.2	-0.5	-80.1	+0.0
23 30p Minimum Price Beers Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.0	-0.4	-0.0	-0.8	+0.0
24 30p Minimum Price Wines Only	+0	+0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	+0.0	+0.0	+0.2	+0.4	+0.0	+0.6	+0.0	+1.0	+0.0
25 30p Minimum Price Spirits Only	+0	-0.0	+0.0	+0.0	+0.0	-0	-0.0	+0.0	+0.0	+0.0	-0.0	-0.0	-0.0	-0.0	+0.0	-0.2	+0.0
26 30p Minimum Price Alcopops (RTDs) Only	+0	+0.0	+0.0	+0.0	+0.0	+0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
27 Ban Off Trade Discounting if > 50%	+0	-0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	+0.0	+0.0	+0.0	+0.0	-0.0	+0.0	+0.0	-0.0	+0.0
28 Ban Off Trade Discounting if > 40%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.2	+0.0
29 Ban Off Trade Discounting if > 30%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.0	-0.6	+0.0
30 Ban Off Trade Discounting if > 20%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.3	-0.0	-1.7	+0.0
31 Ban Off Trade Discounting if > 10%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.2	-0.8	-0.0	-3.6	+0.0
32 Total Ban Off Trade Discounting	-0	-0.0	-0.0	-0.1	-0.0	-1	-0.0	-0.0	-0.1	-0.2	-0.4	-0.6	-0.4	-1.5	-0.0	-6.7	+0.0
33 Ban Off Trade Discount if Reg Price <30p	+0	-0.0	+0.0	+0.0	+0.0	+0	-0.0	+0.0	+0.0	+0.0	+0.0	+0.0	-0.0	+0.0	+0.0	-0.0	+0.0

Table 44 Summary of estimated effects of policies on health, crime and employment alcohol related harm – moderate drinkers

SUMMARY - MODERATE	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
1 General Price +1%	-4	-0.0	-0.2	-0.2	-0.1	-7	-0.3	-0.2	-0.7	-2.2	-0.4	-0.6	-0.3	-1.3	-0.0	-9.6	+0.0
2 General Price +10%	-38	-0.2	-1.8	-2.5	-0.7	-71	-2.6	-1.9	-7.0	-21.7	-4.0	-6.3	-3.1	-13.4	-0.3	-97.3	+0.0
3 General Price +25%	-95	-0.6	-4.6	-6.3	-1.7	-169	-6.6	-4.8	-17.6	-54.6	-10.3	-16.1	-7.9	-34.2	-0.7	-247.3	+0.0
4 Low Priced Off Trade Products +10%	+0	-0.0	+0.1	+0.0	+0.0	+0	-0.2	+0.1	-0.3	-0.8	+0.1	+0.1	+0.0	+0.2	+0.0	-0.2	+0.0
5 Low Priced Off Trade Products +25%	-2	-0.1	-0.0	-0.1	-0.0	-4	-0.5	-0.1	-1.0	-3.0	+0.1	+0.4	+0.0	+0.5	+0.0	-0.6	+0.0
6 Low Priced On Trade Products +10%	-4	-0.0	-0.2	-0.3	-0.1	-9	-0.3	-0.2	-0.8	-2.1	-0.8	-1.2	-0.6	-2.6	-0.1	-13.8	+0.0
7 Low Priced On Trade Products +25%	-11	-0.1	-0.5	-0.7	-0.2	-21	-0.8	-0.6	-2.1	-5.5	-1.9	-3.1	-1.5	-6.5	-0.1	-34.7	+0.0
8 All Low Priced Products +10%	-6	-0.0	-0.3	-0.4	-0.1	-12	-0.5	-0.3	-1.3	-3.7	-0.7	-1.1	-0.6	-2.4	-0.1	-14.2	+0.0
9 All Low Priced Products +25%	-14	-0.1	-0.7	-1.0	-0.3	-29	-1.3	-0.8	-3.3	-9.3	-1.8	-2.8	-1.5	-6.1	-0.1	-35.9	+0.0
10 Minimum Price 15p (Off and On Trade)	+0	-0.0	+0.0	+0.0	+0.0	+1	-0.0	+0.0	+0.0	+0.2	+0.0	+0.0	+0.0	+0.0	+0.0	+0.1	+0.0
11 Minimum Price 20p " "	+0	-0.0	+0.1	+0.1	+0.0	+1	-0.0	+0.1	-0.0	+0.0	+0.0	+0.1	+0.0	+0.1	+0.0	+0.4	+0.0
12 Minimum Price 25p	+1	-0.0	+0.1	+0.1	+0.0	+2	-0.1	+0.1	-0.1	-0.4	+0.0	+0.1	+0.0	+0.2	+0.0	+0.6	+0.0
13 Minimum Price 30p	-0	-0.0	+0.0	-0.0	+0.0	-1	-0.3	+0.0	-0.6	-2.2	+0.1	+0.3	+0.0	+0.4	+0.0	+0.7	+0.0
14 Minimum Price 35p	-4	-0.1	-0.2	-0.3	-0.1	-11	-0.9	-0.2	-1.8	-6.5	+0.1	+0.4	-0.0	+0.5	+0.0	-2.3	+0.0
15 Minimum Price 40p	-12	-0.2	-0.6	-0.9	-0.2	-27	-1.7	-0.7	-3.8	-13.7	-0.0	+0.3	-0.2	+0.0	+0.0	-11.1	+0.0
16 Minimum Price 45p	-23	-0.3	-1.2	-1.8	-0.4	-50	-2.8	-1.3	-6.5	-23.6	-0.4	-0.2	-0.6	-1.2	-0.0	-27.6	+0.0
17 Minimum Price 50p	-37	-0.4	-1.9	-2.8	-0.7	-76	-4.2	-2.1	-10.0	-35.8	-1.1	-1.0	-1.2	-3.3	-0.1	-52.0	+0.0
18 Minimum Price 60p	-72	-0.7	-3.8	-5.5	-1.4	-135	-7.8	-4.1	-18.7	-64.7	-3.1	-3.6	-3.0	-9.7	-0.2	-121.6	+0.0
19 Minimum Price 70p " "	-113	-1.1	-6.1	-8.7	-2.2	-188	-11.8	-6.6	-28.8	-93.7	-5.8	-7.2	-5.5	-18.5	-0.4	-210.0	+0.0
20 Minimum Price 20p Off and 60p On Trade	-3	-0.0	-0.1	-0.2	-0.1	-6	-0.3	-0.2	-0.7	-1.6	-0.5	-0.8	-0.4	-1.6	-0.0	-8.7	+0.0
21 Minimum Price 30p Off and 80p On Trade	-13	-0.1	-0.7	-1.0	-0.3	-28	-1.2	-0.7	-3.1	-8.5	-2.0	-3.1	-1.6	-6.7	-0.1	-36.7	+0.0
22 Minimum Price 40p Off and 100p On Trade	-41	-0.3	-2.1	-2.9	-0.8	-81	-3.7	-2.2	-9.3	-27.4	-5.1	-8.0	-4.1	-17.1	-0.4	-102.4	+0.0
23 30p Minimum Price Beers Only	+2	-0.0	+0.2	+0.2	+0.1	+4	-0.1	+0.2	+0.1	-0.5	+0.1	+0.1	+0.1	+0.2	+0.0	-0.5	+0.0
24 30p Minimum Price Wines Only	-1	-0.0	-0.1	-0.1	-0.0	-3	-0.2	-0.1	-0.4	-1.0	-0.1	-0.0	-0.1	-0.2	-0.0	-2.4	+0.0
25 30p Minimum Price Spirits Only	+2	-0.0	+0.2	+0.2	+0.1	+3	-0.1	+0.2	+0.0	+0.3	+0.1	+0.2	+0.1	+0.3	+0.0	+2.8	+0.0
26 30p Minimum Price Alcopops (RTDs) Only	+0	+0.0	+0.0	+0.0	+0.0	+0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
27 Ban Off Trade Discounting if > 50%	+0	-0.0	+0.0	+0.0	+0.0	+1	+0.0	+0.0	+0.0	+0.1	-0.0	-0.0	-0.0	-0.0	+0.0	+0.0	+0.0
28 Ban Off Trade Discounting if > 40%	-1	-0.0	-0.0	-0.1	-0.0	-2	-0.1	-0.0	-0.2	-0.7	-0.0	-0.0	-0.0	-0.1	-0.0	-1.6	+0.0
29 Ban Off Trade Discounting if > 30%	-2	-0.0	-0.1	-0.2	-0.0	-5	-0.2	-0.1	-0.5	-1.8	-0.1	-0.1	-0.1	-0.3	-0.0	-4.3	+0.0
30 Ban Off Trade Discounting if > 20%	-5	-0.0	-0.3	-0.4	-0.1	-11	-0.4	-0.3	-1.1	-4.2	-0.3	-0.3	-0.3	-0.8	-0.0	-10.6	+0.0
31 Ban Off Trade Discounting if > 10%	-11	-0.1	-0.5	-0.8	-0.2	-22	-0.9	-0.6	-2.3	-8.5	-0.6	-0.7	-0.5	-1.8	-0.0	-22.0	+0.0
32 Total Ban Off Trade Discounting	-20	-0.1	-1.0	-1.3	-0.4	-39	-1.6	-1.0	-4.1	-14.9	-1.0	-1.3	-1.0	-3.3	-0.1	-39.2	+0.0
33 Ban Off Trade Discount if Reg Price <30p	+1	-0.0	+0.1	+0.1	+0.0	+2	-0.0	+0.1	+0.1	+0.2	+0.0	+0.0	+0.0	+0.0	+0.0	-0.1	+0.0

Table 45 Summary of estimated effects of policies on health, crime and employment alcohol related harm – hazardous drinkers

SUMMARY - HAZARDOUS	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
1 General Price +1%	-10	-0.1	-0.3	-0.4	-0.1	-65	-0.6	-0.3	-1.5	-1.8	-0.7	-1.3	-0.9	-2.9	-0.1	-14.0	+0.0
2 General Price +10%	-98	-0.5	-2.6	-4.0	-1.0	-633	-6.3	-2.7	-15.2	-18.1	-7.5	-13.4	-9.0	-29.9	-0.6	-143.3	+0.0
3 General Price +25%	-248	-1.4	-6.7	-10.3	-2.6	-1579	-16.1	-6.9	-39.1	-46.5	-19.2	-34.6	-22.9	-76.8	-1.5	-370.5	+0.0
4 Low Priced Off Trade Products +10%	-3	-0.0	+0.0	-0.0	-0.0	-24	-0.2	+0.0	-0.4	-0.4	+0.1	+0.1	-0.2	+0.0	+0.0	-0.7	+0.0
5 Low Priced Off Trade Products +25%	-7	-0.1	-0.1	-0.2	-0.0	-62	-0.6	-0.1	-1.2	-1.4	+0.1	+0.4	-0.5	+0.0	+0.0	-2.0	+0.0
6 Low Priced On Trade Products +10%	-8	-0.0	-0.3	-0.4	-0.1	-48	-0.6	-0.3	-1.4	-1.9	-2.2	-4.2	-3.5	-9.9	-0.2	-28.7	+0.0
7 Low Priced On Trade Products +25%	-23	-0.1	-0.8	-1.2	-0.3	-137	-1.4	-0.8	-3.8	-5.2	-5.5	-10.7	-8.8	-25.1	-0.4	-72.4	+0.0
8 All Low Priced Products +10%	-13	-0.1	-0.4	-0.6	-0.2	-82	-0.8	-0.4	-2.1	-2.8	-2.1	-4.1	-3.7	-10.0	-0.2	-29.6	+0.0
9 All Low Priced Products +25%	-34	-0.2	-1.0	-1.6	-0.4	-211	-2.1	-1.1	-5.3	-7.2	-5.4	-10.4	-9.3	-25.2	-0.4	-75.3	+0.0
10 Minimum Price 15p (Off and On Trade)	+1	-0.0	+0.1	+0.1	+0.0	+4	-0.0	+0.1	+0.1	+0.3	-0.0	-0.0	-0.1	-0.1	-0.0	-0.1	+0.0
11 Minimum Price 20p " "	+1	-0.0	+0.1	+0.1	+0.0	+2	-0.0	+0.1	+0.0	+0.1	-0.0	-0.1	-0.3	-0.4	-0.0	-1.0	+0.0
12 Minimum Price 25p	+0	-0.0	+0.1	+0.1	+0.0	-4	-0.1	+0.1	-0.1	-0.1	-0.1	-0.1	-0.5	-0.7	-0.0	-2.5	+0.0
13 Minimum Price 30p	-5	-0.0	-0.1	-0.2	-0.0	-38	-0.3	-0.1	-0.8	-1.3	-0.2	-0.4	-1.1	-1.7	-0.0	-6.0	+0.0
14 Minimum Price 35p	-20	-0.1	-0.4	-0.7	-0.2	-136	-1.3	-0.5	-3.0	-4.0	-0.4	-0.8	-2.0	-3.2	-0.0	-14.8	+0.0
15 Minimum Price 40p	-48	-0.3	-1.1	-1.8	-0.4	-334	-3.3	-1.1	-7.6	-9.1	-1.1	-1.9	-3.1	-6.1	-0.1	-34.7	+0.0
16 Minimum Price 45p	-92	-0.6	-2.1	-3.5	-0.8	-640	-6.4	-2.2	-14.9	-16.9	-2.5	-4.1	-5.0	-11.6	-0.2	-70.8	+0.0
17 Minimum Price 50p	-149	-1.0	-3.4	-5.7	-1.4	-1035	-10.6	-3.7	-24.6	-27.4	-4.4	-7.3	-7.5	-19.2	-0.4	-122.2	+0.0
18 Minimum Price 60p	-290	-2.0	-7.0	-11.5	-2.7	-1981	-21.3	-7.5	-49.2	-53.6	-9.5	-15.6	-14.2	-39.3	-0.7	-259.6	+0.0
19 Minimum Price 70p " "	-425	-3.0	-10.3	-17.2	-4.1	-2891	-32.5	-11.1	-74.7	-79.4	-14.5	-23.8	-21.3	-59.6	-1.1	-397.2	+0.0
20 Minimum Price 20p Off and 60p On Trade	-7	-0.0	-0.3	-0.4	-0.1	-27	-0.4	-0.3	-1.1	-1.7	-3.0	-6.3	-5.1	-14.5	-0.2	-33.4	+0.0
21 Minimum Price 30p Off and 80p On Trade	-28	-0.1	-1.0	-1.5	-0.4	-158	-1.7	-1.0	-4.5	-6.9	-7.1	-14.2	-12.8	-34.0	-0.6	-90.3	+0.0
22 Minimum Price 40p Off and 100p On Trade	-96	-0.6	-2.7	-4.1	-1.1	-614	-6.0	-2.8	-14.9	-19.6	-10.9	-21.8	-19.5	-52.3	-0.9	-157.1	+0.0
23 30p Minimum Price Beers Only	+3	+0.0	+0.2	+0.2	+0.1	+16	+0.1	+0.3	+0.5	+0.3	-0.4	-0.8	-0.6	-1.8	-0.0	-7.2	+0.0
24 30p Minimum Price Wines Only	-4	-0.0	-0.0	-0.1	-0.0	-37	-0.4	-0.0	-0.7	-0.4	+0.1	+0.3	-0.5	-0.1	+0.0	-0.5	+0.0
25 30p Minimum Price Spirits Only	+1	-0.0	+0.1	+0.1	+0.0	-1	-0.0	+0.1	+0.0	+0.2	+0.1	+0.2	-0.0	+0.2	+0.0	+2.2	+0.0
26 30p Minimum Price Alcopops (RTDs) Only	+0	+0.0	+0.0	+0.0	+0.0	+0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
27 Ban Off Trade Discounting if > 50%	-0	-0.0	+0.0	-0.0	+0.0	-1	-0.0	+0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	+0.0	-0.1	+0.0
28 Ban Off Trade Discounting if > 40%	-4	-0.0	-0.1	-0.1	-0.0	-27	-0.3	-0.1	-0.6	-0.6	-0.1	-0.1	-0.1	-0.2	-0.0	-2.7	+0.0
29 Ban Off Trade Discounting if > 30%	-9	-0.1	-0.2	-0.3	-0.1	-68	-0.7	-0.2	-1.5	-1.6	-0.2	-0.2	-0.2	-0.7	-0.0	-7.3	+0.0
30 Ban Off Trade Discounting if > 20%	-22	-0.1	-0.5	-0.8	-0.2	-158	-1.6	-0.5	-3.6	-3.8	-0.5	-0.6	-0.5	-1.6	-0.0	-17.9	+0.0
31 Ban Off Trade Discounting if > 10%	-44	-0.3	-1.0	-1.6	-0.4	-309	-3.1	-1.1	-7.2	-7.6	-1.0	-1.4	-1.1	-3.5	-0.1	-36.8	+0.0
32 Total Ban Off Trade Discounting	-74	-0.5	-1.7	-2.8	-0.7	-520	-5.3	-1.8	-12.2	-13.1	-1.8	-2.5	-2.0	-6.4	-0.1	-64.8	+0.0
33 Ban Off Trade Discount if Reg Price <30p	+1	+0.0	+0.1	+0.1	+0.0	+5	+0.0	+0.1	+0.1	+0.3	-0.0	-0.0	-0.1	-0.1	-0.0	-0.5	+0.0

Table 46 Summary of estimated effects of policies on health, crime and employment alcohol related harm – harmful drinkers

SUMMARY - HARMFUL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
1 General Price +1%	-10	-0.1	-0.1	-0.4	-0.1	-97	-1.3	-0.1	-2.9	-1.6	-0.3	-0.6	-0.3	-1.3	-0.0	-6.4	-1.3
2 General Price +10%	-96	-1.0	-1.2	-3.5	-0.6	-976	-12.7	-1.3	-28.5	-15.9	-3.4	-6.1	-3.5	-12.9	-0.3	-64.8	-12.8
3 General Price +25%	-239	-2.4	-3.1	-8.6	-1.5	-2428	-30.6	-3.2	-68.6	-39.0	-8.7	-15.6	-8.9	-33.2	-0.7	-167.4	-31.9
4 Low Priced Off Trade Products +10%	-10	-0.1	-0.1	-0.4	-0.1	-106	-1.3	-0.2	-3.0	-1.6	-0.2	-0.4	-0.4	-1.1	-0.0	-5.4	-1.2
5 Low Priced Off Trade Products +25%	-26	-0.3	-0.4	-1.0	-0.2	-265	-3.3	-0.4	-7.5	-4.1	-0.6	-1.1	-1.1	-2.7	-0.0	-13.6	-3.1
6 Low Priced On Trade Products +10%	-9	-0.1	-0.1	-0.4	-0.1	-95	-1.4	-0.1	-3.1	-1.7	-0.8	-1.6	-0.8	-3.3	-0.1	-9.7	-1.2
7 Low Priced On Trade Products +25%	-23	-0.3	-0.3	-0.9	-0.2	-236	-3.4	-0.3	-7.8	-4.2	-2.1	-4.1	-2.1	-8.3	-0.2	-24.4	-3.0
8 All Low Priced Products +10%	-20	-0.2	-0.3	-0.8	-0.1	-202	-2.7	-0.3	-6.2	-3.4	-1.1	-2.1	-1.3	-4.4	-0.1	-15.2	-2.4
9 All Low Priced Products +25%	-50	-0.5	-0.7	-1.9	-0.3	-510	-6.8	-0.7	-15.3	-8.4	-2.7	-5.2	-3.2	-11.1	-0.2	-38.5	-6.1
10 Minimum Price 15p (Off and On Trade)	-0	-0.0	+0.0	-0.0	+0.0	-6	-0.1	+0.0	-0.2	-0.1	+0.1	+0.2	+0.0	+0.3	+0.0	+0.3	-0.1
11 Minimum Price 20p " "	-3	-0.0	-0.0	-0.1	-0.0	-35	-0.6	-0.0	-1.3	-0.6	+0.1	+0.2	-0.2	+0.2	+0.0	-1.2	-0.5
12 Minimum Price 25p	-9	-0.1	-0.1	-0.4	-0.1	-106	-1.7	-0.1	-3.7	-1.9	-0.1	-0.1	-0.6	-0.8	-0.0	-6.1	-1.6
13 Minimum Price 30p	-24	-0.3	-0.3	-1.0	-0.2	-263	-3.8	-0.3	-8.6	-4.5	-0.5	-0.9	-1.3	-2.7	-0.0	-16.2	-3.8
14 Minimum Price 35p	-54	-0.6	-0.7	-2.1	-0.4	-567	-7.6	-0.8	-17.1	-9.2	-1.2	-2.1	-2.4	-5.6	-0.1	-32.2	-7.3
15 Minimum Price 40p	-98	-1.0	-1.2	-3.6	-0.6	-1019	-13.2	-1.3	-29.5	-15.9	-2.0	-3.5	-3.6	-9.1	-0.2	-54.5	-12.4
16 Minimum Price 45p	-153	-1.6	-1.9	-5.5	-1.0	-1598	-20.2	-2.0	-45.1	-24.5	-3.2	-5.4	-5.0	-13.6	-0.3	-84.3	-19.1
17 Minimum Price 50p	-219	-2.2	-2.6	-7.7	-1.3	-2282	-28.3	-2.8	-63.2	-34.7	-4.5	-7.7	-6.7	-18.9	-0.4	-120.6	-27.1
18 Minimum Price 60p	-364	-3.6	-4.4	-12.5	-2.2	-3757	-45.1	-4.6	-100.6	-56.5	-7.7	-12.8	-9.7	-30.2	-0.6	-204.2	-43.4
19 Minimum Price 70p " "	-493	-4.7	-5.9	-16.5	-3.0	-5022	-58.5	-6.3	-130.6	-74.7	-10.3	-16.9	-12.5	-39.7	-0.8	-272.7	-55.0
20 Minimum Price 20p Off and 60p On Trade	-8	-0.1	-0.1	-0.4	-0.1	-89	-1.4	-0.1	-3.1	-1.7	-1.1	-2.1	-0.9	-4.1	-0.1	-13.7	-2.0
21 Minimum Price 30p Off and 80p On Trade	-48	-0.6	-0.7	-2.0	-0.3	-512	-7.4	-0.7	-16.6	-9.0	-3.2	-6.2	-3.5	-12.9	-0.2	-47.0	-7.5
22 Minimum Price 40p Off and 100p On Trade	-153	-1.7	-2.0	-5.8	-1.0	-1596	-21.0	-2.1	-47.2	-25.8	-6.4	-12.3	-7.8	-26.4	-0.5	-107.2	-19.1
23 30p Minimum Price Beers Only	-17	-0.2	-0.2	-0.7	-0.1	-192	-3.1	-0.2	-6.8	-3.6	-0.8	-1.5	-0.7	-3.1	-0.1	-17.7	-3.7
24 30p Minimum Price Wines Only	-3	-0.0	-0.0	-0.1	-0.0	-30	-0.2	-0.0	-0.5	-0.3	+0.4	+0.9	+0.2	+1.5	+0.0	+3.1	+0.1
25 30p Minimum Price Spirits Only	-4	-0.0	-0.1	-0.1	-0.0	-39	-0.5	-0.1	-1.1	-0.6	-0.1	-0.2	-0.7	-1.0	-0.0	-1.3	-0.1
26 30p Minimum Price Alcopops (RTDs) Only	+0	+0.0	+0.0	+0.0	+0.0	+0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
27 Ban Off Trade Discounting if > 50%	-0	-0.0	-0.0	-0.0	-0.0	-1	-0.0	-0.0	-0.0	-0.0	+0.0	+0.0	+0.0	+0.0	+0.0	-0.0	-0.0
28 Ban Off Trade Discounting if > 40%	-3	-0.0	-0.0	-0.1	-0.0	-31	-0.4	-0.0	-0.9	-0.5	-0.0	-0.0	-0.0	-0.1	-0.0	-1.3	-0.4
29 Ban Off Trade Discounting if > 30%	-8	-0.1	-0.1	-0.3	-0.1	-84	-1.1	-0.1	-2.4	-1.3	-0.1	-0.2	-0.1	-0.4	-0.0	-3.7	-1.0
30 Ban Off Trade Discounting if > 20%	-20	-0.2	-0.3	-0.7	-0.1	-206	-2.6	-0.3	-5.9	-3.3	-0.3	-0.4	-0.3	-1.0	-0.0	-9.1	-2.4
31 Ban Off Trade Discounting if > 10%	-40	-0.4	-0.5	-1.5	-0.2	-418	-5.3	-0.5	-11.9	-6.5	-0.6	-0.9	-0.7	-2.1	-0.0	-18.8	-4.8
32 Total Ban Off Trade Discounting	-71	-0.7	-0.8	-2.5	-0.4	-740	-9.4	-0.9	-20.9	-11.4	-1.1	-1.6	-1.2	-3.9	-0.1	-33.7	-8.5
33 Ban Off Trade Discount if Reg Price <30p	-2	-0.0	-0.0	-0.1	-0.0	-19	-0.3	-0.0	-0.6	-0.3	-0.1	-0.1	-0.1	-0.3	-0.0	-1.5	-0.3

3.1.9 SUMMARY TABLES FOR FINANCIAL VALUE OF HARM REDUCTIONS BY PRIORITY GROUP

Table 47 Summary of estimated for financial value of harm reductions – 11 to 18 year olds

SUMMARY - 11 TO 18	Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1 General Price +1%	-0.2	-1.4	-.0	-.1	-1.8	-.7	-1.6	-4.1	-2	-12	-	-1	-15	-7	-15	-37
2 General Price +10%	-1.9	-14.3	-.5	-1.5	-18.1	-6.9	-16.6	-41.6	-17	-119	-4	-12	-152	-68	-153	-373
3 General Price +25%	-4.9	-36.4	-1.2	-3.2	-45.6	-17.5	-42.4	-105.5	-44	-302	-10	-26	-383	-173	-391	-947
4 Low Priced Off Trade Products +10%	-0.0	-.6	-.0	-.2	-.8	-.1	-.6	-1.5	-	-5	-	-2	-7	-1	-5	-13
5 Low Priced Off Trade Products +25%	-0.2	-1.5	-.1	-.5	-2.2	-.5	-1.7	-4.4	-1	-13	-	-4	-18	-5	-15	-39
6 Low Priced On Trade Products +10%	-0.8	-6.1	-.2	-.7	-7.8	-2.9	-7.0	-17.7	-7	-51	-2	-6	-66	-28	-64	-158
7 Low Priced On Trade Products +25%	-2.0	-15.4	-.5	-1.7	-19.5	-7.3	-17.5	-44.3	-18	-128	-4	-14	-164	-72	-162	-398
8 All Low Priced Products +10%	-0.9	-6.8	-.2	-.9	-8.8	-3.2	-7.7	-19.7	-8	-56	-2	-8	-73	-31	-71	-176
9 All Low Priced Products +25%	-2.2	-17.0	-.5	-2.0	-21.8	-8.0	-19.5	-49.4	-20	-142	-4	-17	-183	-79	-180	-442
10 Minimum Price 15p (Off and On Trade)	+0.0	-.1	-.0	-.0	-.1	+.1	+.1	+.1	+	-1	-	-	-1	+1	+1	+1
11 Minimum Price 20p " "	-0.0	-.5	-.0	-.1	-.6	-.1	-.3	-1.0	-	-4	-	-1	-5	-1	-3	-9
12 Minimum Price 25p	-0.1	-1.5	-.1	-.3	-2.0	-.5	-1.4	-3.9	-1	-12	-	-3	-17	-5	-13	-35
13 Minimum Price 30p	-0.3	-3.0	-.1	-.7	-4.2	-1.3	-3.3	-8.7	-3	-25	-1	-6	-35	-12	-30	-77
14 Minimum Price 35p	-0.6	-5.2	-.2	-1.2	-7.2	-2.4	-5.8	-15.4	-6	-43	-2	-10	-60	-23	-54	-136
15 Minimum Price 40p	-1.0	-7.7	-.3	-1.6	-10.6	-3.6	-9.1	-23.4	-9	-64	-2	-14	-89	-35	-84	-207
16 Minimum Price 45p	-1.5	-11.2	-.4	-2.1	-15.1	-5.4	-13.4	-33.9	-13	-93	-3	-17	-127	-52	-124	-302
17 Minimum Price 50p	-2.1	-15.3	-.5	-2.5	-20.4	-7.4	-18.5	-46.3	-18	-127	-5	-21	-171	-71	-170	-412
18 Minimum Price 60p	-3.3	-24.1	-.9	-3.2	-31.4	-11.7	-29.4	-72.6	-29	-201	-7	-26	-263	-114	-271	-649
19 Minimum Price 70p " "	-4.6	-33.6	-1.2	-3.7	-43.1	-16.4	-40.5	-100.0	-41	-279	-10	-31	-361	-161	-374	-896
20 Minimum Price 20p Off and 60p On Trade	-1.2	-8.9	-.3	-.4	-10.9	-4.3	-10.9	-26.2	-11	-74	-2	-4	-92	-43	-101	-236
21 Minimum Price 30p Off and 80p On Trade	-3.3	-24.4	-.8	-2.1	-30.7	-11.7	-29.6	-72.0	-30	-203	-7	-18	-258	-117	-273	-647
22 Minimum Price 40p Off and 100p On Trade	-5.9	-43.7	-1.4	-3.6	-54.6	-20.9	-52.6	-128.1	-53	-363	-12	-30	-459	-207	-485	-1,150
23 30p Minimum Price Beers Only	-0.2	-1.4	-.1	-.5	-2.1	-.5	-1.9	-4.5	-1	-12	-1	-4	-18	-5	-17	-40
24 30p Minimum Price Wines Only	-0.1	-.6	-.0	+.0	-.7	-.3	-.5	-1.6	-1	-5	-	+	-6	-3	-5	-14
25 30p Minimum Price Spirits Only	-0.1	-.9	-.0	-.2	-1.2	-.3	-.7	-2.2	-1	-8	-	-2	-10	-3	-6	-19
26 30p Minimum Price Alcopops (RTDs) Only	+0.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0
27 Ban Off Trade Discounting if > 50%	-0.0	-.0	-.0	-.0	-.0	-.0	-.0	-.0	-	-	-	-	-	-	-	-
28 Ban Off Trade Discounting if > 40%	-0.0	-.1	-.0	-.0	-.1	-.1	-.1	-.3	-	-1	-	-	-1	-1	-1	-3
29 Ban Off Trade Discounting if > 30%	-0.0	-.3	-.0	-.1	-.4	-.1	-.3	-.8	-	-2	-	-	-3	-1	-3	-7
30 Ban Off Trade Discounting if > 20%	-0.1	-.6	-.0	-.1	-.9	-.3	-.7	-1.9	-1	-5	-	-1	-7	-3	-7	-17
31 Ban Off Trade Discounting if > 10%	-0.2	-1.2	-.0	-.3	-1.7	-.6	-1.4	-3.8	-1	-10	-	-2	-14	-6	-13	-33
32 Total Ban Off Trade Discounting	-0.3	-2.2	-.1	-.4	-3.0	-1.1	-2.5	-6.7	-3	-18	-1	-4	-25	-11	-24	-59
33 Ban Off Trade Discount if Reg Price <30p	+0.0	-.2	-.0	-.1	-.2	+.1	-.1	-.2	+	-1	-	-1	-2	+1	-1	-2

Table 48 Summary of estimated for financial value of harm reductions –18 to 24 year old hazardous

SUMMARY - HAZARDOUS 18 to 24	Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1 General Price +1%	-0.2	-1.7	-.3	+.0	-2.2	-.6	-2.4	-5.2	-2	-14	-2	+	-18	-7	-22	-47
2 General Price +10%	-2.0	-16.9	-3.0	+.0	-21.9	-6.6	-24.1	-52.6	-18	-141	-25	+	-184	-69	-222	-475
3 General Price +25%	-5.0	-43.4	-7.8	+.0	-56.3	-16.9	-61.9	-135.1	-47	-361	-65	+	-473	-176	-571	-1,220
4 Low Priced Off Trade Products +10%	+0.0	+.3	+.0	+.0	+.4	+.1	+.6	+1.2	+	+3	+	+	+3	+1	+5	+10
5 Low Priced Off Trade Products +25%	+0.1	+.8	+.1	+.0	+1.0	+.2	+1.4	+2.6	+1	+7	+1	+	+8	+2	+13	+23
6 Low Priced On Trade Products +10%	-0.8	-6.6	-1.2	+.0	-8.6	-2.7	-9.3	-20.6	-7	-55	-10	+	-72	-28	-86	-186
7 Low Priced On Trade Products +25%	-2.0	-16.7	-3.1	+.0	-21.7	-6.7	-23.5	-51.8	-19	-138	-25	+	-182	-70	-216	-469
8 All Low Priced Products +10%	-0.8	-6.3	-1.2	+.0	-8.2	-2.6	-8.8	-19.7	-7	-53	-10	+	-69	-27	-81	-178
9 All Low Priced Products +25%	-1.9	-16.0	-3.0	+.0	-20.9	-6.6	-22.4	-49.8	-18	-133	-25	+	-176	-69	-206	-451
10 Minimum Price 15p (Off and On Trade)	-0.0	-.0	-.0	+.0	-.0	-.0	-.0	-.0	-	-	-	+	-	-	-	-
11 Minimum Price 20p " "	+0.0	+.1	+.0	+.0	+.1	+.1	+.2	+.4	+	+1	+	+	+1	+1	+2	+4
12 Minimum Price 25p	+0.0	+.2	+.0	+.0	+.2	+.1	+.3	+.7	+	+2	+	+	+2	+1	+3	+6
13 Minimum Price 30p	+0.0	+.1	-.0	+.0	+.1	+.0	+.3	+.4	-	+1	-	+	+1	-	+3	+3
14 Minimum Price 35p	-0.0	-.0	-.1	+.0	-.1	-.1	+.2	+.0	-1	-	-	+	-1	-2	+2	-2
15 Minimum Price 40p	-0.1	-1.0	-.3	+.0	-1.4	-.6	-1.1	-3.1	-2	-8	-2	+	-13	-8	-10	-30
16 Minimum Price 45p	-0.5	-3.4	-.7	+.0	-4.6	-1.7	-4.4	-10.7	-5	-28	-6	+	-39	-19	-41	-99
17 Minimum Price 50p	-0.9	-6.7	-1.4	+.0	-9.0	-3.1	-9.0	-21.1	-9	-56	-11	+	-76	-35	-83	-194
18 Minimum Price 60p	-1.9	-15.5	-3.0	+.0	-20.4	-6.8	-21.1	-48.3	-19	-129	-25	+	-173	-74	-194	-441
19 Minimum Price 70p " "	-3.2	-25.4	-5.0	+.0	-33.6	-11.2	-34.6	-79.4	-31	-211	-41	+	-284	-120	-319	-723
20 Minimum Price 20p Off and 60p On Trade	-1.0	-8.6	-1.5	+.0	-11.1	-3.2	-12.6	-26.8	-9	-72	-12	+	-93	-34	-116	-243
21 Minimum Price 30p Off and 80p On Trade	-2.3	-19.8	-3.6	+.0	-25.7	-7.9	-27.9	-61.6	-23	-165	-30	+	-217	-84	-258	-559
22 Minimum Price 40p Off and 100p On Trade	-3.2	-27.4	-4.9	+.0	-35.5	-10.8	-39.0	-85.3	-31	-228	-41	+	-300	-118	-359	-778
23 30p Minimum Price Beers Only	-0.0	-.4	-.1	+.0	-.5	-.1	-.6	-1.1	-	-3	-	+	-4	-1	-6	-11
24 30p Minimum Price Wines Only	+0.1	+.6	+.1	+.0	+.7	+.2	+1.0	+1.9	+	+5	+1	+	+6	+2	+9	+16
25 30p Minimum Price Spirits Only	+0.0	-.0	-.0	+.0	-.0	+.0	+.0	+.0	+	-	-	+	-	+	+	+
26 30p Minimum Price Alcopops (RTDs) Only	+0.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0
27 Ban Off Trade Discounting if > 50%	+0.0	+.0	-.0	+.0	+.0	+.1	+.1	+.2	+	+	-	+	+	+1	+1	+2
28 Ban Off Trade Discounting if > 40%	-0.0	-.1	-.0	+.0	-.1	-.0	-.1	-.2	-	-	-	+	-1	-	-1	-2
29 Ban Off Trade Discounting if > 30%	-0.0	-.2	-.0	+.0	-.2	-.1	-.2	-.5	-	-1	-	+	-2	-1	-2	-5
30 Ban Off Trade Discounting if > 20%	-0.1	-.4	-.1	+.0	-.6	-.2	-.5	-1.4	-1	-4	-1	+	-5	-2	-5	-12
31 Ban Off Trade Discounting if > 10%	-0.1	-1.0	-.2	+.0	-1.3	-.5	-1.2	-3.1	-1	-8	-2	+	-11	-5	-11	-28
32 Total Ban Off Trade Discounting	-0.3	-1.9	-.4	+.0	-2.5	-.9	-2.4	-5.9	-2	-16	-3	+	-21	-10	-22	-53
33 Ban Off Trade Discount if Reg Price <30p	+0.0	+.0	+.0	+.0	+.0	+.1	+.1	+.2	+	+	+	+	+	+1	+1	+2

Table 49 Summary of estimated for financial value of harm reductions – moderate drinkers

SUMMARY - MODERATE	Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1 General Price +1%	-1.2	-1.6	-.9	+.0	-3.7	-3.4	-2.4	-9.5	-16	-14	-8	+	-37	-109	-22	-168
2 General Price +10%	-11.9	-16.5	-9.4	+.0	-37.9	-34.0	-23.9	-95.8	-160	-138	-78	+	-376	-1,087	-220	-1,683
3 General Price +25%	-30.3	-42.1	-23.9	+.0	-96.2	-86.3	-60.7	-243.3	-407	-350	-199	+	-956	-2,730	-560	-4,246
4 Low Priced Off Trade Products +10%	+0.3	+.3	-.0	+.0	+.6	+1.4	+.7	+2.6	-2	+2	-	+	+	-42	+6	-36
5 Low Priced Off Trade Products +25%	-0.5	+.6	-.0	+.0	+.1	-.5	+1.2	+.7	-16	+5	-	+	-12	-148	+11	-148
6 Low Priced On Trade Products +10%	-1.4	-3.1	-1.1	+.0	-5.7	-4.0	-4.4	-14.0	-19	-26	-10	+	-54	-107	-40	-202
7 Low Priced On Trade Products +25%	-3.5	-7.8	-2.9	+.0	-14.2	-10.1	-11.0	-35.4	-48	-65	-24	+	-137	-277	-102	-516
8 All Low Priced Products +10%	-1.9	-2.9	-1.2	+.0	-6.0	-5.3	-4.1	-15.4	-28	-24	-10	+	-63	-183	-38	-283
9 All Low Priced Products +25%	-4.9	-7.5	-3.0	+.0	-15.3	-13.4	-10.3	-39.0	-72	-62	-25	+	-159	-463	-95	-717
10 Minimum Price 15p (Off and On Trade)	+0.3	+.0	+.0	+.0	+.3	+.9	+.2	+1.4	+2	+	+	+	+2	+9	+2	+13
11 Minimum Price 20p " "	+0.3	+.2	+.0	+.0	+.5	+1.3	+.5	+2.4	+2	+1	+	+	+3	+	+5	+8
12 Minimum Price 25p	+0.6	+.2	+.1	+.0	+.9	+2.3	+.7	+3.9	+3	+2	+1	+	+6	-18	+6	-6
13 Minimum Price 30p	+0.1	+.5	+.1	+.0	+.7	+1.0	+1.1	+2.7	-7	+4	+1	+	-2	-110	+10	-103
14 Minimum Price 35p	-1.4	+.5	-.2	+.0	-1.1	-2.9	+1.2	-2.8	-33	+4	-1	+	-30	-324	+11	-343
15 Minimum Price 40p	-4.4	-.3	-1.0	+.0	-5.7	-10.9	+.1	-16.6	-77	-2	-9	+	-88	-686	+1	-773
16 Minimum Price 45p	-8.5	-2.0	-2.7	+.0	-13.2	-21.8	-2.4	-37.3	-137	-17	-22	+	-176	-1,182	-22	-1,380
17 Minimum Price 50p	-13.4	-4.8	-5.1	+.0	-23.4	-35.1	-6.3	-64.7	-212	-40	-43	+	-295	-1,792	-58	-2,144
18 Minimum Price 60p	-26.3	-13.3	-12.0	+.0	-51.7	-70.3	-18.2	-140.1	-404	-111	-100	+	-615	-3,237	-168	-4,020
19 Minimum Price 70p " "	-41.6	-24.7	-20.7	+.0	-87.0	-112.2	-34.1	-233.4	-628	-205	-172	+	-1,005	-4,687	-315	-6,006
20 Minimum Price 20p Off and 60p On Trade	-0.9	-2.0	-.7	+.0	-3.6	-2.6	-2.8	-9.0	-14	-16	-6	+	-36	-81	-26	-143
21 Minimum Price 30p Off and 80p On Trade	-4.5	-8.2	-3.0	+.0	-15.7	-12.6	-11.5	-39.8	-67	-68	-25	+	-160	-426	-106	-692
22 Minimum Price 40p Off and 100p On Trade	-14.0	-20.8	-8.9	+.0	-43.7	-38.5	-29.4	-111.6	-204	-173	-74	+	-452	-1,372	-271	-2,095
23 30p Minimum Price Beers Only	+1.1	+.3	-.1	+.0	+1.3	+3.4	+.6	+5.3	+8	+2	-1	+	+10	-23	+5	-8
24 30p Minimum Price Wines Only	-0.5	-.3	-.2	+.0	-1.0	-1.4	-.3	-2.7	-8	-2	-2	+	-12	-48	-3	-62
25 30p Minimum Price Spirits Only	+0.9	+.5	+.3	+.0	+1.7	+3.1	+1.1	+5.9	+6	+4	+3	+	+12	+15	+10	+37
26 30p Minimum Price Alcopops (RTDs) Only	+0.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0
27 Ban Off Trade Discounting if > 50%	+0.3	+.0	+.0	+.0	+.3	+.8	+.0	+1.1	+2	+	+	+	+2	+7	+	+9
28 Ban Off Trade Discounting if > 40%	-0.3	-.2	-.2	+.0	-.6	-.8	-.2	-1.6	-4	-1	-1	+	-7	-34	-2	-43
29 Ban Off Trade Discounting if > 30%	-0.7	-.5	-.4	+.0	-1.6	-2.0	-.6	-4.3	-10	-4	-4	+	-18	-88	-6	-112
30 Ban Off Trade Discounting if > 20%	-1.8	-1.1	-1.1	+.0	-4.0	-4.9	-1.6	-10.5	-25	-10	-9	+	-43	-211	-15	-269
31 Ban Off Trade Discounting if > 10%	-3.6	-2.4	-2.2	+.0	-8.2	-10.1	-3.3	-21.7	-51	-20	-19	+	-90	-426	-31	-546
32 Total Ban Off Trade Discounting	-6.4	-4.4	-4.0	+.0	-14.8	-18.0	-6.1	-38.8	-91	-36	-33	+	-160	-743	-56	-959
33 Ban Off Trade Discount if Reg Price <30p	+0.4	+.1	-.0	+.0	+.5	+1.4	+.2	+2.2	+4	+	-	+	+4	+11	+2	+17

Table 50 Summary of estimated for financial value of harm reductions – hazardous drinkers

SUMMARY - HAZARDOUS	**Value of harm reduction in year 1 (£ millions)**								**Cumulative discounted value of harm reduction over 10 years (£m)**							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1 General Price +1%	-1.8	-3.2	-1.3	+.0	-6.2	-5.0	-4.5	-15.8	-28	-27	-11	+	-65	-90	-42	-197
2 General Price +10%	-18.0	-32.6	-13.1	+.0	-63.7	-50.9	-46.1	-160.7	-281	-271	-109	+	-662	-907	-426	-1,994
3 General Price +25%	-46.5	-84.0	-34.0	+.0	-164.5	-131.7	-118.9	-415.0	-727	-699	-282	+	-1,708	-2,326	-1,096	-5,130
4 Low Priced Off Trade Products +10%	-0.1	+.1	-.0	+.0	-.0	-.1	+.4	+.3	-6	+1	-	+	-5	-20	+4	-22
5 Low Priced Off Trade Products +25%	-0.8	+.2	-.2	+.0	-.8	-2.0	+.8	-2.0	-20	+2	-1	+	-19	-70	+7	-82
6 Low Priced On Trade Products +10%	-1.9	-10.2	-2.0	+.0	-14.1	-5.8	-13.6	-33.5	-27	-85	-17	+	-129	-94	-126	-348
7 Low Priced On Trade Products +25%	-5.4	-25.8	-5.1	+.0	-36.3	-16.5	-34.4	-87.1	-75	-215	-43	+	-332	-259	-317	-908
8 All Low Priced Products +10%	-2.8	-10.2	-2.1	+.0	-15.1	-8.2	-13.4	-36.7	-41	-85	-18	+	-143	-141	-124	-407
9 All Low Priced Products +25%	-7.1	-25.8	-5.4	+.0	-38.4	-21.2	-34.1	-93.6	-105	-215	-45	+	-364	-360	-314	-1,039
10 Minimum Price 15p (Off and On Trade)	+0.5	-.1	-.0	+.0	+.4	+1.4	-.0	+1.8	+4	-1	-	+	+4	+14	-	+18
11 Minimum Price 20p " "	+0.4	-.3	-.1	+.0	+.0	+1.1	-.2	+1.0	+3	-2	-1	+	+	+7	-2	+6
12 Minimum Price 25p	+0.4	-.6	-.2	+.0	-.4	+1.0	-.5	+.1	+2	-5	-2	+	-5	-3	-5	-13
13 Minimum Price 30p	-0.8	-1.5	-.5	+.0	-2.8	-2.3	-1.5	-6.6	-14	-12	-4	+	-31	-66	-14	-111
14 Minimum Price 35p	-3.2	-2.9	-1.3	+.0	-7.5	-8.8	-3.4	-19.6	-55	-24	-11	+	-90	-201	-31	-322
15 Minimum Price 40p	-7.8	-6.1	-3.2	+.0	-17.1	-20.9	-7.7	-45.7	-135	-50	-27	+	-212	-453	-71	-736
16 Minimum Price 45p	-15.3	-12.2	-6.6	+.0	-34.2	-40.9	-16.4	-91.4	-265	-101	-55	+	-421	-847	-151	-1,420
17 Minimum Price 50p	-25.4	-20.7	-11.6	+.0	-57.7	-67.8	-28.4	-153.9	-438	-172	-96	+	-707	-1,369	-262	-2,337
18 Minimum Price 60p	-51.3	-43.4	-24.8	+.0	-119.5	-137.5	-60.1	-317.1	-880	-361	-207	+	-1,448	-2,678	-554	-4,680
19 Minimum Price 70p " "	-76.7	-66.5	-37.8	+.0	-181.0	-205.8	-91.6	-478.4	-1,335	-553	-314	+	-2,202	-3,969	-844	-7,015
20 Minimum Price 20p Off and 60p On Trade	-1.8	-14.1	-2.2	+.0	-18.1	-6.0	-19.2	-43.4	-24	-117	-18	+	-159	-87	-177	-424
21 Minimum Price 30p Off and 80p On Trade	-6.8	-33.9	-6.3	+.0	-47.0	-21.2	-45.3	-113.5	-93	-282	-52	+	-426	-345	-418	-1,190
22 Minimum Price 40p Off and 100p On Trade	-18.7	-51.8	-12.3	+.0	-82.8	-53.4	-70.5	-206.6	-285	-431	-102	+	-818	-980	-650	-2,447
23 30p Minimum Price Beers Only	+1.3	-1.7	-.8	+.0	-1.1	+3.1	-2.6	-.7	+14	-14	-7	+	-6	+15	-24	-15
24 30p Minimum Price Wines Only	-0.2	-.0	+.0	+.0	-.2	-.4	+.6	+.0	-10	-	+	+	-10	-22	+6	-26
25 30p Minimum Price Spirits Only	+0.4	+.3	+.3	+.0	+1.0	+1.3	+.7	+3.0	+2	+3	+2	+	+7	+10	+6	+24
26 30p Minimum Price Alcopops (RTDs) Only	+0.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0
27 Ban Off Trade Discounting if > 50%	+0.0	+.0	-.0	+.0	-.0	+.0	+.1	+.1	-	+	-	+	-	-	+1	+
28 Ban Off Trade Discounting if > 40%	-0.6	-.3	-.3	+.0	-1.2	-1.6	-.4	-3.2	-10	-3	-2	+	-15	-31	-4	-50
29 Ban Off Trade Discounting if > 30%	-1.5	-.8	-.7	+.0	-3.1	-4.1	-1.2	-8.4	-27	-7	-6	+	-40	-80	-11	-130
30 Ban Off Trade Discounting if > 20%	-3.6	-2.1	-1.8	+.0	-7.5	-9.8	-2.9	-20.2	-63	-17	-15	+	-95	-190	-27	-312
31 Ban Off Trade Discounting if > 10%	-7.2	-4.4	-3.8	+.0	-15.4	-19.7	-6.1	-41.2	-125	-36	-31	+	-193	-380	-57	-629
32 Total Ban Off Trade Discounting	-12.5	-7.9	-6.6	+.0	-27.0	-33.9	-11.2	-72.2	-214	-66	-55	+	-335	-653	-103	-1,091
33 Ban Off Trade Discount if Reg Price <30p	+0.5	-.1	-.1	+.0	+.4	+1.3	-.1	+1.6	+4	-1	-	+	+3	+13	-1	+15

Table 51 Summary of estimated for financial value of harm reductions – harmful drinkers

SUMMARY - HARMFUL	Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemployment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemployment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
1 General Price +1%	-1.3	-1.4	-.6	-30.2	-33.4	-3.2	-2.0	-38.7	-33	-12	-5	-251	-301	-81	-19	-401
2 General Price +10%	-12.3	-14.5	-5.9	-301.4	-334.1	-30.9	-20.7	-385.8	-324	-120	-49	-2,507	-3,001	-795	-191	-3,987
3 General Price +25%	-30.2	-37.2	-15.4	-754.0	-836.8	-76.7	-53.3	-966.8	-788	-309	-128	-6,271	-7,497	-1,950	-492	-9,938
4 Low Priced Off Trade Products +10%	-1.4	-1.1	-.5	-28.8	-31.8	-3.4	-1.5	-36.8	-35	-9	-4	-240	-288	-82	-14	-384
5 Low Priced Off Trade Products +25%	-3.5	-2.9	-1.3	-72.2	-79.8	-8.6	-3.8	-92.2	-87	-24	-11	-600	-722	-206	-35	-963
6 Low Priced On Trade Products +10%	-1.3	-3.5	-.7	-24.6	-30.0	-3.2	-5.0	-38.3	-35	-29	-6	-204	-274	-84	-46	-405
7 Low Priced On Trade Products +25%	-3.2	-8.8	-1.7	-61.2	-74.9	-8.2	-12.7	-95.7	-87	-73	-14	-509	-684	-210	-117	-1,010
8 All Low Priced Products +10%	-2.7	-4.6	-1.2	-53.7	-62.3	-6.7	-6.6	-75.5	-70	-39	-10	-447	-566	-168	-61	-794
9 All Low Priced Products +25%	-6.7	-11.7	-3.0	-135.6	-157.1	-17.0	-16.6	-190.6	-176	-98	-25	-1,127	-1,426	-420	-153	-1,999
10 Minimum Price 15p (Off and On Trade)	+0.0	+.3	-.0	-2.3	-2.0	+.1	+.5	-1.4	-2	+3	-	-19	-18	-3	+5	-17
11 Minimum Price 20p " "	-0.3	+.2	-.2	-14.3	-14.7	-.9	+.5	-15.1	-13	+2	-1	-119	-132	-30	+4	-157
12 Minimum Price 25p	-1.3	-.8	-.7	-43.4	-46.1	-3.4	-.8	-50.2	-40	-7	-6	-361	-412	-94	-7	-514
13 Minimum Price 30p	-3.4	-2.8	-1.7	-97.6	-105.5	-8.7	-3.5	-117.8	-95	-24	-14	-812	-944	-226	-33	-1,203
14 Minimum Price 35p	-7.3	-6.0	-3.2	-182.1	-198.6	-18.4	-7.9	-224.8	-194	-50	-27	-1,514	-1,785	-462	-72	-2,319
15 Minimum Price 40p	-12.4	-10.0	-5.4	-302.8	-330.5	-31.1	-13.3	-374.9	-333	-83	-45	-2,518	-2,979	-796	-122	-3,897
16 Minimum Price 45p	-18.9	-15.1	-8.3	-461.7	-504.0	-47.6	-20.4	-572.0	-511	-126	-69	-3,840	-4,546	-1,226	-188	-5,960
17 Minimum Price 50p	-26.7	-21.2	-11.9	-649.6	-709.4	-67.4	-28.9	-805.6	-720	-176	-99	-5,402	-6,397	-1,733	-266	-8,396
18 Minimum Price 60p	-43.8	-34.8	-20.1	-1,033.9	-1,132.6	-111.0	-48.3	-1,291.8	-1,160	-289	-167	-8,599	-10,215	-2,823	-445	-13,483
19 Minimum Price 70p " "	-58.4	-46.0	-26.6	-1,298.2	-1,429.3	-148.3	-64.0	-1,641.6	-1,525	-383	-221	-10,797	-12,926	-3,734	-590	-17,250
20 Minimum Price 20p Off and 60p On Trade	-1.3	-4.4	-1.0	-41.5	-48.3	-3.5	-6.4	-58.2	-35	-37	-9	-345	-425	-87	-59	-571
21 Minimum Price 30p Off and 80p On Trade	-6.8	-13.8	-3.8	-172.7	-197.1	-17.5	-19.6	-234.2	-186	-115	-32	-1,436	-1,768	-448	-181	-2,397
22 Minimum Price 40p Off and 100p On Trade	-20.2	-28.2	-9.4	-457.6	-515.4	-50.6	-39.8	-605.8	-537	-235	-78	-3,806	-4,656	-1,289	-367	-6,312
23 30p Minimum Price Beers Only	-2.6	-3.4	-1.8	-99.7	-107.5	-6.7	-5.2	-119.4	-74	-28	-15	-829	-947	-179	-48	-1,174
24 30p Minimum Price Wines Only	-0.2	+1.6	+.2	+2.8	+4.4	-.4	+2.5	+6.5	-6	+13	+2	+23	+32	-13	+23	+41
25 30p Minimum Price Spirits Only	-0.5	-.9	-.0	+.0	-1.4	-1.3	-.7	-3.3	-13	-7	-	+	-20	-28	-7	-54
26 30p Minimum Price Alcopops (RTDs) Only	+0.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0	+.0
27 Ban Off Trade Discounting if > 50%	-0.0	+.0	-.0	-.3	-.3	-.0	+.0	-.3	-	+	-	-2	-3	-1	+	-3
28 Ban Off Trade Discounting if > 40%	-0.4	-.2	-.1	-8.2	-8.9	-1.0	-.2	-10.1	-10	-1	-1	-68	-81	-25	-2	-108
29 Ban Off Trade Discounting if > 30%	-1.1	-.5	-.4	-22.3	-24.3	-2.7	-.7	-27.6	-27	-4	-3	-186	-220	-67	-6	-293
30 Ban Off Trade Discounting if > 20%	-2.6	-1.3	-.9	-54.6	-59.4	-6.5	-1.7	-67.6	-67	-10	-8	-454	-539	-164	-16	-719
31 Ban Off Trade Discounting if > 10%	-5.0	-2.6	-1.9	-111.5	-121.1	-12.5	-3.6	-137.2	-134	-22	-16	-928	-1,099	-327	-33	-1,459
32 Total Ban Off Trade Discounting	-8.6	-4.8	-3.4	-197.5	-214.2	-21.3	-6.6	-242.2	-235	-40	-28	-1,643	-1,945	-569	-61	-2,576
33 Ban Off Trade Discount if Reg Price <30p	-0.3	-.3	-.1	-8.3	-9.0	-.7	-.4	-10.2	-7	-3	-1	-69	-80	-17	-4	-101

3.2 SENSITIVITY ANALYSES ON MODEL ASSUMPTIONS

A series of sensitivity analyses have been undertaken on key model parameters and underpinning assumptions. Scenario 15 (the 40p minimum price policy option) was chosen as a basecase scenario as it has reasonably large effects on each of the dimensions. The results of the sensitivity analyses are presented in detail in Table 35 to Table 57 and summarised in Figure 32.

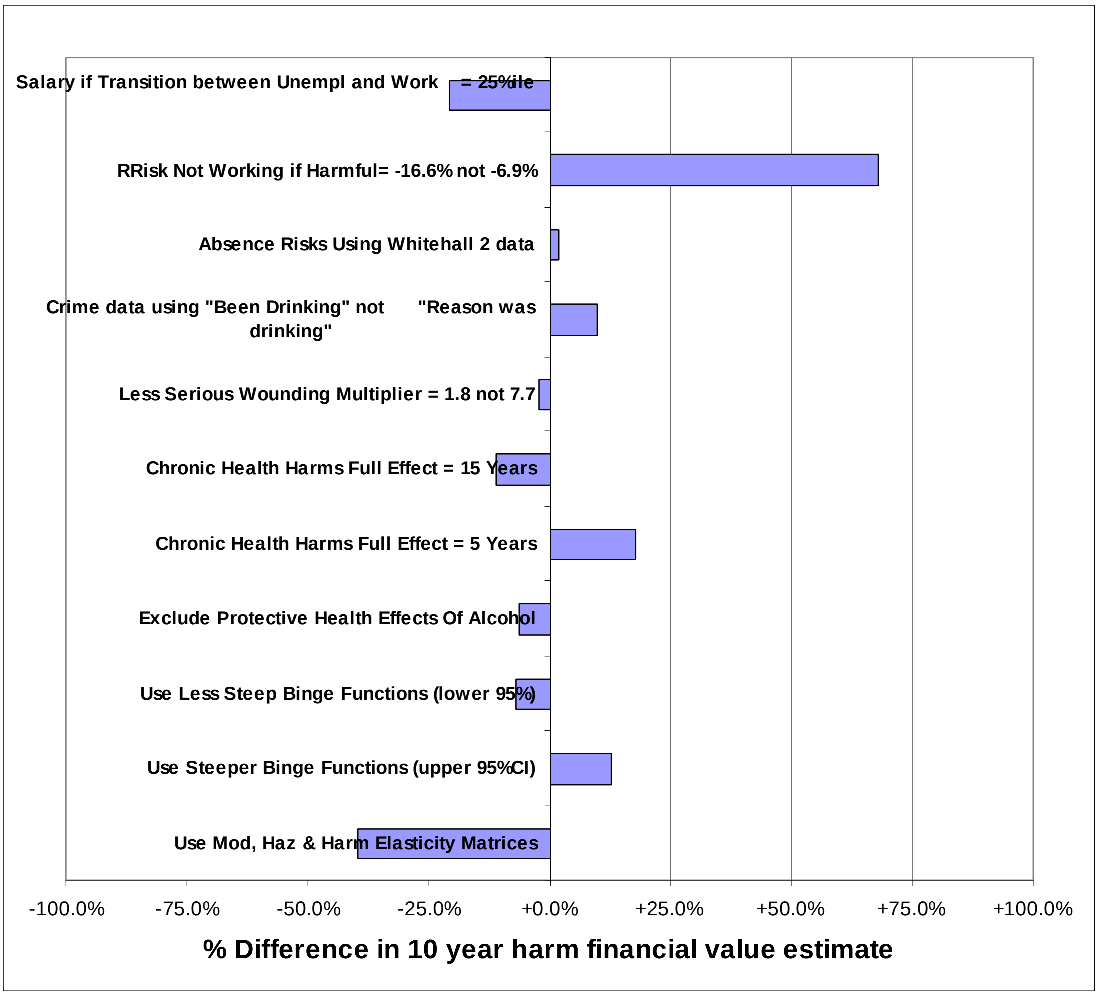


Figure 32 Results of sensitivity analyses on model parameters

A single elasticity matrix: The model has used 2 elasticity matrices in the basecase analysis, one for moderate drinkers and a second for hazardous and harmful drinkers combined. It was important to do this because, as discussed earlier, a matrix based on all the EFS cases together is heavily weighted towards moderate drinkers and misses some features of hazardous and harmful drinkers responsiveness to price. In particular, the "all" cases elasticity matrix has very small estimates for cross-elasticities and so under-estimates the effects of price changes on the switching behaviour of hazardous and harmful drinkers. This can be seen in Table 35 scenario 42, which shows much greater consumption reductions for the population than the basecase scenario 15.

Three elasticity matrices: Another option is to further split the data in moderate, hazardous and harmful matrices. This is tested in scenario 43. The results show smaller consumption changes than our basecase due to some switching behaviours towards wine in particular. This occurs in the basecase but is more pronounced here. Detailed examination at age/sex/consumption group level showed some groups having larger increases in off-trade wine consumption wine than were felt plausible given the relatively small change in price for the products that those groups consume. We therefore chose the two matrix form as our basecase. Figure 32 shows the results of working the difference through to the full 10 year cumulative financial value of harms, with a resulting figure that is 39.6% below the basecase level.

The use of different slopes for the expected scale of binge given mean consumption function, the exclusion of any protective effects of alcohol, and alternative assumptions of the time to full effect for chronic harms ranging from 5 to 15 years all make relatively little difference to the final cumulative value result, affecting it by less than +/-20%. This is partly because the figure is made up of a large component of unemployment related harm, but the healthcare 10 year costs are also relatively stable, ranging from -£412m to -£731m around the basecase estimate -£546m.

The use of an alternative multiplier for the extent of reporting of “less serious wounding” crimes, makes little difference overall (-2.1%), but does affect the overall estimated crime reduction -£93m crime costs to the justice system versus the basecase of -£140.

Similarly, use of base data for the fraction of crimes attributable to alcohol based on answers to the OCJS survey question on whether the offender had been drinking rather than was alcohol the ‘reason’ causes just over a doubling of the attributable fraction on average and hence a doubling of the crime harm value. In terms of total harm reduction this cause a 9.9% difference from basecase.

Use of the UK based Whitehall 2 study absence data rather than the Roche et al Australian study makes very little difference (1.9%).

Sensitivity on the salary to use for valuation of lost productivity due to unemployment also makes some difference. If a lower 25th percentile is used from the Labour Force Survey rather than the national mean, the resulting 10 year cumulative value would change by -20.7%.

The largest sensitivity effect is seen in scenario 51, in which an alternative relative risk of not working for problem drinking parameter is taken from the results of MacDonald and Shields. The basecase used MacDonald and Shields estimate of 6.9% which was a conservative assumption at the lower end of the various alternative statistical models presented in their study. If we use instead -16.6%, then the unemployment harm reductions become substantially larger and the difference from the basecase is +67.8%.

All of the above sensitivity analyses are on model parameters rather than the particulars on any one policy over another. They would therefore not substantially affect the relative differences between the policies.

Table 52: Parameter sensitivity analysis – effects on consumption results

SUMMARY - TOTAL	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
15 Minimum Price 40p	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
42 Use "All" Elasticity Matrix	-6.2%	-23.0	-18.5	-9.4	-0.0	-50.9	+244.4	+21.0	-216.6	+2.9	+51.7	+0.3%	+1.76	+23.34
43 Use Mod, Haz & Harm Elasticity Matrices	-1.1%	-7.8	+6.9	-8.0	+0.2	-8.7	+479.3	+311.3	-29.7	+115.6	+876.4	+5.0%	+29.78	+23.34
44 Use Steeper Binge Functions (upper 95%CI)	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
45 Use Less Steep Binge Functions (lower 95%)	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
46 Exclude Protective Health Effects Of Alcohol	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
47 Chronic Health Harms Full Effect = 5 Years	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
48 Chronic Health Harms Full Effect = 15 Years	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
49 Less Serious Wounding Multiplier = 1.8 not 7.7	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
50 Crime data using "Been Drinking" not "Reason was drinking"	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
51 Absence Risks Using Whitehall 2 data	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
52 RRisk Not Working if Harmful= -16.6% not -6.9	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34
53 Salary if Transition between Unempl and Work = 25%ile	-2.6%	-12.0	-1.4	-8.5	+0.2	-21.7	+404.4	+234.3	-90.1	+84.9	+633.5	+3.6%	+21.52	+23.34

Table 53: Parameter sensitivity analysis – effects on harm reduction results

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
15 Minimum Price 40p	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-12.4
42 Use "All" Elasticity Matrix	-347	-2.9	-7.5	-14.4	-3.2	-2744	-35.3	-7.9	-81.1	-84.1	-13.7	-23.7	-18.7	-56.1	-1.1	-335.9	-22.7
43 Use Mod, Haz & Harm Elasticity Matrices	-64	-0.9	-0.7	-2.7	-0.4	-723	-11.4	-0.8	-24.7	-17.9	+1.6	+3.2	-2.7	+2.2	+0.1	+4.8	-10.7
44 Use Steeper Binge Functions (upper 95%CI)	-193	-1.5	-5.1	-8.7	-2.0	-1420	-18.1	-5.6	-43.5	-46.8	-4.6	-7.6	-11.2	-23.3	-0.4	-143.1	-12.4
45 Use Less Steep Binge Functions (lower 95%	-140	-1.5	-1.8	-5.1	-0.9	-1362	-18.1	-1.9	-39.6	-34.8	-2.3	-3.7	-5.4	-11.4	-0.2	-72.1	-12.4
46 Exclude Protective Health Effects Of Alcoho	-115	-1.4	-2.9	-6.1	-1.2	-786	-16.8	-3.1	-38.2	-32.5	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-12.4
47 Chronic Health Harms Full Effect = 5 Years	-263	-3.0	-2.9	-9.4	-1.5	-1314	-17.5	-3.1	-39.4	-54.5	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-12.4
48 Chronic Health Harms Full Effect = 15 Years	-122	-1.0	-2.9	-5.3	-1.2	-942	-12.1	-3.1	-28.5	-29.5	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-12.4
49 Less Serious Wounding Multiplier = 1.8 not 7	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-1.6	-5.3	-7.6	-14.4	-0.2	-100.4	-12.4
50 Crime data using "Been Drinking" not "Reason was drinking"	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-9.1	-11.5	-21.7	-42.4	-0.7	-100.4	-12.4
51 Absence Risks Using Whitehall 2 data	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-3.2	-5.3	-7.6	-16.0	-0.3	-228.1	-12.4
52 RRisk Not Working if Harmful= -16.6% not -	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-30.4
53 Salary if Transition between Unempl and Work = 25%ile	-157	-1.5	-2.9	-6.3	-1.3	-1381	-18.1	-3.1	-40.8	-38.8	-3.2	-5.3	-7.6	-16.0	-0.3	-100.4	-12.4

Table 54: Parameter sensitivity analysis – effects on financial value of harm results

SUMMARY - TOTAL		Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)								
	Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10	Comaprison of 10 year harm reduction versus 40p min price option
15	Minimum Price 40p	-24.7	-16.8	-9.6	-302.8	-353.9	-63.1	-21.3	-438.4	-546	-140	-80	-2,518	-3,284	-1,938	-196	-5,418	0%
42	Use "All" Elasticity Matrix	-59.2	-61.6	-32.8	-540.7	-694.2	-157.9	-86.6	-938.8	-1,164	-513	-272	-4,497	-6,446	-4,203	-799	-11,447	+111.3%
43	Use Mod, Haz & Harm Elasticity Matrices	-8.6	+3.6	+.7	-266.4	-270.8	-18.5	+8.7	-280.5	-278	+30	+5	-2,215	-2,458	-894	+81	-3,271	-39.6%
44	Use Steeper Binge Functions (upper 95%CI)	-37.2	-24.5	-13.6	-302.8	-378.1	-99.1	-30.7	-507.9	-655	-203	-113	-2,518	-3,490	-2,338	-283	-6,111	+12.8%
45	Use Less Steep Binge Functions (lower 95%)	-18.5	-11.9	-6.9	-302.8	-340.2	-45.3	-15.1	-400.6	-493	-99	-58	-2,518	-3,167	-1,741	-139	-5,048	-6.8%
46	Exclude Protective Health Effects Of Alcohol	-24.2	-16.8	-9.6	-302.8	-353.4	-62.0	-21.3	-436.8	-519	-140	-80	-2,518	-3,257	-1,625	-196	-5,078	-6.3%
47	Chronic Health Harms Full Effect = 5 Years	-33.1	-16.8	-9.6	-302.8	-362.3	-77.3	-21.3	-460.9	-731	-140	-80	-2,518	-3,469	-2,723	-196	-6,388	+17.9%
48	Chronic Health Harms Full Effect = 15 Years	-21.9	-16.8	-9.6	-302.8	-351.2	-58.5	-21.3	-430.9	-412	-140	-80	-2,518	-3,150	-1,477	-196	-4,823	-11.0%
49	Less Serious Wounding Multiplier = 1.8 not 7.7	-24.7	-11.2	-9.6	-302.8	-348.3	-63.1	-14.0	-425.4	-546	-93	-80	-2,518	-3,237	-1,938	-129	-5,304	-2.1%
50	Crime data using "Been Drinking" not "Reason was drinking"	-24.7	-44.5	-9.6	-302.8	-381.6	-63.1	-54.3	-499.0	-546	-370	-80	-2,518	-3,514	-1,938	-501	-5,953	+9.9%
51	Absence Risks Using Whitehall 2 data	-24.7	-16.8	-22.2	-302.8	-366.5	-63.1	-21.3	-451.0	-546	-140	-185	-2,518	-3,389	-1,938	-196	-5,523	+1.9%
52	RRisk Not Working if Harmful= -16.6% not -6.	-24.7	-16.8	-9.6	-744.6	-795.8	-63.1	-21.3	-880.2	-546	-140	-80	-6,193	-6,959	-1,938	-196	-9,093	+67.8%
53	Salary if Transition between Unempl and Work = 25%ile	-24.7	-16.8	-5.3	-171.9	-218.7	-63.1	-21.3	-303.2	-546	-140	-44	-1,430	-2,160	-1,938	-196	-4,294	-20.7%

3.3 EXPLORATORY ANALYSIS OF ADVERTISING POLICIES AND ASSESSMENT OF UNCERTAINTY

There is much less routine data available on advertising than for the pricing policies. Ideally, one would require data to link the extent of advertising exposure in England, the relationship between advertising and purchasing patterns, the moderate, hazardous and harmful drinkers' different responses, separate data on under 18s etc.

In the absence of such detailed integrated data for England, it is published evidence that we use to examine the potential effects of advertising policies. As discussed in the methods section, there are substantial differences between studies, as well as considerable uncertainty and controversy.

Given this, we have undertaken a series of exploratory analyses to examine the effects of different assumptions concerning the effects of advertising on consumption. The framework of the modelling is exactly the same as that used for the pricing policies.

The analyses examine three specific areas:

- The possible effects of proposals to include public health based messages in $1/6^{th}$ of all alcohol advertising
- Eliminating exposure of under-18s to TV based advertising
- A total ban on all alcohol advertising.

The results of analyses are shown in Table 35 for consumption and spending, Table 56 for health, crime and employment harms, and Table 57 for financial value.

3.3.1 EFFECTS OF PROPOSALS TO INCLUDE PUBLIC HEALTH BASED MESSAGES IN 1/6TH OF ADVERTISING

In scenarios 34 to 36, an attempt has been made to quantify the effects of the recently suggested proposal that 1/6th of advertising time be used for public health messages. In line with the systematic review of evidence and as discussed earlier, we do not assume any direct benefits from this, but have examined the impact by assuming that advertisers would maintain their budget and that this would therefore reduce advertising exposure pro rata. There is obviously a large degree of uncertainty around the appropriateness of this assumption. Note also that we have modelled this as a total effect across all channels not just broadcast, including internet, radio etc. Also the modelling does not differentiate between end-frames & replacing 1/6th of adverts

The results in Table 35 show relatively small effects compared to some of the pricing policy options with a change in mean consumption of -0.5% if the median estimated elasticity is used from the meta-analysis by Gallet (2007). Uncertainty is substantial though, with the results ranging from -0.2% to -2.2% (an eleven-fold difference) if higher or lower estimated advertising elasticities also reported by Gallet are used.

The results for harm reduction are similarly varied, with for example 7 deaths saved in year 1 using the lower estimate and 119 using the higher estimate. This is reflected again in crime harms (range from 800 to 8,000 violent crimes avoided depending on the assumption used. And again, for employment, there is an almost 15-fold difference between the lower and upper estimates of days absence.

Figure 33 shows the corresponding uncertainty in the expected financial value of savings.

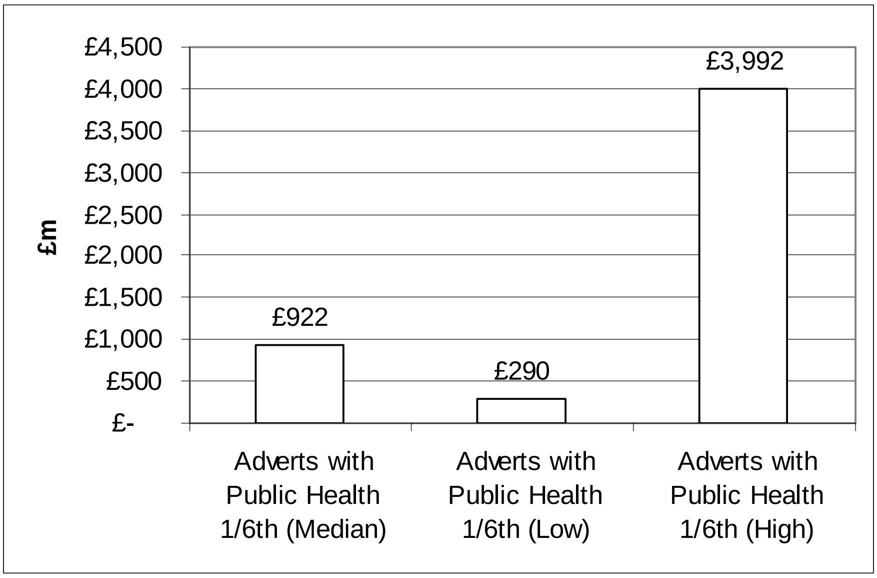


Figure 33: Uncertainty in 10 year cumulative financial value of savings: proposals to include public health based messages in 1/6th of advertising

Table 55 Summary of uncertainty in consumption effects for advertising policies: England population (scenarios 34 to 41)

SUMMARY - TOTAL	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£ p)	
Policy Scenario	% change in consumption (all beverages)	Beer	Wine	Spirit	RTD	All beverages	Off retail (exc duty + VAT)	On retail (exc duty + VAT)	Off duty + VAT	On duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in consump.
34 Adverts with Public Health 1_6th (Median)	-0.5%	-1.8	-1.7	-0.5	-0.2	-4.2	-16.2	-41.5	-15.7	-15.6	-89.0	-0.5%	-3.02	+0.00
35 Adverts with Public Health 1_6th (Low)	-0.2%	-0.6	-0.4	-0.2	-0.1	-1.3	-4.3	-14.4	-4.2	-5.5	-28.5	-0.2%	-0.97	+0.00
36 Adverts with Public Health 1_6th (High)	-2.2%	-7.9	-7.4	-2.3	-0.7	-18.3	-72.0	-178.6	-69.9	-67.0	-387.4	-2.2%	-13.16	+0.00
37 Eliminate Exposure to TV Adverts <18s (Mid)	-0.3%	-1.4	-0.4	-0.5	-0.5	-2.8	-4.0	-48.3	-4.5	-19.5	-76.3	-0.4%	-2.59	+0.00
38 Eliminate Exposure to TV Adverts <18s (Low)	-0.1%	-0.5	-0.2	-0.2	-0.2	-1.1	-1.5	-18.3	-1.7	-7.4	-29.0	-0.2%	-0.98	+0.00
39 Eliminate Exposure to TV Adverts <18s (High)	-0.4%	-1.8	-0.5	-0.6	-0.7	-3.6	-5.1	-62.4	-5.9	-25.2	-98.6	-0.6%	-3.35	+0.00
40 Total Adv Ban (Saffer & Dave Evidence)	-26.9%	-95.3	-90.9	-27.8	-7.8	-221.8	-887.8	-2131.5	-860.2	-796.6	-4676.1	-26.9%	-158.88	+0.00
41 Total Adv Ban (Nelson & Young Evidence)	+4.9%	+17.4	+16.6	+5.1	+1.4	+40.4	+161.8	+388.5	+156.8	+145.2	+852.2	+4.9%	+28.96	+0.00

Table 56 Summary of financial of uncertainty in harm reduction effects for advertising policies: England population (scenarios 34 to 41)

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace harm p.a.	
Policy Scenario	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	QALYs saved ('000s)	Deaths	Chronic illness ('000s)	Acute illness ('000s)	Hospital admissions ('000s)	Cum. dicounted QALYs Years 1-10 ('000s)	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims ('000s)	Days Absence ('000s days)	Unemployed ('000s people)
34 Adverts with Public Health 1_6th (Median)	-27	-0.2	-0.7	-1.2	-0.3	-188	-2.5	-0.7	-5.9	-6.6	-1.9	-3.7	-3.9	-9.6	-0.2	-37.1	-1.4
35 Adverts with Public Health 1_6th (Low)	-7	-0.1	-0.2	-0.4	-0.1	-45	-0.6	-0.2	-1.5	-1.9	-0.8	-1.9	-3.1	-5.8	-0.1	-11.6	-0.4
36 Adverts with Public Health 1_6th (High)	-119	-0.9	-3.1	-5.3	-1.3	-830	-10.9	-3.2	-25.8	-29.1	-8.0	-15.2	-13.9	-37.1	-0.6	-161.9	-6.2
37 Eliminate Exposure to TV Adverts <18s (Mid	-6	-0.0	-0.6	-0.8	-0.3	-8	-0.3	-0.6	-1.2	-3.1	-3.6	-10.9	-23.5	-37.9	-0.4	-29.1	-0.4
38 Eliminate Exposure to TV Adverts <18s (Low	-2	-0.0	-0.2	-0.3	-0.1	-3	-0.1	-0.2	-0.5	-1.2	-1.4	-4.1	-8.9	-14.4	-0.2	-11.0	-0.2
39 Eliminate Exposure to TV Adverts <18s (Hig	-8	-0.0	-0.8	-1.1	-0.4	-11	-0.4	-0.8	-1.6	-4.0	-4.6	-14.0	-30.3	-48.9	-0.5	-37.6	-0.6
40 Total Adv Ban (Saffer & Dave Evidence)	-1349	-9.8	-36.6	-60.9	-14.8	-8971	-117.2	-38.1	-278.6	-326.7	-93.1	-167.8	-127.8	-388.7	-7.3	-1957.9	-64.2
41 Total Adv Ban (Nelson & Young Evidence)	+294	+2.1	+8.5	+13.8	+3.3	+1969	+25.8	+9.0	+62.8	+72.3	+17.8	+32.2	+24.3	+74.3	+1.4	+375.9	+14.5

Table 57 Summary of uncertainty in financial value advertising policies: England population (scenarios 34 to 41)

SUMMARY - TOTAL	Value of harm reduction in year 1 (£ millions)								Cumulative discounted value of harm reduction over 10 years (£m)							
Policy Scenario	Healthcare costs Year 1	Crime costs Year 1	Absence costs Year 1	Unemploy ment costs Year 1	Total direct costs Year 1	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1	Healthcare costs Years 1-10	Crime costs Years 1-10	Absence costs Years 1-10	Unemploy ment costs Years 1-10	Total direct costs Years 1-10	Health QALY value	Crime QALY value	Total value of harm reduction incl. QALYs Year 1-10
34 Adverts with Public Health 1_6th (Median)	-5.3	-9.4	-3.4	-33.0	-51.0	-14.7	-12.8	-78.5	-91	-78	-28	-274	-472	-332	-118	-922
35 Adverts with Public Health 1_6th (Low)	-1.6	-4.8	-.9	-8.1	-15.5	-4.8	-6.1	-26.4	-25	-40	-7	-68	-141	-93	-57	-290
36 Adverts with Public Health 1_6th (High)	-22.9	-37.8	-15.0	-146.1	-221.8	-63.6	-52.5	-338.0	-400	-314	-125	-1,215	-2,055	-1,453	-484	-3,992
37 Eliminate Exposure to TV Adverts <18s (Mid)	-3.8	-28.1	-.9	-1.8	-34.5	-13.6	-33.2	-81.3	-38	-233	-8	-15	-294	-153	-306	-753
38 Eliminate Exposure to TV Adverts <18s (Low)	-1.4	-10.7	-.3	-.7	-13.1	-5.1	-12.6	-30.9	-14	-89	-3	-6	-112	-58	-116	-286
39 Eliminate Exposure to TV Adverts <18s (High)	-4.9	-36.2	-1.2	-2.3	-44.6	-17.6	-42.9	-105.1	-49	-301	-10	-19	-379	-198	-396	-973
40 Total Adv Ban (Saffer & Dave Evidence)	-265.6	-416.7	-185.1	-1,530.7	-2,398.1	-740.7	-589.7	-3,728.5	-4,528	-3,466	-1,540	-12,730	-22,263	-16,335	-5,438	-44,037
41 Total Adv Ban (Nelson & Young Evidence)	+60.6	+79.8	+35.7	+345.7	+521.8	+167.5	+113.8	+803.0	+1,002	+664	+297	+2,875	+4,838	+3,614	+1,049	+9,501

3.3.2 ELIMINATING EXPOSURE OF UNDER-18S TO TV BASED ADVERTISING

The analysis presented here assumes that there is no effect on any drinkers over the age of 18, and also assumes it is possible to eliminate exposure to TV advertising for children. This elimination is not evidence based but rather a 'what-if analysis' to obtain an estimate of the potential upper bound of effect of some attempt at restriction on exposure.

In the 'Mid' scenario (37) here, the effect of the policy is simplistically modelled as equivalent to the effect of one 'media ban', as defined and evidenced with an associated consumption elasticity (-8.98% per ban) in the study by Saffer and Dave (2002). As alternative evidence scenarios, Saffer & Dave's 2006 study presents several analyses providing estimated elasticities for advertising exposure and we take an upper and lower estimate from the published ranges.

The result of the 'Mid' scenario (37) is an estimated reduction in total consumption of just -0.3%, but the effects on 11 to 18 year olds are estimated to be much more substantial with a reduction in consumption for that group of -9%. The estimated consequent reduction in harm occurs particularly in the area of crime, with -38,000 offences and a crime costs reduction of -£28m per annum.

Using higher and lower estimates for elasticities provides a range for example of -£11m to -£36m crime costs per annum (scenarios 38, 39). This range does not account however for the uncertainty concerning the potential for actually implementing a total elimination of exposure to TV advertising for the under-18s.

Figure 34 shows the corresponding uncertainty in the expected financial value of savings.

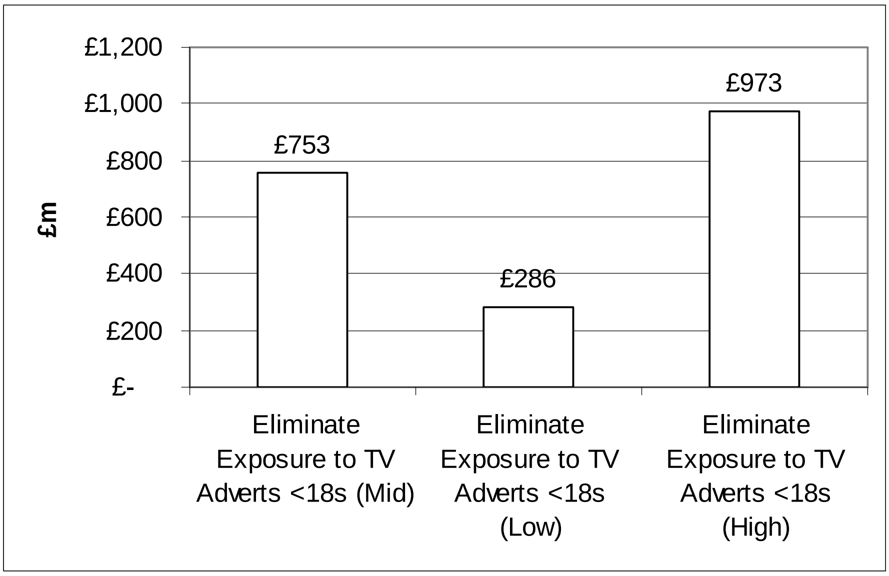


Figure 34: Uncertainty in 10 year cumulative financial value of savings: eliminating exposure of <18s to TV advertising

3.3.3 COMPLETE ADVERTISING BAN

Two scenarios (40, 41) have been examined to investigate a total ban on all advertising.

Scenario 40 uses method and assumptions based again on Saffer and Dave 2002. *If* the assumptions and results of that study were believed to hold and apply to England as of 2008, then the estimated impact of a total ban on advertising would be substantial. A -26.9% estimated change in mean consumption would be the result, with consequently very high reductions in harm and a 10-year cumulative financial value of harm reduction of -£44bn. This is much higher than any equivalent figure seen in the pricing policy scenarios examined (compare for example -£20bn for a +25% increase in prices across the board).

Scenario 41 uses published work by Nelson and Young in which they argue that advertising bans have little benefit and in fact can cause harm because suppliers compete for market share instead on the basis of price and thus, as prices fall, consumption actually rises. The results of using this assumption therefore is a +4.9% increase in consumption, and an associated increase in harms, with a ten year financial value effect of +£9bn more harm, as compared to the Saffer & Dave based -£44bn.

Figure 35 shows the uncertainty in the expected financial value of savings.

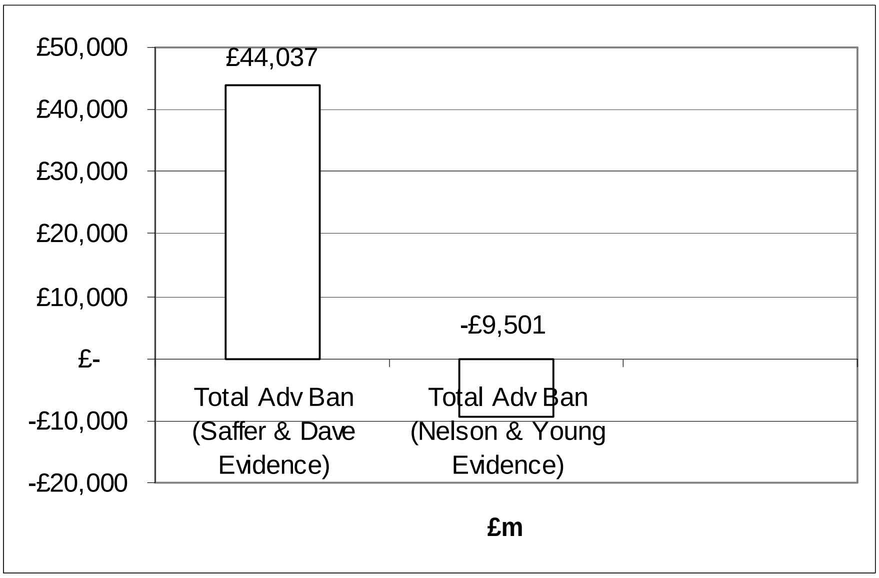


Figure 35: Uncertainty in 10 year cumulative financial value of savings: total advertising ban

Given this disparity in evidence, and the associated controversy, an accurate estimate of potential effect cannot be determined without further primary research, ideally in the UK.

4 DISCUSSION

This discussion section summarises the capability of the new alcohol policy model built for this project, sets out the results of validating the model against earlier work on alcohol attributable harms, details the main assumptions limitations and cautions, and discusses areas for possible future work.

4.1 CAPABILITIES OF THE MODEL

This is the first study to integrate modelling approaches intended to answer specific policy questions around pricing and promotion of alcohol and the related effects on harms in terms of health, crime and employment in England. We have developed an integrated suite of models, linking the aspects of price, advertising, drinking patterns, purchasing patterns, elasticities, health conditions including diseases wholly attributable to alcohol, chronic and acute alcohol-related illnesses and mortality, crimes including violence and criminal damage, and work absence and unemployment attributable to alcohol.

Importantly, we have made substantial use of contemporary data from a variety of sources including individual level data on patterns of drinking, purchasing of alcohol, as well as UK and international evidence on the harms attributable to alcohol. This study is the first to derive own-and cross-price elasticities for 16 beverage categories (high- and low-priced beers, wines, spirits and RTDs, split further by on- and off-trade purchasing). These are more detailed figures broadly in line with meta-estimates of elasticities reported in our systematic review. This has been done for two groups (a) moderate drinkers and (b) combined hazardous and harmful drinkers. It also contains detailed data on individual consumption and purchasing patterns through linked use of GHS and EFS data, enabling analysis by age/sex/consumption group and by the 16 categories of alcohol. Thus the modelling accounts for the heterogeneity in the UK drinking population in terms of consumption preferences and in terms of responses to changes in product prices, including substitution effects.

The model has been constructed in conjunction with a systematic review of evidence of available evidence. It runs in EXCEL VBA based software, and can rapidly analyse alternative policies and assumptions, taking around fifteen minutes to undertake one policy analysis.

The aim of the modelling has been to provide new insight into potential policies on pricing and promotion intervention for policymakers, and its first use has been to provide the results here to inform policy for the Department of Health and government in England. The range of questions the modelling is able to address extends beyond the current report and the aim will be to adapt and utilise the model as part of a number of research programmes including those for the National Institute for Health and Clinical Excellence as well as in collaborations internationally.

4.2 VALIDATION OF MODEL

As a central part of model testing and validation, particularly for the consumption-to-harm model, we ran the model to the very extreme in a scenario of zero alcohol consumption in England. This is essentially asking the same question as that recently addressed by Home Office and the NWPHO reports, i.e. what is the estimated alcohol-attributable cost of health, crime and employment related harms? Several aspects of the Home Office analysis fed into our modelling work, including use of the same 47 health conditions, unit costs for inpatient admission, for crimes etc. There are many necessary differences in approach though in order for our work to address the more complex questions around marginal changes in consumption and due to our updated evidence review. We have undertaken a comparison with the recently revised Department of Health and Home Office analysis (Table 58). The results are very similar for health and unemployment. The difference in crime results is explained by our use of different lower alcohol attributable fractions AAF and our exclusion of lost output due to premature deaths for homicide. The difference in absence from work costs is explained by our use of the latest available detailed attributable fractions (Roche et al, 2008).

Table 58: Comparison of estimates of total attributable alcohol costs

	Home Office Analysis 2008 £bn p.a.	Our Model £bn p.a
NHS related costs	2.7	2.8 *
Crime related costs	9.0 - 15.0	5.1
Absence from work costs	1.4 - 2.0	0.9
Unemployment costs	2.0 - 2.5	2.6

* assuming full effect after 10 year time delay

4.3 MODELLING ISSUES, ASSUMPTIONS AND LIMITATIONS

Both “price to consumption” and “consumption to harm” models are populated with a very large number of inputs, and it has not been possible to examine the uncertainty in a probabilistic sensitivity analysis (PSA) within the scope of the current project. We undertook exploration of uncertainty using one-sensitivity analysis for key parameters and results suggest confidence bounds of +/-25% on the cumulative value of harm reduction for most of the key parameters, with greater sensitivity for the use of further split elasticity matrix (-39%) and for the relative risk of not working for harmful drinkers (+68%).

A – Price, promotion and consumption data sets

The model results present are based on the assumption that the datasets and reported relationships used in the various components of the model are representative. We base much of our analysis on the GHS datasets on consumption and EFS datasets on purchasing. Both are cross-sectional surveys and enable examination of the impact of changes in price on changes in consumption under the assumption that the cross-sectional econometric modelling is representative of longitudinal change. A recent meta-analysis (Gallet 2007) compared average elasticities derived from time-series, panel and cross-sectional studies (-0.54, -0.47 and -0.63, respectively). These do no differ substantially; which lends important credence to our cross-sectional derived elasticity estimates.

Binge drinking is not adequately represented in EFS and we mapped the relationship between average and peak consumption from GHS. We were thus not able to derive elasticities specifically for "binge". Similarly, one cannot disentangle demand response to price from the demand response to price promotions using EFS, and so different elasticities to represent the feeling that one is getting "a bargain" cannot be computed. One also cannot explore the relationship between size of discount and volume of purchasing required to qualify for the discount, again due to EFS data limitations.

The "ideal" integrated dataset would have contained longitudinal cohort data on consumption, pricing, sales and purchasing patterns of alcohol. This would have enabled a more direct analysis of the impact of prices on drinking behaviour, including bingeing, than our approaches. The GHS information on consumption patterns and EFS information on purchasing behaviour were linked through matching the behaviours of "similar" people (based on a large range of variables including age, gender, income, region, educational status, quantity of alcohol bought etc). This loses some of the individual variability present in the original data sources.

The EFS is advantageous in that it provides detailed measures of purchasing in terms of both price paid and quantity bought. Of course, the main limitations are that the person who buys is not necessarily the person who drinks, and alcohol bought in the off-trade may be stored over any length of time. Purchasing behaviour, including the price paid, may also be influenced by aspects of utility other than ethanol content (for example, convenience of shopping or amenity value of drinking location).

Alcohol surveys have a number of general limitations, including a tendency to underestimate alcohol consumption due to underreporting and through under sampling people who drink the most. GHS, SDD and EFS all under-represent population groups that are likely to experience significant alcohol-related harm, for example the homeless, those not regularly attending mainstream schools etc. (groups unlikely to account for a large proportion of the population but who may account for significant harm). Our analyses of GHS and HMRC Clearance data suggest that methodological revisions have reduced this problem from around 50% in 2005 to 21% in 2006 (Table 59). Interestingly, sales data obtained from Nielsen for the same period also underestimates HMRC Clearance data by 20%. Unfortunately, there are no robust data that allow us to determine whether under-reporting is consistent across age and consumption groups (moderate, heavy and harmful drinkers). This under-reporting affects only sales value estimates in the modelling, rather than the level of harms avoided, because harm estimates are scaled to match routine available data on total observed harm, for example, number of crimes or hospitalisations.

Table 59: Underestimation of alcohol sales and consumption in datasets used

	l of pure alcohol
HMRC Clearance 2006/7 (per adult)	11.39
GHS 2006: Total consumption per person >16 years*	8.96
HMRC Clearance 2006/7 (total litres)	560,000,000
Nielsen: Total litres of pure alcohol sold year ending May 2007*	446,069,462

*ABV estimation method follows the revised ONS recommendations

Our population sub-group analysis is strongest for those groups for which we have the most data, particularly moderate drinkers. Our modelling is less strong for under-16s since their purchasing behaviour is not represented in the EFS and their total consumption levels are likely to be less strongly linked to price because they also obtain alcohol from other sources – e.g. parents – and as such may have price elasticities that are functions of both their own and others' behaviour.

The available data sources provide little evidence on detailed patterns of consumption, including frequency of binge drinking, which has implications for the model's ability to fully capture impacts on acute harms (e.g. a drinker may cut weekly consumption by 1 drink a week but still ensure that a budget is available to drink to intoxication at the weekend).

B – Advertising effects

The evidence base on the effects of advertising on consumption, whilst comprising many hundreds of papers, is severely limited due to methodological difficulties, as discussed in detail in our systematic review report and the relevant report section. Studies estimating advertising elasticities rely on high-level aggregates of advertising expenditure, mostly with short-run series. This makes it unlikely that such studies will find significant effects. Cohort studies can be prone to confounding effects, i.e. unmeasured third variables that influence both advertising exposure and later drinking behaviour. Given these problems, we have chosen to adopt an exploratory approach. We model a range of plausible effect sizes reported in the literature, including some of the smallest and some of the largest effects reported, to give an idea of the boundaries of effects that might be expected. Data limitations have also prevented us from analysing the effects of time-based restrictions on alcohol advertising (e.g. a 9pm watershed). Crucially, we also cannot consider indirect and long-term influences of advertising on consumption through third variables such as changes in social norms and acceptability of alcohol.

It should be noted that the effectiveness of a particular intervention involving a form of restriction or ban will be determined by a number of other factors, including the degree of enforcement and opportunities for advertisers to redirect their resources to other channels that might escape the effect of a ban e.g. product placement or event sponsorship. We have not been able to consider industry responses as part of our model and policy makers will need to carefully evaluate the potential for substitution.

C – Evidence on risk functions

Many risk estimates in our modelling were based on non-UK research as UK studies were either not available, did not provide the necessary detail of information or were of insufficient quality (see Systematic Review report for details of identified studies). A further limitation of the evidence base is that some of the risk estimates were available for only few exposure categories, which may under/overestimate the risk after the last risk estimates point. Often, risk estimates were also not available for all age and gender groups modelled, most notably for the under-18s age group. Where this was the case, risk functions were assumed to be similar between age and sex groups. Finally, most of the literature on partially attributable disease risk functions and AAF examines mortality and hospitalisation data together in some weighted mix, so that different relative risk functions for mortality and morbidity are not available. Risk functions and/or AAF were often not adjusted for confounding factors such as smoking which may overestimate risk associated with alcohol exposure.

Risk modelling is further developed for health harms than crime and employment outcomes. However, when risk functions were not available, we have often transformed AAF and/or published cohort-based risk models with step functions of relative risks for groups into linear risk models. A linear approach was selected in the absence of empirical evidence. The risk was assumed to start after a threshold of 4/3 units for acute drinking and 3/2 units for chronic drinking for males and females respectively due to the absence of consensus. Such approach may thus present a limitation, notably for harms caused by acute drinking behaviour. However, we judged that these assumptions would be a better approximate than assuming a risk increase after a threshold of 0, or after the threshold of “binge drinking”.

D – Evidence on morbidity

Essentially in our health harm model we assume that the person-specific hospitalisation rates for each age/sex group can be considered as a proxy for the prevalence of the disease. Clearly, this assumption has major limitations, since persons with an alcohol-attributable disease who are not hospitalised during the year are not included in the dataset. Therefore, morbidity and consequent health savings are likely to be underestimated in our models.

E – Evidence on lag between consumption change and impact on harm

Very limited research evidence exists on population-based “lags”, i.e. information on the timescales and functional forms that link reductions in consumption to effects on harms. For example, it is unclear whether harm effects are accrued following a linear pattern, or another functional form. Indeed, there is some debate whether, at the population (aggregate) level, lags should be modelled at all (e.g. Kerr et al. 2000[72]).

In the absence of clear evidence, we made an assumption of a 10-year lag with linear progression (i.e. 1/10th of the effect is accrued each year). This may lead to significant underestimates if full benefits are either gained earlier or if health benefits are disproportionately achieved in the early years (Ramstedt, 2004[73]). We also made an assumption that the time lag to full effect for chronic conditions is similar for both morbidity and mortality. This may not be true for many conditions, but no empirical evidence on this could be identified. Uncertainty analyses have been conducted to test effects using a 5- and 15-year lag structure.

4.4 AREAS FOR POSSIBLE FUTURE RESEARCH

Given the trends in consumption over the past ten years it is unlikely that a ‘do nothing’ policy would result in no change to the consumption of alcohol in the population. The model currently takes an incremental approach and compares the effect of a new policy against a ‘stay steady’ position. This is not too great a limitation for comparing the relative incremental effect of different policy options but does limit its absolute predictive power. Further research could be undertaken to analyse trends for different population subgroups and project forward a continuation of these trends if no policy action were taken.

At present our analyses exclude the direct costs to government of implementation and monitoring of any of the policies and when available these should be considered alongside our results. Detailed data on the extent of sales promotion in the on-trade are lacking and research or infrastructure investment to ascertain patterns here would probably be beneficial for policy and evaluation of change.

A much more intensive economics based research programme could develop modelling approaches to account for the effects of actions taken by the industry in response to the policy options and the possible effects on the market structure and supply. This could also potentially extend to other exclusions from our analysis such as wider costs or benefits to the economy beyond health, crime and employment, any “drinkers’ pleasure” or “social lubricant” effects of alcohol and on the harm side, modelling the impact on lower-level social disorder and the effect on families and friends of individuals who misuse alcohol.

4.5 SUMMARY

The development of these modelling approaches to consider policy questions represents a substantial challenge. This work has surmount several of the important hurdles and aims to support policy makers directly in relation to important decisions.

APPENDICES

Appendix 1: Age/sex consumption distribution from the GHS (2006) – Descriptive statistics

Figure 36: Age and sex-specific distribution of drinking behaviour in adults in England in 2006

		18 – 24 years		25 – 34 years		35 – 44 years		45 – 54 years		55 – 64 years		65 – 74 years		75 years +	
Mean Consumption	**Intake the heaviest day**	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Abstainers		10.71%	14.03%	10.47%	14.21%	7.20%	12.86%	8.67%	13.28%	8.18%	15.30%	8.37%	20.59%	15.99%	27.00%
Moderate	< 6 / 8 units	41.97%	46.49%	43.95%	51.11%	46.60%	54.20%	49.59%	53.73%	50.65%	57.89%	59.88%	58.50%	65.84%	59.95%
	≥ 8 / 6 units	10.06%	10.93%	10.58%	8.30%	9.79%	6.67%	6.87%	4.97%	4.05%	2.66%	2.09%	1.16%	0.78%	0.38%
Hazardous	< 6 / 8 units	10.06%	9.79%	9.92%	9.33%	14.64%	11.35%	15.90%	13.90%	18.60%	14.57%	19.42%	15.31%	14.13%	11.28%
	≥ 8 / 6 units	16.27%	11.58%	15.59%	9.85%	12.62%	8.60%	9.21%	6.21%	8.10%	3.78%	3.60%	1.37%	0.62%	0.25%
Harmful	< 6 / 8 units	2.78%	1.47%	1.96%	1.80%	2.51%	2.06%	2.98%	3.26%	3.01%	2.58%	3.37%	2.01%	1.71%	1.01%
	≥ 8 / 6 units	8.14%	5.71%	7.52%	5.39%	6.63%	4.26%	6.78%	4.66%	7.41%	3.22%	3.26%	1.06%	0.93%	0.13%
Total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Figure 37: Proxy of the binge behaviour in England in 2006

	18 – 24 years		25 – 34 years		35 – 44 years		45 – 54 years		55 – 64 years		65 – 74 years		75 years +	
Intake the heaviest day	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Abstainers	10.71%	14.03%	10.47%	14.21%	7.20%	12.86%	8.67%	13.28%	8.18%	15.30%	8.37%	20.59%	15.99%	27.00%
< 6 / 8 units	54.82%	57.75%	55.83%	62.24%	63.75%	67.61%	68.47%	70.89%	72.27%	75.04%	82.67%	75.82%	81.68%	72.24%
≥ 8 / 6 units	34.48%	28.22%	33.70%	23.54%	29.05%	19.53%	22.85%	15.84%	19.55%	9.66%	8.95%	3.59%	2.33%	0.76%

Appendix 2: Nielsen Data Specification

Requirement specification for price and promotion distribution of alcohol sales – FINAL VERSION

1. Summary

This document finalises the specification for the distribution of alcohol sales price and promotion.

2. Our understanding of Nielsen's raw data

Nielsen hold data on the sales of SKUs (defined by individual bar-codes) for alcoholic beverages, where each item of data includes at least the following fields:

- SKU code
- Week
- Store / outlet (this is at individual store level, e.g. Waitrose, Marylebone High Street)
- Volume of sales (litres of beverage)
- Value of sales (in £)
- Flag identifying whether these sales were on promotion or not
- Product category

This data is available for the Grocery Multiples channel. Data is more limited for the Impulse and on-trade channels; in particular, promotion data is not available in these channels.

3. Our requirement for price distribution

We require a description of the price at which products are sold.

For every Product we will provide a set of 10 ranges of sales price per unit volume. For every range, we require the total sales volume and the total sales value for the SKUs (at individual week and outlet level) falling within that range, split by those SKUs that were sold on promotion and those not sold on promotion. For those SKUs on promotion, we also require the hypothetical sales value if the SKUs had been sold at non-promotional price.

An example template for a Product is shown below (Template 1). We will provide the information shown in ***bold italics***. We require Nielsen to provide the information in *italics*. The data shown is for illustrative purposes only.

Product	***Cider/ perry***	Non-promotional sales		Promotional sales		
Price range identifier	Price range (in £ per litre)	Total volume of sales (in litres)	Total value of sales (in £)	Total volume of sales (in litres)	Total value of sales (in £)	Total non-promotional value of sales (in £)
1	***Under 0.50***	*10,000,000*	*2,500,000*	*8,000,000*	*1,500,000*	*2,200,000*
2	***0.50 to less than 0.60***	*12,000,000*	*7,000,000*	*11,000,000*	*4,000,000*	*6,500,000*
…	***…***	*…*	*…*	*…*	*…*	*…*
10	***5.00 and over***	*1,000,000*	*7,500,000*	*500,000*	*1,500,000*	*3,500,000*

4. Our requirement for promotion distribution

We require a description of the extent of sales promotions within the price distribution.

Nielsen use an industry recognised method to determine if a price of an item (an SKU in an outlet) is promotional or not in any given week. The highest price recorded over the previous 5 weeks in the outlet is treated as the regular price ("RRP") of the item. If the price drops from the RRP by 5% or more in a subsequent week, the item is classified as being on promotion. If the reduced price remains in place for more than 4 weeks it then becomes the new RRP (i.e. the item is no longer on promotion).

<u>Using RRP to determine the distribution of promotion</u>

Each record in the raw data would now conceptually have three new attributes:

- RRP (computed as above)
- Price band identifier from 1 to 10 (as described in Section 3 above) corresponding to sales price
- Price band identifier from 1 to 10 corresponding to RRP.

These attributes can be used to derive the "Total non-promotional value of sales" (for promotional sales only) for each price band, as required in Template 1, using the formula:

Total non-promotional value of sales $_{product,\ sales\_price\_band}$ =

$$\sum_{SKU=1}^{\text{Total SKUs in product}}\left[\sum_{outlet=1}^{\text{Total outlets}}\left[\sum_{\text{week}=1}^{52}\left[Volume_{SKU,outlet,week,sales\_price\_band}\times I_{SKU,outlet,week}\times \mathrm{RRP}_{SKU,outlet,week}\right]\right]\right]$$

where $I_{SKU,outlet,week}$ = 1 if *SKU, outlet, week* is on promotion

$I_{SKU,outlet,week}$ = 0 if *SKU, outlet, week* is not on promotion.

<u>Additional table as a by-product of the analysis</u>

As a by-product of the above computation, Nielsen will provide the following descriptive output. We do not anticipate this would require further bespoke analysis, but simply a standard cross-tabulation of the data.

For each of the 32 Product categories we require a summary of volume sales split by sales price band and RRP price band. The summary should be for promotional sales only. The resulting output is shown in the template below (Template 2):

Product	***Cider/ Perry***	RRP range	(in £ per litre)		
		Under 0.50	***0.50 to less than 0.60***	***…***	***5.00 and over***
Sales price range (in £ per litre)	***Under 0.50***	*200,000*	*1,000,000*	*1,500,000*	*50,000*
	0.50 to less than 0.60	*0*	*150,000*	*1,250,000*	*70,000*
	…	*…*	*…*	*…*	*…*
	5.00 and over	*0*	*0*	*0*	*500,000*

We will have already provided the price ranges definitions shown in ***bold italic***. We require Nielsen to populate the aggregate volume of promotional sales shown in *italic*.

As an example, in the illustrative data shown in Template 2 above, 1,000,000 litres of Cider/Perry sold at a promotional price of less than 0.50 £/litre had an associated RRP of between 0.5 and 0.6 £/litre.

5. Product inclusion

Our aim is to perform analysis at the aggregated level of beers, wines, spirits and alcopops but we wish to have slightly more detail by Nielsen Product categories so that we can aggregate later by ethanol content.

Beers:

- Non/low alcoholic lager
- Commodity lager
- Standard lager
- Premium lager
- Superstrength lager
- Non/low alcoholic ale
- Commodity ale
- Standard ale
- Premium ale
- Superstrength ale
- Stout
- Cider and perry

Spirits:

- Blended Scotch Whisky
- Malt Whisky
- Imported Whisky
- Gin
- Vodka
- Liquers
- Brandy/cognac
- Rum

Wines:

- Australian Light Wine
- French Light Wine
- Italian Light Wine
- USA Light Wine
- German Light Wine
- Chilean Light Wine
- Sparkling Wine
- Champagne

Fortified wines:

- Sherry
- Port
- Vermouth

Alcopops:

- RTDs (Flavoured Alcoholic Beverages)

6. Data coverage

We understand that data is available for Great Britain and can also be partitioned for England & Wales. However data for England in isolation is not available.

Our requirement is:

Timeframe = Three separate analyses for each of the three years of Nielsen data.
Geography = England & Wales only.

7. Supplementary analysis requirements

We also require Nielsen to provide the following supplementary analyses for each of the 52 weeks of data.

A. Total volume and value of sales in Grocery Multiples in England & Wales

We require Nielsen to complete the template below, in which **all** sales of alcoholic beverages are summarised in the high-level categories of beer, wine, fortified wine, spirits and alcopops. We have distinguished between wine and fortified wine because of likely differences in both ABV and the market coverage by the Products included in the main analysis.

	Total volume of sales (litres)	Total value of sales (£)
Beer		
Wine		
Fortified wine		
Spirits		
Alcopops		

B. Impulse channel sales

We require Nielsen to provide the total volume and value of sales in the Impulse channel for England & Wales, ideally divided into price ranges. The set of Products should be the same as the main analysis. The template to be completed is shown below:

Product	***Cider/ perry***		
Price range identifier	Price range (in £ per litre)	Total volume of sales (in litres)	Total value of sales (in £)
1	***Under 0.50***	*8,000,000*	*1,500,000*
2	***0.50 to less than 0.60***	*10,000,000*	*6,000,000*
…	***…***	*…*	*…*
10	***5.00 and over***	*1,500,000*	*9,500,000*

We also require the total volumes and values of Impulse sales by aggregated categories of beers, wines, fortified wines, spirits and alcopops (i.e. a repeat of supplementary analysis 1 for the Impulse channel).

C. On-trade sales

We require total volume and value of sales by each Product itemised in the main analysis as shown in the template below:

Product	Total volume of sales (in litres)	Total value of sales (in £)
Non/low alcoholic lager	*1,000,000*	*2,500,000*
Commodity lager	*90,000,000*	*250,000,000*
…	*…*	*…*
RTDs	*25,000,000*	*55,500,000*

We also require the total volumes and values of on-trade sales by aggregated categories of beers, wines, fortified wines, spirits and alcopops (i.e. a repeat of supplementary analysis 1 for the on-trade).

Appendix 3: Statistical regression model: Relationship between the scale of the binge and the mean daily consumption

	IF (Moderate)	IF (Hazardous)	IF (Harmful)	
maximum unit drunk =				
Moderate drinker	1.844889	-1.093021	1.885406	male aged 18 – 24
	1.607251	-1.638768	3.1741	male aged 25 – 34
(mean daily intake)*2.349081 + 0.5176387	1.027955	-2.237691	-0.1498614	male aged 35 – 44
	0.8532059	-3.701012	-1.765391	male aged 45 – 54
	0.510439	-4.568189	-2.78108	male aged 55 – 64
Hazardous drinker	0.2033556	-6.000076	-4.294118	male aged 65 – 74
	-0.4201547	-7.129887	-6.214318	male aged 75 +
(mean daily intake)*1.160154 + 7.146892	0.4240746	-4.053762	-2.865602	female aged 16 – 17
	1.211984	-3.156531	1.974312	female aged 18 – 24
	0.9236356	-3.123848	-1.234301	female aged 25 – 34
Harmful drinker	0.6555516	-4.187639	0.3792851	female aged 35 – 44
	0.4335669	-5.321915	-4.245981	female aged 45 – 54
(mean daily intake)*0.5618365 + 8.342676	-0.0194434	-6.004615	-5.15465	female aged 55 – 64
	-0.3256304	-7.261813	-6.039655	female aged 65 – 74
	-0.6310582	-8.084949	-12.7028	female aged 75 +
R-Squared	0.2517	0.1423	0.1974	
Adjusted R-Squared	0.2501	0.1370	0.1860	
Root MSE	3.2255	5.2096	7.3303	

Appendix 4: Elasticities: econometric analysis of alcohol demand

The aim of this section is to estimate own and cross price elasticity of demand for different types of alcohol products. The Expenditure Food Survey (EFS) 2001-2005, enables estimation of own price (responsiveness of demand for product *j* to changes in the price of product *j*) and cross price elasticity of demand (responsiveness of demand for product *j* to changes in the price of product *k*) for various types of alcohol products consistently for five years.[17] A critical advantage of the EFS over other potential data sources, such as the General Household Survey (GHS) which also records the volume of alcohol consumption, is that information is available upon the unit price paid for each item of expenditure. This is crucial for the empirical analysis in that price is allowed to vary across each observational unit, i.e. individuals *i* and time *t*. Comparative data sources at the individual and/or household level which are available over time do not possess detailed price information at such levels of disaggregation, meaning that it is not possible to accurately estimate elasticities.[18] The basic unit of analysis is the individual within the household where interviews are spread evenly over the year to ensure that seasonal effects are covered.[19] In 2005-06, the latest sweep, the EFS collected the diaries of 16,085 people within 6,785 households across the United Kingdom. Specifically advantageous for our analysis is that each individual aged 16 and over in the household is visited and asked to keep diary records of daily expenditure for two weeks.[20] For the analysis which follows we restrict the sample to individuals in England.

An advantage of the EFS over its predecessor the FES is that records of individual consumption is recorded in milliliters for each year, which are converted to units of equivalent alcohol consumption, denoted by $c_j^{t,i}$, across the *J=4* types of goods, where 1=beer; 2=wine; 3=spirits; 4=alcopops (RTD); and $J+1$ (i.e. 5)=other non durable (OND) goods: food, soft drinks and tobacco (natural units for these consumption goods are given in millilitres, grams or as a count; we convert to MJ of energy to provide commensurability). The vector $\boldsymbol{X}$ contains demographic controls for gender, ethnicity, age,[21] education,[22] region, household composition,[23] household size and whether the individual is unemployed. The log price of beer is denoted by $\ln p1$, $\ln p2$ is log price of wine, $\ln p3$ is log price of spirits, $\ln p4$ is log price of alcopops, and $\ln p5$ is log average price of other non durable goods. The log of household income (labour and non labour) is given by $\ln dy$. Note all prices are allowed to vary over individuals and time, which is a key advantage of the EFS, and are deflated to 2005 prices.

$$\begin{aligned}
\ln c_1^{t,i} &= b_1 \boldsymbol{X}^{i,t} + q_1 \ln dy^{t,i} + \sum_{j=1}^{J} g_{1,j} \ln p_j^{t,i} + p_1 \ln a_1^t + e_1^{t,i} \\
\ln c_2^{t,i} &= b_2 \boldsymbol{X}^{t,i} + q_2 \ln dy^{t,i} + \sum_{j=1}^{J} g_{2,j} \ln p_j^{t,i} + p_2 \ln a_2^t + e_2^{t,i} \\
\ln c_3^{t,i} &= b_3 \boldsymbol{X}^{t,i} + q_3 \ln dy^{t,i} + \sum_{j=1}^{J} g_{3,j} \ln p_j^{t,i} + p_3 \ln a_3^t + e_3^{t,i} \\
\ln c_4^{t,i} &= b_4 \boldsymbol{X}^{t,i} + q_4 \ln dy^{t,i} + \sum_{j=1}^{J} g_{4,j} \ln p_j^{t,i} + p_4 \ln a_4^t + e_4^{t,i}
\end{aligned} \tag{1}$$

Advertising promotion of type is given in logs and is denoted by $\ln a_j^t$, notice that this only varies across type of good and over time *t* not the individual unit of observation *i*.[24] Note that since promotion data is more aggregated than all other covariates and the dependent variables the standard errors will need to be adjusted to take this into account, Moulton (1990). The functional form of the model is double log whereby the g parameters are actual elasticities.

Across each alcohol type *j=1,…,4* we consider whether alcohol is consumed on/off premises and whether it is high/low price, hence the model given in equation (1) is expanded. For all off (on) trade consumption a low price is defined as below £0.3 (£0.8) per unit of alcohol and a high price greater or equal to £0.3 (£0.8) per unit of alcohol respectively. Hence the initial model which is estimated, shown in equation (2) below, becomes a system of 17 simultaneous equations, i.e. for each alcohol type there are four equations *q*=1,…,4. For example, considering beer consumption: low price off-trade beer (*q=1*); high price off-trade beer (*q=2*); low price on-trade beer (*q=3*); and high price on-trade beer (*q=4*). Consequently, in the estimated empirical model there are 16 alcohol price and terms in each equationand a single price term for other goods. An incremental approach is taken, with off-trade low price as baseline.

Estimates of own price and cross price elasticity of demand can be obtained from equation (2), i.e. the $\hat{g}_{k,r,j,q}$ parameters which are algebraic functions of the estimated g parameters, as defined in Table 1. Given that the model is log-log, we can estimate the impact of an *z* per cent increase in the price, of good *j,q* upon the percentage change in consumption, which is given by $\hat{g}_{j,q} \times z$. Specifically, the $\hat{g}_{k,r,j,q}$ parameters represent own price elasticity terms (shaded area on lead diagonal in the following tables) and the $\hat{g}_{k,r,j,q}$

parameters (for all except the case $j = q$ combined with $k = r$) represent cross price elasticity terms (off lead diagonal terms in the following tables). If $\left|\hat{g}_{k,r,j,q}\right| < 1$ then own price elasticity of demand is inelastic, i.e. the proportional change in demand is less than the proportional change in price.

$$
\begin{aligned}
\ln c_{1,1}^{t,i} &= b_{1,1}\boldsymbol{X}^{t,i} + q_{1,1}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{1,1,j,q}\ln p_{j,q}^{t,i} + g_{1,1,J+1}p_{J+1}^{t,i} + p_{1,1}\ln a_1^t + e_{1,1}^{t,i} \\
\ln c_{1,2}^{t,i} &= b_{1,2}\boldsymbol{X}^{t,i} + q_{1,2}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{1,2,j,q}\ln p_{j,q}^{t,i} + g_{1,2,J+1}p_{J+1}^{t,i} + p_{1,2}\ln a_1^t + e_{1,2}^{t,i} \\
\ln c_{1,3}^{t,i} &= b_{1,3}\boldsymbol{X}^{t,i} + q_{1,3}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{1,3,j,q}\ln p_{j,q}^{t,i} + g_{1,3,J+1}p_{J+1}^{t,i} + p_{1,3}\ln a_1^t + e_{1,3}^{t,i} \\
\ln c_{1,4}^{t,i} &= b_{1,4}\boldsymbol{X}^{t,i} + q_{1,4}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{1,4,j,q}\ln p_{j,q}^{t,i} + g_{1,4,J+1}p_{J+1}^{t,i} + p_{1,4}\ln a_1^t + e_{1,4}^{t,i} \\
\ln c_{2,1}^{t,i} &= b_{2,1}\boldsymbol{X}^{t,i} + q_{2,1}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{2,1,j,q}\ln p_{j,q}^{t,i} + g_{2,1,J+1}p_{J+1}^{t,i} + p_{2,1}\ln a_2^t + e_{2,1}^{t,i} \\
\ln c_{2,2}^{t,i} &= b_{2,2}\boldsymbol{X}^{t,i} + q_{2,2}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{2,2,j,q}\ln p_{j,q}^{t,i} + g_{1,2,J+1}p_{J+1}^{t,i} + p_{2,2}\ln a_2^t + e_{2,2}^{t,i} \\
\ln c_{2,3}^{t,i} &= b_{2,3}\boldsymbol{X}^{t,i} + q_{2,3}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{2,3,j,q}\ln p_{j,q}^{t,i} + g_{2,3,J+1}p_{J+1}^{t,i} + p_{2,3}\ln a_2^t + e_{2,3}^{t,i} \\
\ln c_{2,4}^{t,i} &= b_{2,4}\boldsymbol{X}^{t,i} + q_{2,4}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{2,4,j,q}\ln p_{j,q}^{t,i} + g_{2,4,J+1}p_{J+1}^{t,i} + p_{2,4}\ln a_2^t + e_{2,4}^{t,i} \\
\ln c_{3,1}^{t,i} &= b_{3,1}\boldsymbol{X}^{t,i} + q_{3,1}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{3,1,j,q}\ln p_{j,q}^{t,i} + g_{3,1,J+1}p_{J+1}^{t,i} + p_{3,1}\ln a_3^t + e_{3,1}^{t,i} \\
\ln c_{3,2}^{t,i} &= b_{3,2}\boldsymbol{X}^{t,i} + q_{3,2}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{3,2,j,q}\ln p_{j,q}^{t,i} + g_{3,2,J+1}p_{J+1}^{t,i} + p_{3,2}\ln a_3^t + e_{3,2}^{t,i} \\
\ln c_{3,3}^{t,i} &= b_{3,3}\boldsymbol{X}^{t,i} + q_{3,3}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{3,3,j,q}\ln p_{j,q}^{t,i} + g_{3,3,J+1}p_{J+1}^{t,i} + p_{3,3}\ln a_3^t + e_{3,3}^{t,i} \\
\ln c_{3,4}^{t,i} &= b_{3,4}\boldsymbol{X}^{t,i} + q_{3,4}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{3,4,j,q}\ln p_{j,q}^{t,i} + g_{3,4,J+1}p_{J+1}^{t,i} + p_{3,4}\ln a_3^t + e_{3,4}^{t,i} \\
\ln c_{4,1}^{t,i} &= b_{4,1}\boldsymbol{X}^{t,i} + q_{4,1}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{4,1,j,q}\ln p_{j,q}^{t,i} + g_{4,1,J+1}p_{J+1}^{t,i} + p_{4,1}\ln a_4^t + e_{4,1}^{t,i} \\
\ln c_{4,2}^{t,i} &= b_{4,2}\boldsymbol{X}^{t,i} + q_{4,2}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{4,2,j,q}\ln p_{j,q}^{t,i} + g_{4,2,J+1}p_{J+1}^{t,i} + p_{4,2}\ln a_4^t + e_{4,2}^{t,i} \\
\ln c_{4,3}^{t,i} &= b_{4,3}\boldsymbol{X}^{t,i} + q_{4,3}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{4,3,j,q}\ln p_{j,q}^{t,i} + g_{4,3,J+1}p_{J+1}^{t,i} + p_{4,3}\ln a_4^t + e_{4,3}^{t,i} \\
\ln c_{4,4}^{t,i} &= b_{4,4}\boldsymbol{X}^{t,i} + q_{4,4}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{4,4,j,q}\ln p_{j,q}^{t,i} + g_{4,4,J+1}p_{J+1}^{t,i} + p_{4,4}\ln a_4^t + e_{4,4}^{t,i} \\
\ln c_{5}^{t,i} &= b_{5}\boldsymbol{X}^{t,i} + q_{5}\ln dy^{t,i} + \sum_{j=1}^{J}\sum_{q=1}^{Q} g_{5,j,q}\ln p_{j,q}^{t,i} + g_{5,J+1}p_{J+1}^{t,i} + p_{5}\ln a_5^t + e_{5}^{t,i}
\end{aligned}
\tag{2}
$$

Moreover, if $\left|\hat{g}_{j,k,j,k}\right| < 1$ then a 1 per cent increase in price for a specific alcohol leads to less than a 1 per cent decrease in demand, $\hat{g}_{j,k,j,k}$ per cent, which is what might be expected from a product which is habitual such as alcohol. Moreover, evidence based for the UK suggests that own price elasticity is inelastic, see Banks et al. (1997) and Crawford et al. (1999).[25] Similarly, if $\left|\hat{g}_{k,r,j,q}\right| < 1$ then the cross price elasticity of demand is inelastic, i.e. demand is not sensitive to price changes in other types of alcohol. Furthermore, the sign of the cross price effect indicates whether goods are complements (negative cross price) or substitutes (positive cross price) for each other.

Results

Using iterative three stage least squares to estimate the system of simultaneous equations, Farrell and Shields (2007), we have been able to estimate results for two major sub-groups in the population: (i) moderate drinkers (males consuming no more than 21 units per week, females consuming no more than 14 units per week) aged 16 and over; (ii) hazardous and harmful drinkers combined (males consuming more than 21 units per week, females consuming more than 14 units per week) aged 16 and over. The results are shown in Tables 2 and 4 respectively.

Considering low price off-trade beer consumption, all age groups are found to drink more than the omitted group (over 65). Throughout all types of beer consumption, males are found to consume more than females. Relative to females male individuals are also found to consume more off-trade wine and off-trade spirits. Income effects reveal that where significant demand is income inelastic, i.e. a 1% increase in income is associated with a less than 1% change in consumption. Mostly, alcohol products are normal goods, i.e. an increase in income is associated with an increase in consumption. Exceptions include, perhaps surprisingly, high price on-trade beer, where a 1% increase in income is associated with a 0.09% fall in consumption and high priced off-trade spirits.

In terms of price elasticity, considering consumption of low price off-trade beer the own price elasticity is $\hat{g}_{1,1,1,1} = g_{1,1,1,1} = -0.4217$, i.e. where a 1 per cent increase in the price of off-trade low priced beer reduces the consumption of off-trade low price beer by 0.42 percentage points.[26] Considering on-trade high priced wine consumption own price elasticity is calculated using Table 2 as $\hat{g}_{2,4,2,4} = g_{2,4,2,1} + g_{2,4,2,4} = 0.0004 - 0.2911 = -0.2907$. Hence, a 1 per cent increase in the price of on-trade high price wine reduces the consumption of on-trade high price wine by 0.29 percentage points.

In terms of cross-elasticities, concerning hazardous and harmful drinkers, the cross price elasticity for on-trade high price beer consumption in response to a price change in off-trade low price alcohol is estimated as $\hat{g}_{1,4,1,1} = g_{1,4,1,1} = 0.0157$. In this case, a 1 per cent increase in the price of off-trade low price beer increases on-trade high price beer consumption by 0.02 percent.

References

Banks, J., Blundell, R. and A. Lewbel (1997) Quadratic Engel Curves and Consumer Demand. *Review of Economics and Statistics*, 79(4), 527-39.

Crawford, I., Smith, Z. and S. Tanner (1999) Alcohol Taxes, Tax Revenues and the Single European Market. *Fiscal Studies*, 20(3), 287-304.

Deaton and Muellbauer (1980) An Almost Ideal Demand System. *American Economic Review*. 70(3), 312-67.

Farrell, L. and M. Shields (2007) Children as Consumers: Investigating Child Diary Expenditure Data. *Canadian Journal of Economics*. 40(2), 445-67.

Moulton, B. (1990) An Illustration of a Pitfall in Estimating Effects of Aggregate Variables on Micro Units. *Review of Economics and Statistics*, 72, 334-8.

Table 1: Interpretation of Parameter Estimates $g_{j,k,q,r}$ – subscripts *j,k,q,r* shown

CONSUMPTION →			OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	1,1,1,1	1,2,1,1	2,1,1,1	2,2,1,1	3,1,1,1	3,2,1,1	4,1,1,1	4,2,1,1	1,3,1,1	1,4,1,1	2,3,1,1	2,4,1,1	3,3,1,1	3,4,1,1	4,3,1,1	4,4,1,1
		HI	1,1,1,1 + 1,1,1,2	1,2,1,1 + 1,2,1,2	2,1,1,1 + 2,1,1,2	2,2,1,1 + 2,2,1,2	3,1,1,1 + 3,1,1,2	3,2,1,1 + 3,2,1,2	4,1,1,1 + 4,1,1,2	4,2,1,1 + 4,2,1,2	1,3,1,1 + 1,3,1,2	1,4,1,1 + 1,4,1,2	2,3,1,1 + 2,3,1,2	2,4,1,1 + 2,4,1,2	3,3,1,1 + 3,3,1,2	3,4,1,1 + 3,4,1,2	4,3,1,1 + 4,3,1,2	4,4,1,1 + 4,4,1,2
	WINE	LOW	1,1,2,1	1,2,2,1	2,1,2,1	2,2,2,1	3,1,2,1	3,2,2,1	4,1,2,1	4,2,2,1	1,3,2,1	1,4,2,1	2,3,2,1	2,4,2,1	3,3,2,1	3,4,2,1	4,3,2,1	4,4,2,1
		HI	1,1,2,1 + 1,1,2.2	1,2,2,1 + 1,2,2.2	2,1,2,1 + 2,1,2.2	2,2,2,1 + 2,2,2,2	3,1,2,1 + 3,1,2.2	3,2,2,1 + 3,2,2.2	4,1,2,1 + 4,1,2.2	4,2,2,1 + 4,2,2.2	1,3,2,1 + 1,3,2.2	1,4,2,1 + 1,4,2.2	2,3,2,1 + 2,3,2.2	2,4,2,1 + 2,4,2.2	3,3,2,1 + 3,3,2.2	3,4,2,1 + 3,4,2.2	4,3,2,1 + 4,3,2.2	4,4,2,1 + 4,4,2.2
	SPIRIT	LOW	1,1,3,1	1,2,3,1	2,1,3,1	2,2,3,1	3,1,3,1	3,2,3,1	4,1,3,1	4,2,3,1	1,3,3,1	1,4,3,1	2,3,3,1	2,4,3,1	3,3,3,1	3,4,3,1	4,3,3,1	4,4,3,1
		HI	1,1,3,1, + 1,1,3,2	1,2,3,1, + 1,2,3,2	2,1,3,1, + 2,1,3,2	2,2,3,1, + 2,2,3,2	3,1,3,1, + 3,1,3,2	3,2,3,1, + 3,2,3,2	4,1,3,1, + 4,1,3,2	4,2,3,1, + 4,2,3,2	1,3,3,1, + 1,3,3,2	1,4,3,1, + 1,4,3,2	2,3,3,1, + 2,3,3,2	2,4,3,1, + 2,4,3,2	3,3,3,1, + 3,3,3,2	3,4,3,1, + 3,4,3,2	4,3,3,1, + 4,3,3,2	4,4,3,1, + 4,4,3,2
	RTD	LOW	1,1,4,1	1,2,4,1	2,1,4,1	2,2,4,1	3,1,4,1	3,2,4,1	4,1,4,1	4,2,4,1	1,3,4,1	1,4,4,1	2,3,4,1	2,4,4,1	3,3,4,1	3,4,4,1	4,3,4,1	4,4,4,1
		HI	1,1,4,1 + 1,1,4,2	1,2,4,1 + 1,2,4,2	2,1,4,1 + 2,1,4,2	2,2,4,1 + 2,2,4,2	3,1,4,1 + 3,1,4,2	3,2,4,1 + 3,2,4,2	4,1,4,1 + 4,1,4,2	4,2,4,1 + 4,2,4,2	1,3,4,1 + 1,3,4,2	1,4,4,1 + 1,4,4,2	2,3,4,1 + 2,3,4,2	2,4,4,1 + 2,4,4,2	3,3,4,1 + 3,3,4,2	3,4,4,1 + 3,4,4,2	4,3,4,1 + 4,3,4,2	4,4,4,1 + 4,4,4,2
ON	BEER	LOW	1,1,1,1 + 1,1,1,3	1,2,1,1 + 1,2,1,3	2,1,1,1 + 2,1,1,3	2,2,1,1 + 2,2,1,3	3,1,1,1 + 3,1,1,3	3,2,1,1 + 3,2,1,3	4,1,1,1 + 4,1,1,3	4,2,1,1 + 4,2,1,3	1,3,1,1 + 1,3,1,3	1,4,1,1 + 1,4,1,3	2,3,1,1 + 2,3,1,3	2,4,1,1 + 2,4,1,3	3,3,1,1 + 3,3,1,3	3,4,1,1 + 3,4,1,3	4,3,1,1 + 4,3,1,3	4,4,1,1 + 4,4,1,3
		HI	1,1,1,1 + 1,1,1,4	1,2,1,1 + 1,2,1,4	2,1,1,1 + 2,1,1,4	2,2,1,1 + 2,2,1,4	3,1,1,1 + 3,1,1,4	3,2,1,1 + 3,2,1,4	4,1,1,1 + 4,1,1,4	4,2,1,1 + 4,2,1,4	1,3,1,1 + 1,3,1,4	1,4,1,1 + 1,4,1,4	2,3,1,1 + 2,3,1,4	2,4,1,1 + 2,4,1,4	3,3,1,1 + 3,3,1,4	3,4,1,1 + 3,4,1,4	4,3,1,1 + 4,3,1,4	4,4,1,1 + 4,4,1,4
	WINE	LOW	1,1,2,1 + 1,1,2,3	1,2,2,1 + 1,2,2,3	2,1,2,1 + 2,1,2,3	2,2,2,1 + 2,2,2,3	3,1,2,1 + 3,1,2,3	3,2,2,1 + 3,2,2,3	4,1,2,1 + 4,1,2,3	4,2,2,1 + 4,2,2,3	1,3,2,1 + 1,3,2,3	1,4,2,1 + 1,4,2,3	2,3,2,1 + 2,3,2,3	2,4,2,1 + 2,4,2,3	3,3,2,1 + 3,3,2,3	3,4,2,1 + 3,4,2,3	4,3,2,1 + 4,3,2,3	4,4,2,1 + 4,4,2,3
		HI	1,1,2,1 + 1,1,2,4	1,2,2,1 + 1,2,2,4	2,1,2,1 + 2,1,2,4	2,2,2,1 + 2,2,2,4	3,1,2,1 + 3,1,2,4	3,2,2,1 + 3,2,2,4	4,1,2,1 + 4,1,2,4	4,2,2,1 + 4,2,2,4	1,3,2,1 + 1,3,2,4	1,4,2,1 + 1,4,2,4	2,3,2,1 + 2,3,2,4	2,4,2,1 + 2,4,2,4	3,3,2,1 + 3,3,2,4	3,4,2,1 + 3,4,2,4	4,3,2,1 + 4,3,2,4	4,4,2,1 + 4,4,2,4
	SPIRIT	LOW	1,1,3,1 + 1,1,3,3	1,2,3,1 + 1,2,3,3	2,1,3,1 + 2,1,3,3	2,2,3,1 + 2,2,3,3	3,1,3,1 + 3,1,3,3	3,2,3,1 + 3,2,3,3	4,1,3,1 + 4,1,3,3	4,2,3,1 + 4,2,3,3	1,3,3,1 + 1,3,3,3	1,4,3,1 + 1,4,3,3	2,3,3,1 + 2,3,3,3	2,4,3,1 + 2,4,3,3	3,3,3,1 + 3,3,3,3	3,4,3,1 + 3,4,3,3	4,3,3,1 + 4,3,3,3	4,4,3,1 + 4,4,3,3
		HI	1,1,3,1 + 1,1,3,4	1,2,3,1 + 1,2,3,4	2,1,3,1 + 2,1,3,4	2,2,3,1 + 2,2,3,4	3,1,3,1 + 3,1,3,4	3,2,3,1 + 3,2,3,4	4,1,3,1 + 4,1,3,4	4,2,3,1 + 4,2,3,4	1,3,3,1 + 1,3,3,4	1,4,3,1 + 1,4,3,4	2,3,3,1 + 2,3,3,4	2,4,3,1 + 2,4,3,4	3,3,3,1 + 3,3,3,4	3,4,3,1 + 3,4,3,4	4,3,3,1 + 4,3,3,4	4,4,3,1 + 4,4,3,4
	RTD	LOW	1,1,4,1 + 1,1,4,3	1,2,4,1 + 1,2,4,3	2,1,4,1 + 2,1,4,3	2,2,4,1 + 2,2,4,3	3,1,4,1 + 3,1,4,3	3,2,4,1 + 3,2,4,3	4,1,4,1 + 4,1,4,3	4,2,4,1 + 4,2,4,3	1,3,4,1 + 1,3,4,3	1,4,4,1 + 1,4,4,3	2,3,4,1 + 2,3,4,3	2,4,4,1 + 2,4,4,3	3,3,4,1 + 3,3,4,3	3,4,4,1 + 3,4,4,3	4,3,4,1 + 4,3,4,3	4,4,4,1 + 4,4,4,3
		HI	1,1,4,1 + 1,1,4,4	1,2,4,1 + 1,2,4,4	2,1,4,1 + 2,1,4,4	2,2,4,1 + 2,2,4,4	3,1,4,1 + 3,1,4,4	3,2,4,1 + 3,2,4,4	4,1,4,1 + 4,1,4,4	4,2,4,1 + 4,2,4,4	1,3,4,1 + 1,3,4,4	1,4,4,1 + 1,4,4,4	2,3,4,1 + 2,3,4,4	2,4,4,1 + 2,4,4,4	3,3,4,1 + 3,3,4,4	3,4,4,1 + 3,4,4,4	4,3,4,1 + 4,3,4,4	4,4,4,1 + 4,4,4,4

Table 2: Moderate Drinkers: Alcohol Consumption – Iterative Three Stage Least Squares

	BEER			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{11}	PRICE HIGH c_{12}	PRICE LOW c_{13}	PRICE HIGH c_{14}
Male	0.0236***	0.0415***	0.1357***	0.2042***
White	-0.0014	0.0086*	-0.0049	-0.0083
Age 16_18	0.0231**	0.0122	0.0876***	-0.0334
Age 18_25	0.0200***	0.0143	0.0653***	0.0905***
Age 25_35	0.0162***	0.0266***	0.0751***	0.1144***
Age 35_45	0.0145***	0.0229***	0.0789***	0.0978***
Age 45_55	0.0144***	0.0088	0.0787***	0.0846***
Age 55_65	0.0070*	0.0011	0.0564***	0.0289**_
Left school <16	0.0059	0.0065	0.0575***	0.0588***
Left school =16	0.0061	0.0109	0.0256**	0.0545***
Left school >16 and <=18	0.0058	0.0102	0.0111	0.0393***
Left school >18 and <=21	0.0012	0.0017	0.0094	0.0127
Left school >21 and <=25	0.0052	0.0107	0.0105	0.0221
Unemployed	0.0150**	-0.0285**	0.0276	-0.0319
Household size	-0.0012	0.0000	0.0005	-0.0100***
Log gross income	0.0025**	0.0014	-0.006*	-0.0088**
Log advertising expenditure	0.0260*	-0.0092	0.0352	-0.0307
Log price beer (low/off)	-0.4217***	0.0044***	0.0131***	0.0157***
Log price beer (high/off)	0.4255***	-0.4268***	0.0000	0.0017
Log price beer (low/on)	0.4268***	0.0022	-0.3909***	0.0102***
Log price beer (high/on)	0.4277***	0.0041***	0.0076***	-0.4220***
Log price wine (low/off)	0.0051***	0.0063***	0.0115***	0.0102***
Log price wine (high/off)	-0.0011	0.0001	-0.0005	0.0053*
Log price wine (low/on)	-0.0044*	-0.0082**	0.0033	0.0048
Log price wine (high/on)	-0.0030***	-0.0029*	0.0006	-0.0031
Log price spirits (low/off)	0.0030*	0.0098***	0.0151***	0.0142***
Log price spirits (high/off)	0.0019	-0.0043	-0.0027	0.0019
Log price spirits (low/on)	-0.0013	-0.0092	-0.0122	-0.0252
Log price spirits (high/on)	-0.0015	-0.0088***	-0.0189***	-0.0202***
Log price RTD (low/off)	0.0118**	0.0075	0.0123	0.0068
Log price RTD (high/off)	-0.0059	0.0029	-0.0040	0.0035
Log price RTD (low/on)	-0.0102	-0.006	-0.0048	-0.0006
Log price RTD (high/on)	-0.0109*	-0.0057	-0.0037	-0.0056
Log price OND	0.0024**	0.0038**	0.0151***	0.0174***
Intercept	-0.2593*	0.0845	-0.3079	0.4093
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.9536	0.9216	0.8281	0.8101
OBSERVATIONS	14,275			

Denotes significance at the *** 1% level, ** 5% level, * 10% level.

Table 2 Contd: Moderate Drinkers: Alcohol Consumption – Iterative Three Stage Least Squares

	WINE			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{21}	PRICE HIGH c_{22}	PRICE LOW c_{23}	PRICE HIGH c_{24}
Male	0.0105***	0.0413***	0.0006	0.0016
White	0.0010	-0.0057	0.0005	0.0054
Age 16_18	0.0021	-0.007	0.0035	-0.0057
Age 18_25	-0.0028	-0.0203**	0.0028	0.0013
Age 25_35	-0.0014	-0.0159**	0.0036*	0.0125
Age 35_45	-0.0046	-0.0094	0.0024	-0.0058
Age 45_55	-0.0019	0.0049	0.0023	-0.0012
Age 55_65	0.0001	0.0135**	0.0015	0.0204***
Left school <16	0.0011	-0.0266***	0.0029	-0.0179**
Left school =16	-0.0034	-0.0186***	0.0005	-0.0117
Left school >16 and <=18	-0.0014	-0.0105	-0.0007	-0.0099
Left school >18 and <=21	-0.0038	-0.0117	-0.0028	-0.0091
Left school >21 and <=25	0.0026	0.0229**	-0.0036	0.0014
Unemployed	0.0051	0.0106	0.0022	0.0178
Household size	-0.0007	0.0026	0.0004	-0.0006
Log gross income	-0.0006	0.0081***	0.0004	0.0109***
Log advertising expenditure	-0.0206*	0.0153	-0.0018	0.0063
Log price beer (low/off)	0.0023***	0.0082***	0.0001	0.002
Log price beer (high/off)	0.0004	0.0013	-0.0002	0.0005
Log price beer (low/on)	0.0004	0.0000	-0.0004	0.0025
Log price beer (high/on)	-0.0002	0.0008	-0.0001	-0.0023
Log price wine (low/off)	-0.4127***	0.0032**	-0.0002	0.0004
Log price wine (high/off)	0.4139***	-0.4644***	0.0000	0.0017
Log price wine (low/on)	0.4136***	-0.0002	-0.2326***	0.0009
Log price wine (high/on)	0.4138***	0.0021	0.0001	-0.2911***
Log price spirits (low/off)	0.0023*	0.0097***	0.0003	-0.0006
Log price spirits (high/off)	-0.0009	-0.0012	-0.0003	0.0022
Log price spirits (low/on)	0.0009	0.0004	-0.0002	0.0196*
Log price spirits (high/on)	-0.0014	-0.0074**	0.0004	-0.0096***
Log price RTD (low/off)	0.0022	0.0010	-0.0020	-0.0006
Log price RTD (high/off)	-0.0020	0.0043	0.0003	0.0022
Log price RTD (low/on)	-0.0023	-0.0048	0.0007	0.0100
Log price RTD (high/on)	-0.0026	0.0010	0.0139	0.0049
Log price OND	0.0002	0.0028*	0.0004	-0.0018
Intercept	0.2241**	-0.1555	-0.0002	-0.1004
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.9733	0.9603	0.7828	0.7387
OBSERVATIONS	14,275			

Denotes significance at the *** 1% level, ** 5% level, * 10% level

Table 2 Contd: Moderate Drinkers: Alcohol Consumption – I3LS

	SPIRIT			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{31}	PRICE HIGH c_{32}	PRICE LOW c_{33}	PRICE HIGH c_{34}
Male	0.0034***	0.0180***	0.0089	-0.0045
White	-0.0003	-0.0046*	0.0053	-0.0059
Age 16_18	-0.0019	-0.0115	0.0628**	0.0224
Age 18_25	-0.0014	-0.0187***	-0.0063	0.0838***
Age 25_35	-0.0018	-0.0131***	0.0109	0.0533***
Age 35_45	-0.001	-0.0131***	0.0113	0.0221**
Age 45_55	-0.0012	-0.0093**	0.0034	0.0116
Age 55_65	-0.0008	-0.0088**	0.0010	0.0185*
Left school <16	-0.0004	-0.0069*	0.0002	0.0282**
Left school =16	-0.0023	-0.0041	0.0015	0.0138
Left school >16 and <=18	-0.0017	-0.0025	0.0165	0.0136
Left school >18 and <=21	-0.0049**	-0.0086	0.0076	0.0155
Left school >21 and <=25	-0.0017	-0.0010	0.0114	-0.0166
Unemployed	-0.0011	-0.0006	-0.0149	0.0153
Household size	-0.0002	-0.0002	-0.0008	0.0009
Log gross income	-0.0003	-0.0022**	-0.0018	0.0063**
Log advertising expenditure	0.0035	0.0110	0.0284	-0.0007
Log price beer (low/off)	0.0011***	0.0055***	0.0029	0.0048**
Log price beer (high/off)	-0.0001	-0.0018**	0.0003	0.0009
Log price beer (low/on)	-0.0001	-0.0008	0.0014	0.0034
Log price beer (high/on)	-0.0001	-0.0013	0.0021	0.0075***
Log price wine (low/off)	0.0012***	0.0028***	0.0033	0.0033*
Log price wine (high/off)	-0.0003	0.0005	0.0005	0.0009
Log price wine (low/on)	0.0007	-0.0012	-0.0024	0.0034
Log price wine (high/on)	-0.0005	0.0003	-0.0012	0.002
Log price spirits (low/off)	-0.5129***	0.0029**	0.0024	0.0031
Log price spirits (high/off)	0.5136***	-0.5271***	0.0001	0.0005
Log price spirits (low/on)	0.5131***	-0.0025	-1.7834***	0.0069
Log price spirits (high/on)	0.5130***	-0.0029*	-0.0029	-0.1922***
Log price RTD (low/off)	0.0003	0.0008	0.0017	-0.008
Log price RTD (high/off)	0.0008	0.0019	0.0003	0.0114
Log price RTD (low/on)	0.0001	-0.0003	0.0397**	-0.0069
Log price RTD (high/on)	0.0003	0.0012	0.0033	-0.0007
Log price OND	0.0001	0.0005	0.0022	0.0023
Intercept	-0.0287	-0.0654	-0.2751	-0.0142
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.9782	0.9532	0.5388	0.3680
OBSERVATIONS	14,275			

Table 2 Contd: Moderate Drinkers: Alcohol Consumption – I3LS

	RTD (ALCOPOPS)			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{41}	PRICE HIGH c_{42}	PRICE LOW c_{43}	PRICE HIGH c_{44}
Male	0.0006	0.0079***	0.0011	-0.0102***
White	-0.0004	-0.0008	0.0003	-0.0007
Age 16_18	-0.0016	-0.0038	0.0152***	0.0615***
Age 18_25	-0.0006	0.0099*	0.0017	0.0229***
Age 25_35	-0.0005	0.0089**	-0.0008	0.0060
Age 35_45	-0.0002	0.0114***	-0.0016	0.0007
Age 45_55	0.0010	0.0031	-0.0007	-0.0031
Age 55_65	-0.0003	0.0061*	-0.0001	0.0014
Left school <16	-0.0011	0.0055	-0.0009	-0.0019
Left school =16	-0.0003	0.0013	0.0009	-0.0006
Left school >16 and <=18	-0.0011	0.0009	0.0004	-0.0017___
Left school >18 and <=21	-0.0008	0.0017	-0.0004	0.0089
Left school >21 and <=25	-0.0004	0.0006	0.0001	-0.0061
Unemployed	0.0005	-0.0043	-0.0008	-0.0092
Household size	-0.0003	-0.0012	0.0002	0.0012
Log gross income	-0.0005**	0.0011	0.0002	0.0010
Log advertising expenditure	0.0014	0.0214	0.0076	-0.0062
Log price beer (low/off)	-0.0002	0.0035***	0.0004	0.0050***
Log price beer (high/off)	0.0002	-0.0003	0.0002	0.0005
Log price beer (low/on)	0.0001	-0.0009	0.0005	0.0015
Log price beer (high/on)	0.0001	-0.0004	0.0002	0.0025**
Log price wine (low/off)	0.0001	0.0019***	0.0001	0.0038***
Log price wine (high/off)	-0.0001	0.0000	0.0001	0.0009
Log price wine (low/on)	-0.0001	-0.0014	0.0001	0.0022
Log price wine (high/on)	-0.0001	-0.0009	0.0005	0.0003
Log price spirits (low/off)	0.0000	0.0018	0.0003	0.0033
Log price spirits (high/off)	0.0000	0.0000	0.0000	0.0006
Log price spirits (low/on)	0.0000	-0.0014	0.002	0.0151*
Log price spirits (high/on)	0.0000	-0.0011	0.0001	-0.0052**
Log price RTD (low/off)	-0.3146***	0.0009	0.0004	0.0039
Log price RTD (high/off)	0.3145***	-0.3296***	0.0000	0.0002
Log price RTD (low/on)	0.3146***	0.0001	-0.3308***	0.0028
Log price RTD (high/on)	0.3145***	-0.0002	0.0003	-0.3230***
Log price OND	-0.0001	0.0009	-0.0007*	0.0011
Intercept	-0.0105	-0.2191	-0.0801	0.1010
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.8895	0.8434	0.8429	0.7669
OBSERVATIONS	14,275			

Table 3: Moderate Drinkers: Own and Cross Price Elasticities Calculated from Table 1

CONSUMPTION →			OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.4217	0.0044	0.0023	0.0082	0.0011	0.0055	-0.0002	0.0035	0.0131	0.0157	0.0001	0.0020	0.0029	0.0048	0.0004	0.0050
		HI	0.0037	-0.4224	0.0027	0.0095	0.0010	0.0037	0.0000	0.0032	0.0130	0.0174	-0.0001	0.0025	0.0033	0.0057	0.0006	0.0055
	WINE	LOW	0.0051	0.0063	-0.4127	0.0032	0.0012	0.0028	0.0001	0.0019	0.0115	0.0102	-0.0002	0.0004	0.0033	0.0033	0.0001	0.0038
		HI	0.0040	0.0064	0.0012	-0.4612	0.0009	0.0032	0.0000	0.0019	0.0111	0.0155	-0.0002	0.0020	0.0038	0.0042	0.0002	0.0047
	SPIRIT	LOW	0.0030	0.0098	0.0023	0.0097	-0.5129	0.0029	0.0000	0.0018	0.0151	0.0142	0.0003	-0.0006	0.0024	0.0031	0.0003	0.0033
		HI	0.0049	0.0056	0.0014	0.0085	0.0007	-0.5242	0.0000	0.0019	0.0124	0.0161	0.0000	0.0017	0.0025	0.0036	0.0003	0.0039
	RTD	LOW	0.0118	0.0075	0.0022	0.0010	0.0003	0.0008	-0.3146	0.0009	0.0123	0.0068	-0.0002	-0.0006	0.0017	-0.0080	0.0004	0.0039
		HI	0.0059	0.0104	0.0001	0.0053	0.0011	0.0027	-0.0001	-0.3287	0.0083	0.0103	0.0002	0.0016	0.0020	0.0034	0.0004	0.0041
ON	BEER	LOW	0.0051	0.0067	0.0027	0.0083	0.0010	0.0047	-0.0001	0.0027	-0.3778	0.0259	-0.0003	0.0044	0.0043	0.0082	0.0009	0.0064
		HI	0.0060	0.0085	0.0022	0.0091	0.0010	0.0042	-0.0001	0.0032	0.0206	-0.4063	0.0000	-0.0003	0.0051	0.0123	0.0006	0.0075
	WINE	LOW	0.0007	-0.0019	0.0009	0.0030	0.0019	0.0016	0.0000	0.0005	0.0148	0.0150	-0.2328	0.0013	0.0010	0.0067	0.0002	0.0060
		HI	0.0021	0.0034	0.0010	0.0052	0.0007	0.0031	0.0000	0.0010	0.0121	0.0072	-0.0002	-0.2907	0.0022	0.0053	0.0006	0.0041
	SPIRIT	LOW	0.0017	0.0006	0.0032	0.0101	0.0002	0.0004	0.0000	0.0004	0.0029	-0.0110	0.0001	0.0190	-1.7810	0.0100	0.0023	0.0183
		HI	0.0015	0.0011	0.0009	0.0023	0.0002	0.0000	0.0000	0.0007	-0.0038	-0.0060	-0.0011	-0.0102	-0.0005	-0.1891	0.0004	-0.0020
	RTD	LOW	0.0016	0.0015	-0.0001	-0.0038	0.0004	0.0005	0.0000	0.0011	0.0075	0.0061	-0.0022	0.0094	0.0414	-0.0149	-0.3304	0.0067
		HI	0.0009	0.0019	-0.0004	0.0020	0.0006	0.0020	-0.0001	0.0008	0.0087	0.0012	0.0001	0.0043	0.0050	-0.0087	0.0007	-0.3191

Note: Own price elasticities, shown along the lead diagonal, are all statistically significant at the 1% level.

Table 4: Hazardous and Harmful Drinkers: Alcohol Consumption – I3LS

	BEER			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{11}	PRICE HIGH c_{12}	PRICE LOW c_{13}	PRICE HIGH c_{14}
Male	0.0751***	0.0791***	0.1710***	0.2325***
White	0.0176**	-0.0091	-0.0047	-0.0246**
Age 16_18	0.0486	0.0219	-0.0147	-0.1585**
Age 18_25	0.0820***	0.0573***	-0.0159	0.1014***
Age 25_35	0.0710***	0.0574***	0.0243	0.1600***
Age 35_45	0.0755***	0.0762***	0.0256*	0.1220***
Age 45_55	0.0741***	0.0520***	0.0499***	0.0904***
Age 55_65	0.0446***	0.0325***	0.0381***	0.0363**
Left school <16	0.0085	0.0092	0.0587***	0.1037***
Left school =16	0.0115	-0.0020	0.0274**	0.1129***
Left school >16 and <=18	0.0004	-0.0038	0.0285**	0.0535***
Left school >18 and <=21	-0.0028	-0.0081	0.0067	0.0198
Left school >21 and <=25	-0.0139	-0.0218	0.0156	0.0192
Unemployed	-0.0188	-0.0151	-0.0219	-0.0092
Household size	0.0027	-0.0022	0.0003	-0.0206***
Log gross income	-0.0003	0.0002	-0.0089**	-0.0040
Log advertising expenditure	-0.0063	-0.0059	0.0032	-0.0779
Log price beer (low/off)	-0.5896***	0.0086***	0.0167***	0.0249***
Log price beer (high/off)	0.5990***	-0.5832***	-0.0031	-0.0043*
Log price beer (low/on)	0.6097***	0.0089***	-0.6328***	0.0275***
Log price beer (high/on)	0.6097***	0.0099***	0.0161***	-0.6580***
Log price wine (low/off)	0.0198***	0.0142***	0.0248***	0.0281***
Log price wine (high/off)	-0.0030*	0.0009	0.0032*	0.0108***
Log price wine (low/on)	-0.0149*	-0.0175**	-0.0560***	-0.0159
Log price wine (high/on)	-0.0102***	-0.0097***	-0.0100***	-0.0321***
Log price spirits (low/off)	0.0064***	0.0120***	0.0181***	0.0206***
Log price spirits (high/off)	-0.0008	-0.0078***	0.0024	0.0030
Log price spirits (low/on)	0.0113	0.0070	-0.0034	-0.0078
Log price spirits (high/on)	0.0003	-0.0097***	-0.0229***	-0.0387***
Log price RTD (low/off)	-0.0049	-0.0115	0.0018	0.0044
Log price RTD (high/off)	0.0047	0.0097	-0.0003	0.0033
Log price RTD (low/on)	0.0101	0.0157	0.0037	0.0074
Log price RTD (high/on)	0.0074	0.0114	0.0134	-0.0022
Log price OND	0.0021	0.0044	0.0168***	0.0031
Intercept	0.0738	0.0972	0.1871	0.9435*
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.9503	0.9332	0.8997	0.8906
OBSERVATIONS	11,935			

Denotes significance at the *** 1% level, ** 5% level, * 10% level.

Table 4 Contd: Hazardous and Harmful Drinkers: Alcohol Consumption – I3LS

	WINE			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{21}	PRICE HIGH c_{22}	PRICE LOW c_{23}	PRICE HIGH c_{24}
Male	0.0256***	0.0668***	0.0009	-0.0096
White	-0.0118	-0.0036	0.0003	-0.0059
Age 16_18	-0.0338	-0.0797	0.0015	-0.0382
Age 18_25	-0.0560***	-0.2057***	-0.0014	0.0058
Age 25_35	-0.0311***	-0.1685***	0.0056*	-0.0003
Age 35_45	-0.0172	-0.0621***	0.0020	0.0116
Age 45_55	-0.0008	0.0035	0.0029	0.0122
Age 55_65	0.0108	0.0433**	0.0061**	0.0072
Left school <16	-0.0355***	-0.2211***	-0.0036	-0.0208**
Left school =16	-0.0182*	-0.1554***	0.0022	-0.0224**
Left school >16 and <=18	-0.0068	-0.0814***	0.0011	-0.0201**
Left school >18 and <=21	-0.0071	-0.0806***	-0.0028	-0.0014
Left school >21 and <=25	0.0063	-0.0102	-0.0036	-0.0095
Unemployed	-0.0270	0.0253	-0.0065	0.0178
Household size	-0.0018	0.0092**	-0.0007	-0.0001
Log gross income	0.0007	0.0239***	-0.0011	0.0050**
Log advertising expenditure	-0.0465	0.1286**	-0.0078	-0.0036
Log price beer (low/off)	0.0088***	0.0367***	-0.0002	0.0041***
Log price beer (high/off)	0.0011	-0.0009	0.0007	-0.0010
Log price beer (low/on)	0.0041**	0.0097***	-0.0009*	-0.0007
Log price beer (high/on)	0.0026	0.0049	0.0000	-0.0068***
Log price wine (low/off)	-0.5603***	0.0116***	-0.0001	0.0007
Log price wine (high/off)	0.5656***	-0.6375***	0.0000	0.0018
Log price wine (low/on)	0.5594***	-0.0129	-0.3798***	-0.0003
Log price wine (high/on)	0.5624***	0.0005	0.0002	-0.4114***
Log price spirits (low/off)	0.0041**	0.0206***	0.0006	0.0036***
Log price spirits (high/off)	-0.0004	-0.0025	-0.0005	-0.0011
Log price spirits (low/on)	-0.0060	-0.0165	-0.0019	0.0241***
Log price spirits (high/on)	0.0014	-0.0027	-0.0009	-0.0051**
Log price RTD (low/off)	0.0038	0.0178	-0.0001	0.0006
Log price RTD (high/off)	0.0097	-0.0106	0.0000	-0.0003
Log price RTD (low/on)	-0.0084	-0.0135	0.0045	0.0014
Log price RTD (high/on)	0.0010	-0.0078	0.0009	0.0080
Log price OND	-0.0002	0.0248***	0.0006	-0.0021
Intercept	0.5632	-0.8760	0.0868	0.0591
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.9408	0.9180	0.7843	0.7539
OBSERVATIONS	11,935			

Denotes significance at the *** 1% level, ** 5% level, * 10% level.

Table 4 Contd: Hazardous and Harmful Drinkers: Alcohol Consumption – I3LS

	SPIRIT			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{31}	PRICE HIGH c_{32}	PRICE LOW c_{33}	PRICE HIGH c_{34}
Male	0.0150***	0.0162***	0.0069	0.0055
White	-0.0022	-0.0113*	-0.0176	-0.0124
Age 16_18	-0.0460	-0.1155***	0.4879***	0.0915*
Age 18_25	-0.0529***	-0.0581***	-0.0260	0.1333***
Age 25_35	-0.0405***	-0.0521***	0.0185	0.0135
Age 35_45	-0.0367***	-0.0388***	-0.0099	-0.0022
Age 45_55	-0.0311***	-0.0288***	-0.0026	-0.0033
Age 55_65	-0.0307***	-0.0151*	-0.0022	-0.0170
Left school <16	0.0008	-0.0177*	-0.0036	0.0121
Left school =16	-0.0051	-0.0094	-0.0021	0.0144
Left school >16 and <=18	-0.0014	-0.0125	0.0068	0.0149
Left school >18 and <=21	0.0005	-0.0358***	0.0211	0.0209
Left school >21 and <=25	0.0032	-0.0073	0.0201	0.0180
Unemployed	-0.0114	-0.0095	0.0471	0.0251
Household size	-0.0003	0.0006	-0.0060	0.0014
Log gross income	0.0005	0.0001	0.0015	-0.0032
Log advertising expenditure	-0.0078	0.0209	0.0832	-0.0055
Log price beer (low/off)	0.0041***	0.0057***	0.0019	0.0073***
Log price beer (high/off)	-0.0002	-0.0024*	-0.0003	-0.0012
Log price beer (low/on)	0.0010	0.0004	0.0020	-0.0014
Log price beer (high/on)	0.0005	-0.0001	0.0030	-0.0058***
Log price wine (low/off)	0.0024**	0.0065***	0.0006	0.0048***
Log price wine (high/off)	0.0023**	-0.0003	-0.0007	0.0037**
Log price wine (low/on)	-0.0041	0.0058	-0.0028	-0.0117
Log price wine (high/on)	0.0006	-0.002	-0.0034	-0.0098***
Log price spirits (low/off)	-0.6266***	0.0016	0.0000	-0.0009
Log price spirits (high/off)	0.6283***	-0.6475***	0.0002	0.0003
Log price spirits (low/on)	0.6260***	-0.0052	-3.7221***	0.0236*
Log price spirits (high/on)	0.6260***	-0.0034	-0.0006	-0.2852***
Log price RTD (low/off)	-0.0047	-0.0013	-0.0012	0.0213*
Log price RTD (high/off)	0.0092	0.0070	-0.0016	-0.0176
Log price RTD (low/on)	-0.0002	0.0059	0.0691***	-0.0512***
Log price RTD (high/on)	0.0066	-0.0006	0.0031	-0.0266**
Log price OND	0.0022	0.0042	-0.0012	0.0019
Intercept	0.1610	-0.0943	-0.8245	0.1450
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.9715	0.9602	0.7589	0.4935
OBSERVATIONS	11,935			

Table 4 Contd: Hazardous and Harmful Drinkers: Alcohol Consumption – I3LS

	RTD (ALCOPOPS)			
	OFF-TRADE		ON-TRADE	
	PRICE LOW c_{41}	PRICE HIGH c_{42}	PRICE LOW c_{43}	PRICE HIGH c_{44}
Male	-0.0023***	-0.0016	0.0000	-0.0128**
White	0.0008	0.0001	-0.0038**	-0.0001
Age 16_18	-0.0013	-0.0147	0.0123	0.0613*
Age 18_25	-0.0009	0.0076	0.0124***	0.1040***
Age 25_35	-0.0005	-0.0035	-0.0019	0.0121
Age 35_45	-0.0006	0.0075	0.0010	0.0065
Age 45_55	-0.0012	0.005	-0.0010	-0.0047
Age 55_65	-0.0010	0.0046	-0.0010	0.0046
Left school <16	-0.0014	0.0077	0.0017	0.0089
Left school =16	0.0005	0.0078	0.0005	0.0046
Left school >16 and <=18	-0.0015	0.0040	0.0002	-0.0040
Left school >18 and <=21	-0.0036*	0.0051	0.0005	-0.0053
Left school >21 and <=25	-0.0010	0.0072	-0.0007	-0.0056
Unemployed	0.0017	-0.0061	0.0099**	0.0072
Household size	0.0005	0.0025	-0.0004	0.0005
Log gross income	0.0008**	0.0012	0.0010	-0.0020
Log advertising expenditure	0.0004	0.0472*	0.0101	-0.0049
Log price beer (low/off)	0.0002	0.0006	0.0002	0.0053***
Log price beer (high/off)	0.0001	0.0000	0.0002	0.0001
Log price beer (low/on)	-0.0002	0.0018	-0.0013***	0.0034**
Log price beer (high/on)	0.0000	0.0010	0.0001	-0.0027**
Log price wine (low/off)	0.0003	0.0043***	0.0005	0.0038***
Log price wine (high/off)	-0.0001	-0.0031***	0.0003	-0.0001
Log price wine (low/on)	-0.0002	-0.0081**	0.0027	0.0007
Log price wine (high/on)	-0.0001	-0.0036**	0.0008	-0.0013
Log price spirits (low/off)	0.0001	-0.0001	0.0003	0.0004
Log price spirits (high/off)	-0.0001	0.0008	0.0001	0.0005
Log price spirits (low/on)	-0.0001	0.0002	-0.0022	-0.0142*
Log price spirits (high/on)	-0.0004	-0.0025	-0.0004	-0.0047**
Log price RTD (low/off)	-0.3816***	-0.0005	0.0001	-0.0007
Log price RTD (high/off)	0.3817***	-0.4153***	0.0000	0.0015
Log price RTD (low/on)	0.3819***	0.0011	-0.3926***	0.0143*
Log price RTD (high/on)	0.3818***	0.0009	0.0011	-0.4186***
Log price OND	0.0001	0.0006	-0.0007	0.0069***
Intercept	-0.0054	-0.5020*	-0.1063	0.1200
CONTROLS	Respondent dummies, Regional dummies and year dummies			
R Squared	0.5186	0.3861	0.3876	0.3858
OBSERVATIONS	11,935			

Table 5: Hazardous and Harmful Drinkers: Own and Cross Price Elasticities Calculated from Table 1

		CONSUMPTION →	OFF								ON							
			BEER		WINE		SPIRIT		RTD		BEER		WINE		SPIRIT		RTD	
PRICE ↓			LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI	LOW	HI
OFF	BEER	LOW	-0.5896	0.0086	0.0088	0.0367	0.0041	0.0057	0.0002	0.0006	0.0167	0.0249	-0.0002	0.0041	0.0019	0.0073	0.0002	0.0053
		HI	0.0094	-0.5746	0.0098	0.0357	0.0039	0.0033	0.0003	0.0006	0.0136	0.0206	0.0005	0.0032	0.0016	0.0061	0.0004	0.0054
	WINE	LOW	0.0198	0.0142	-0.5603	0.0116	0.0024	0.0065	0.0003	0.0043	0.0248	0.0281	-0.0001	0.0007	0.0006	0.0048	0.0005	0.0038
		HI	0.0168	0.0151	0.0053	-0.6260	0.0047	0.0062	0.0002	0.0012	0.0280	0.0390	0.0000	0.0025	-0.0001	0.0085	0.0008	0.0037
	SPIRIT	LOW	0.0064	0.0120	0.0041	0.0206	-0.6266	0.0016	0.0001	-0.0001	0.0181	0.0206	0.0006	0.0036	0.0000	-0.0009	0.0003	0.0004
		HI	0.0056	0.0042	0.0037	0.0182	0.0017	-0.6459	0.0000	0.0007	0.0205	0.0236	0.0001	0.0025	0.0003	-0.0007	0.0004	0.0009
	RTD	LOW	-0.0049	-0.0115	0.0038	0.0178	-0.0047	-0.0013	-0.3816	-0.0005	0.0018	0.0044	-0.0001	0.0006	-0.0012	0.0213	0.0001	-0.0007
		HI	-0.0002	-0.0018	0.0135	0.0072	0.0045	0.0057	0.0000	-0.4158	0.0015	0.0077	-0.0001	0.0003	-0.0028	0.0037	0.0001	0.0008
ON	BEER	LOW	0.0201	0.0175	0.0129	0.0464	0.0052	0.0061	0.0000	0.0024	-0.6161	0.0524	-0.0011	0.0034	0.0039	0.0059	-0.0011	0.0088
		HI	0.0201	0.0185	0.0113	0.0415	0.0046	0.0055	0.0002	0.0015	0.0329	-0.6331	-0.0001	-0.0027	0.0048	0.0015	0.0003	0.0026
	WINE	LOW	0.0049	-0.0033	-0.0009	-0.0014	-0.0017	0.0123	0.0001	-0.0038	-0.0312	0.0122	-0.3799	0.0004	-0.0022	-0.0069	0.0032	0.0045
		HI	0.0097	0.0045	0.0021	0.0121	0.0029	0.0045	0.0002	0.0007	0.0148	-0.0039	0.0001	-0.4106	-0.0028	-0.0050	0.0013	0.0025
	SPIRIT	LOW	0.0176	0.0190	-0.0019	0.0041	-0.0005	-0.0036	0.0000	0.0001	0.0147	0.0128	-0.0012	0.0277	-3.7220	0.0227	-0.0019	-0.0138
		HI	0.0066	0.0023	0.0055	0.0179	-0.0006	-0.0018	-0.0003	-0.0026	-0.0048	-0.0181	-0.0003	-0.0015	-0.0006	-0.2861	-0.0002	-0.0043
	RTD	LOW	0.0052	0.0042	-0.0046	0.0043	-0.0049	0.0046	0.0003	0.0006	0.0055	0.0119	0.0045	0.0020	0.0679	-0.0299	-0.3925	0.0135
		HI	0.0024	-0.0002	0.0048	0.0100	0.0019	-0.0020	0.0002	0.0003	0.0152	0.0022	0.0008	0.0086	0.0019	-0.0053	0.0012	-0.4194

Note: Own price elasticities, shown along the lead diagonal, are all statistically significant at the 1% level.

Figure 1: Distributions of Alcohol Consumption in England 2005 – Comparison of the EFS and GHS (Head of Household)

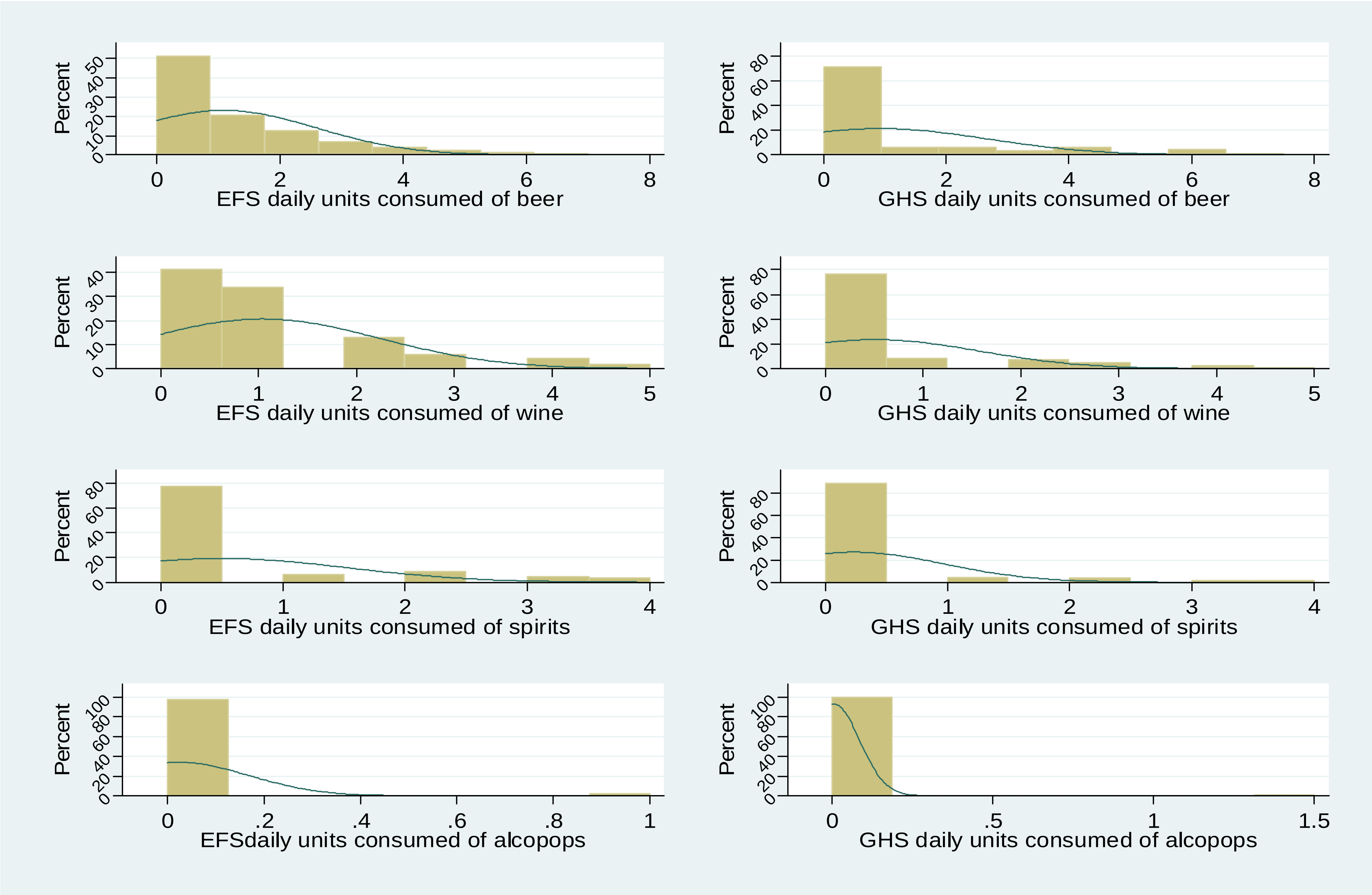


Table A1: GHS and EFS Daily Units of Alcohol Consumption in 2005 (England – Head of Household)

	GHS DAILY UNITS		EFS DAILY UNITS		DIFFERENCE IN MEAN	
	MEAN	% NONE	MEAN	% NONE	$\Delta_j = \overline{c}_j^{EFS} - \overline{c}_j^{GHS}$	TSTAT
BEER	0.922	64.2%	0.963	50.7%	0.041	*(1.12)*
WINE	0.708	74.0%	0.816	40.2%	0.108	*(3.27)*
SPIRITS	0.471	85.2%	0.493	72.7%	0.022	*(0.68)*
ALCOPOPS	0.044	98.7%	0.030	97.4%	-0.014	*(1.57)*

Notes: Alcohol consumption in the EFS is given over a two week period in ml this is converted into alcohol units. The mean and difference are based upon trimming outliers (top 5%) from the two sample surveys.

Appendix 5: Detailled tables from the NWPHO report

Table 60: Number of person-specific hospital admission attributable to alcohol– reproduction of the NWPHO report (2008) [43]

Conditions	ICD-10 codes	16 – 24 yrs		25 – 34 yrs		35 – 44 yrs		45 – 54 yrs		55 – 64 yrs		65 – 74 yrs		75 + yrs	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F
Alcohol-induced pseudo-Cushing's syndrome	E24.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Menral and behavioural disorders due to use of alcohol	F10	7,164	3,242	9,554	3,595	15,396	6,075	14,527	5,819	11,606	3,823	6,527	1,972	3,452	1,630
Degeneration of nervous system due to alcohol	G31.2	0	0	1	1	30	15	71	29	64	26	42	11	24	10
Alcoholic polyneuropathy	G62.1	0	0	6	4	9	4	25	15	33	8	20	5	11	6
Alcoholic myopathy	G72.1	0	0	0	0	2	1	8	1	10	1	5	1	4	1
Alcoholic cardiomyopathy	I426	0	0	7	0	46	6	119	9	159	11	103	3	37	9
Alcoholic gastritis	K29.2	65	30	91	19	128	39	97	28	55	17	30	9	14	3
Alcoholic liver disease	K70	18	10	233	167	1,229	675	2,316	1,139	2,590	1,091	1,467	657	522	267
Alcohol-induced chronic pancreatitis	K86.0	39	12	155	32	331	80	261	72	146	30	52	17	18	3
Ethanol	T51.0	1,550	2,452	1,700	1,959	1,639	2,321	839	1,239	340	385	96	105	46	43
Methanol	T51.1	1	3	3	1	2	4	4	3	1	0	0	0	1	2
Toxic effect of alcohol, unspecified	T519	54	80	53	63	79	76	36	40	13	20	3	5	2	1
Accidental poisoning by and exposure to alcohol	X45	79	77	55	48	53	54	34	29	13	13	9	2	5	7
Malignant neoplasms of lip, oral cavity and pharynx	C00 - C14	11	8	27	19	101	49	395	113	565	165	395	129	254	122
Malignant neoplasm of oesophagus	C15	1	1	6	1	45	12	223	43	581	111	625	127	541	200
Malignant neoplasm of colon	C18	1	1	4	2	13	8	40	21	115	49	159	59	150	77
Malignant neoplasm of rectum	C20	0	0	2	2	12	7	60	20	156	41	185	44	131	48
Malignant neopasm of liver and intrahepatic bile ducts	C22	2	1	3	1	8	3	20	9	48	17	61	20	56	25
Malignant neoplasm of larynx	C32	0	0	2	0	14	4	82	13	231	24	189	19	140	18
Malignant neoplasm of breast	C50	0	3	0	69	0	430	0	771	0	800	0	394	0	223
Epilepsy	G40-G41	1,581	2,314	1,966	2,757	2,558	3,062	2,636	2,760	2,832	2,669	2,460	1,960	2,459	2,469
Hypertensive diseases	I10-I15	201	173	971	602	4,119	2,476	12,368	6,303	23,317	11,755	25,438	12,593	19,292	13,699
Cardiac arrhyththmias	I47-I48	219	264	474	443	1,232	715	2,649	1,279	7,058	3,258	12,337	6,686	20,431	19,495
Heart failure	I50-I51	1	0	1	0	2	1	3	1	5	2	8	3	20	14
Haemorrhagic stroke	I60-I62, I69.0-I69.2	36	19	69	27	138	81	294	128	348	141	348	125	349	182
Ischaemic stroke	I63-I66, 169.3, I69.4	9	2	22	-9	48	-21	308	-48	544	-108	465	-248	-305	-1,075
Oesophageal varices	I85	37	23	53	29	131	57	293	104	349	163	279	158	168	101
Gastro-oesophageal laceration-haemorrhage	K22.6	145	120	156	81	123	60	63	43	83	55	112	72	166	154
Unspecified liver cirrhosis	K73, K74	54	50	108	77	454	196	622	336	675	561	479	600	401	441
Acute and chronic pancreatitis	K86.1, K85	63	95	157	126	303	174	402	186	423	216	327	158	267	167
Psoriasis	L40	49	105	102	144	180	144	185	128	181	135	108	76	74	71
Spontaneous abortion	L40.5	0	2,156	0	3,603	0	2,374	0	70	0	1	0	0	0	11
Road traffic accidents		1,035	178	1,013	202	697	121	417	91	114	16	55	13	60	18
Pedestrian traffic accidents		33	8	38	7	35	7	24	7	9	2	6	1	13	2
Water transport accidents	V90-V94	6	2	9	2	11	3	6	2	7	2	2	2	1	2
Air and Space transport accidents	V95-V97	1	0	3	1	5	0	3	0	2	0	1	0	0	0
Falls	W00-W19	1,925	596	1,669	710	1,668	773	1,473	924	1,764	1,582	1,319	786	4,623	4,428
Work/Machine injuries	W24-W31	325	79	300	71	260	66	157	40	108	24	45	13	20	11
Firearm injuries	W32-W34	71	7	29	3	20	4	12	1	7	1	3	0	1	0
Drowning	W65-W74	4	3	2	1	3	3	3	1	4	2	3	1	4	4
Inhalation of gastric contents/inhalation and ingestion of food causing obstruction of the respiratory tract	W78-W79	9	5	10	9	15	12	15	12	21	19	37	23	81	98
Fire injuries	X00-X09	114	31	91	32	77	33	53	24	40	23	35	23	43	63
Accidental excessive cold	X31	2	0	1	1	2	1	2	1	3	1	3	3	14	27
Intentional self-harm	X60-X84, Y10-Y33	1,613	3,310	1,606	1,896	1,471	1,953	795	1,072	394	464	167	187	173	180
Assault	X85-Y09	3,016	481	1,907	372	1,281	269	534	112	185	42	64	26	39	60
Diabetes mellitus	E11	-20	-16	-82	-64	-302	-193	-731	-319	-1,258	-451	-1,108	-571	-790	-697
Ischaemic heart disease	I20-I25	-8	-4	-59	-24	-495	-159	-957	-467	-2,224	-908	-3,039	-1,212	0	0
Cholelithiasis	K80	-49	-667	-207	-1,447	-541	-2,030	-843	-1,967	-1,179	-2,102	-1,347	-1,335	-1,387	-1,457

Table 61: Alcohol attributable fraction in England– reproduction of the NWPHO report (2008) [43]

Conditions	ICD-10 codes	16 – 24 yrs		25 – 34 yrs		35 – 44 yrs		45 – 54 yrs		55 – 64 yrs		65 – 74 yrs		75 + yrs	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F
Alcohol-induced pseudo-Cushing's syndrome	E24.4	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
Menral and behavioural disorders due to use of alcohol	F10	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
Degeneration of nervous system due to alcohol	G31.2	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
Alcoholic polyneuropathy	G62.1	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
Alcoholic myopathy	G72.1	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
Alcoholic cardiomyopathy	I426	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
Alcoholic gastritis	K29.2	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
Alcoholic liver disease	K70	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
Alcohol-induced chronic pancreatitis	K86.0	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
Ethanol	T51.0	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
Methanol	T51.1	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
Toxic effect of alcohol, unspecified	T519	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
Accidental poisoning by and exposure to alcohol	X45	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
Malignant neoplasms of lip, oral cavity and pharynx	C00 - C14	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
Malignant neoplasm of oesophagus	C15	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
Malignant neoplasm of colon	C18	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
Malignant neoplasm of rectum	C20	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
Malignant neopasm of liver and intrahepatic bile ducts	C22	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
Malignant neoplasm of larynx	C32	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
Malignant neoplasm of breast	C50	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
Epilepsy	G40-G41	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
Hypertensive diseases	I10-I15	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
Cardiac arrhyththmias	I47-I48	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
Heart failure	I50-I51	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
Haemorrhagic stroke	I60-I62, I69.0-I69.2	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
Ischaemic stroke	I63-I66, 169.3, I69.4	0.16	0.03	0.13	-0.04	0.08	-0.04	0.18	-0.04	0.12	-0.05	0.06	-0.05	-0.02	-0.06
Oesophageal varices	I85	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
Gastro-oesophageal laceration-haemorrhage	K22.6	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
Unspecified liver cirrhosis	K73, K74	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
Acute and chronic pancreatitis	K86.1, K85	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
Psoriasis	L40	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
Spontaneous abortion	L40.5	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
Road traffic accidents – Death		0.37	0.18	0.37	0.18	0.37	0.18	0.37	0.18	0.09	0.00	0.09	0.00	0.09	0.00
Road traffic accidents – Hospitalisation		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
Pedestrian traffic accidents – Death		0.69	0.50	0.58	0.22	0.51	0.42	0.51	0.42	0.16	0.06	0.16	0.06	0.16	0.06
Pedestrian traffic accidents - Hospitalisation		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
Water transport accidents	V90-V94	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
Air and Space transport accidents	V95-V97	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
Falls	W00-W19	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
Work/Machine injuries	W24-W31	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
Firearm injuries	W32-W34	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
Drowning	W65-W74	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
Inhalation of gastric contents	W78-W79	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
Fire injuries	X00-X09	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
Accidental excessive cold	X31	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
Intentional self-harm	X60-X84, Y10-Y33	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
Assault	X85-Y09	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
Diabetes mellitus	E11	-0.08	-0.05	-0.09	-0.06	-0.09	-0.06	-0.10	-0.05	-0.10	-0.05	-0.06	-0.05	-0.04	-0.04
Ischaemic heart disease	I20-I25	-0.07	-0.06	-0.08	-0.09	-0.10	-0.09	-0.07	-0.09	-0.09	-0.08	-0.10	-0.08	-0.11	-0.07
Cholelithiasis	K80	-0.23	-0.23	-0.23	-0.21	-0.24	-0.22	-0.26	-0.22	-0.24	-0.19	-0.21	-0.14	-0.17	-0.11

Appendix 6: Risk functions

Table 62: Constant and slope of the linear absolute risk function for mortality for wholly attributable conditions.

		11 – 15 years		16 - 17 years		18 - 24 years		25 - 34 years		35 - 44 years		45 - 54 years		55 - 64 years		65 - 74 years		75 + years	
Conditions		**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Alcohol-induced pseudo-Cushing's syndrome	constant		8E-04																
	Slope																		
Mental and behavioural disorders due to use of alcohol	constant	7E-04		9E-04	5E-04	5E-04	4E-04	6E-04	4E-04	1E-03	7E-04	2E-03	1E-03	2E-03	1E-03	3E-03	1E-03	5E-03	3E-03
	Slope	9E-05	1E-04	1E-04	9E-05	5E-05	5E-05	7E-05	8E-05	2E-04	2E-04	3E-04	3E-04	3E-04	4E-04	6E-04	6E-04	2E-03	2E-03
Degeneration of nervous system due to alcohol	constant							6E-08	1E-07	2E-06	2E-06	6E-06	4E-06	8E-06	6E-06	1E-05	6E-06	3E-05	1E-05
	Slope							3E-08	3E-08	2E-07	3E-07	9E-07	8E-07	1E-06	1E-06	3E-06	2E-06	7E-06	5E-06
Alcoholic polyneuropathy	constant							3E-07	4E-07	6E-07	4E-07	2E-06	2E-06	4E-06	2E-06	6E-06	3E-06	1E-05	8E-06
	Slope							4E-08	7E-08	7E-08	8E-08	3E-07	4E-07	6E-07	5E-07	1E-06	8E-07	3E-06	3E-06
Alcoholic myopathy	constant									1E-07	1E-07	7E-07	1E-07	1E-06	2E-07	2E-06	6E-07	5E-06	1E-06
	Slope									2E-08	3E-08	1E-07	4E-08	2E-07	7E-08	3E-07	2E-07	1E-06	5E-07
Alcoholic cardiomyopathy	constant							4E-07		3E-06	6E-07	1E-05	1E-06	2E-05	3E-06	3E-05	2E-06	4E-05	1E-05
	Slope							5E-08		4E-07	1E-07	2E-06	3E-07	3E-06	6E-07	6E-06	5E-07	1E-05	4E-06
Alcoholic gastritis	constant			7E-06	4E-06	4E-06	3E-06	5E-06	2E-06	8E-06	4E-06	9E-06	4E-06	6E-06	4E-06	1E-05	5E-06	2E-05	4E-06
	Slope			8E-07	6E-07	4E-07	4E-07	6E-07	3E-07	1E-06	7E-07	1E-06	8E-07	1E-06	1E-06	2E-06	2E-06	4E-06	1E-06
Alcoholic liver disease	constant			2E-06	1E-06	1E-06	1E-06	1E-05	2E-05	8E-05	7E-05	2E-04	2E-04	3E-04	2E-04	5E-04	4E-04	6E-04	3E-04
	Slope			2E-07	2E-07	1E-07	1E-07	1E-06	3E-06	9E-06	1E-05	3E-05	3E-05	5E-05	6E-05	9E-05	1E-04	2E-04	1E-04
Alcohol-induced chronic pancreatitis	constant		8E-04	4E-06	2E-06	2E-06	1E-06	9E-06	3E-06	2E-05	8E-06	2E-05	1E-05	2E-05	7E-06	2E-05	1E-05	2E-05	4E-06
	Slope			5E-07	3E-07	2E-07	2E-07	1E-06	5E-07	3E-06	1E-06	3E-06	2E-06	3E-06	2E-06	3E-06	3E-06	5E-06	1E-06
Ethanol	constant	3E-04		2E-04	4E-04	1E-04	3E-04	1E-04	2E-04	1E-04	3E-04	9E-05	2E-04	5E-05	1E-04	4E-05	8E-05	7E-05	7E-05
	Slope	4E-05	1E-04	2E-05	7E-05	1E-05	4E-05	1E-05	4E-05	2E-05	6E-05	1E-05	5E-05	8E-06	4E-05	9E-06	3E-05	2E-05	4E-05
Methanol	constant			1E-07	5E-07	6E-08	3E-07	2E-07	1E-07	1E-07	5E-07	4E-07	5E-07	1E-07				2E-06	3E-06
	Slope			2E-08	9E-08	3E-08	6E-08	3E-08	3E-08	3E-08	1E-07	8E-08	1E-07	3E-08				5E-07	2E-06
Toxic effect of alcohol, unspecified	constant			7E-06	1E-05	4E-06	9E-06	3E-06	8E-06	6E-06	9E-06	4E-06	7E-06	2E-06	6E-06	1E-06	4E-06	3E-06	2E-06
	Slope			8E-07	2E-06	4E-07	1E-06	4E-07	1E-06	8E-07	2E-06	6E-07	2E-06	3E-07	2E-06	3E-07	2E-06	1E-06	1E-06
Accidental poisoning by and exposure to alcohol	constant		0E+00	1E-05	1E-05	5E-06	9E-06	4E-06	6E-06	4E-06	7E-06	4E-06	5E-06	2E-06	4E-06	4E-06	1E-06	8E-06	1E-05
	Slope			1E-06	2E-06	6E-07	1E-06	4E-07	1E-06	5E-07	1E-06	6E-07	1E-06	3E-07	1E-06	8E-07	6E-07	2E-06	7E-06

Table 63: Constant and slope of the linear absolute risk function for morbidity for wholly attributable conditions

		11 – 15 years		16 - 17 years		18 - 24 years		25 - 34 years		35 - 44 years		45 - 54 years		55 - 64 years		65 - 74 years		75 + years	
Conditions		**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Alcohol-induced pseudo-Cushing's syndrome	constant																				
	Slope																				
Mental and behavioural disorders due to use of alcohol	constant	3E-07		5E-07		2E-07		2E-06	6E-07	6E-06	4E-06	1E-05	9E-06	1E-05	2E-05	2E-05	9E-06	3E-05	2E-05
	Slope	5E-08		6E-08		3E-08		2E-07	1E-07	8E-07	9E-07	2E-06	2E-06	3E-06	5E-06	5E-06	4E-06	1E-05	1E-05
Degeneration of nervous system due to alcohol	constant											2E-07		4E-07		3E-07		4E-06	
	Slope											3E-08		6E-08		7E-08		9E-07	
	constant											9E-08							
Alcoholic polyneuropathy	Slope											3E-08							
	constant											2E-07		1E-07					
Alcoholic myopathy	Slope											3E-08		3E-08					
	constant							1E-07	1E-07	8E-07		2E-06	6E-07	3E-06	7E-07	5E-06	6E-07	1E-06	1E-06
Alcoholic cardiomyopathy	Slope							2E-08	3E-08	1E-07		3E-07	1E-07	4E-07	2E-07	1E-06	2E-07	3E-07	5E-07
	constant								1E-07			9E-08		1E-07		3E-07			
Alcoholic gastritis	Slope								3E-08			3E-08		3E-08		7E-08			
	constant					2E-07	2E-07	5E-06	5E-06	3E-05	3E-05	8E-05	6E-05	1E-04	1E-04	1E-04	1E-04	2E-04	1E-04
Alcoholic liver disease	Slope					3E-08	4E-08	6E-07	7E-07	4E-06	5E-06	1E-05	1E-05	2E-05	2E-05	3E-05	3E-05	4E-05	4E-05
Alcohol-induced chronic pancreatitis	constant							2E-07	1E-07	2E-07	1E-07	1E-06	4E-07	1E-06	5E-07	1E-06	6E-07	2E-06	
	Slope							2E-08	3E-08	4E-08	3E-08	2E-07	9E-08	2E-07	1E-07	2E-07	2E-07	6E-07	
	constant					8E-08			1E-07	6E-07	2E-07	4E-07	3E-07	6E-07	3E-07	4E-07			
Ethanol	Slope					2E-08			3E-08	1E-07	6E-08	8E-08	1E-07	1E-07	1E-07	1E-07			
	constant		2E-07							7E-08		1E-07							
Methanol	Slope									3E-08		3E-08							
Toxic effect of alcohol, unspecified	constant		2E-07		3E-07	2E-07	2E-07	9E-07	4E-07	1E-06	2E-06	4E-06	2E-06	2E-06	3E-06	3E-06	3E-06	2E-06	
	Slope		4E-08		6E-08	2E-08	4E-08	1E-07	7E-08	2E-07	4E-07	6E-07	6E-07	3E-07	1E-06	8E-07	1E-06	5E-07	
Accidental poisoning by and exposure to alcohol	constant		0E+00		3E-07	3E-07	2E-07	8E-07	6E-07	2E-06	2E-06	4E-06	3E-06	2E-06	3E-06	3E-06	2E-06	2E-06	
	Slope		4E-08		6E-08	3E-08	4E-08	1E-07	1E-07	3E-07	5E-07	7E-07	7E-07	4E-07	1E-06	8E-07	9E-07	5E-07	

Figure 38: Relative risk functions for partially chronic conditions attributable to alcohol

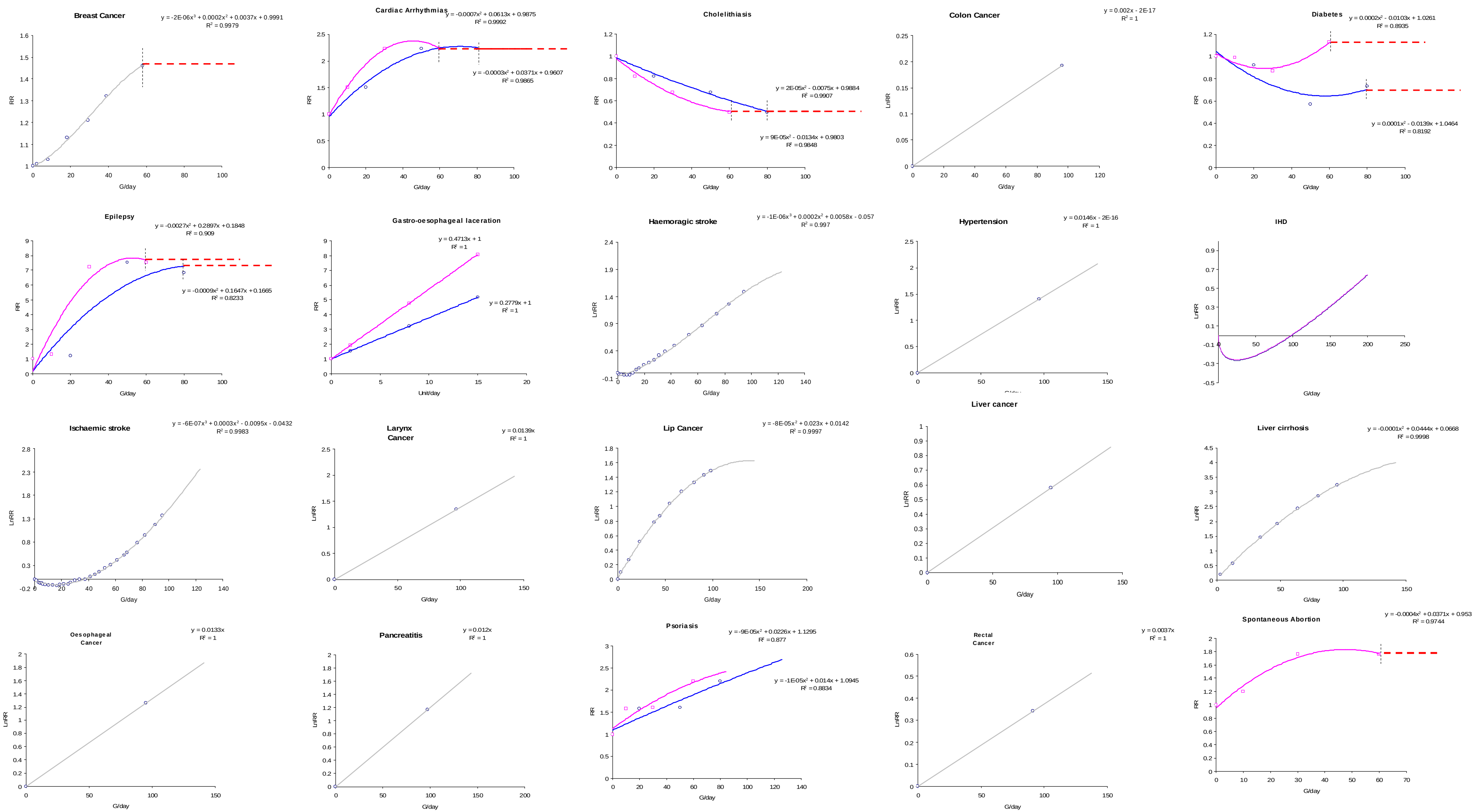


Table 64: Slope of the linear function for partially acute conditions attributable to alcohol

	11 – 15 years		16 - 17 years		18 - 24 years		25 - 34 years		35 - 44 years		45 - 54 years		55 - 64 years		65 - 74 years		75 + years	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Road traffic – deaths	0.69528	0.173454	0.09405	0.025168	0.08942	0.043672329	0.08942	0.043672	0.11357	0.066326	0.11357	0.066326	0.02874	0.000199	0.02874	0.000199	0.02874	0.00020
Road traffic– hosp	0.46673	0.17172	0.05686	0.031407	0.06639	0.042037688	0.06639	0.042038	0.05434	0.041922	0.05434	0.041922	0.02809	0.013213	0.02809	0.013213	0.02809	0.01321
Pedestrian traffic– deaths	0.44682	0.276398	0.44682	0.276398	0.18897	0.029381198	0.18897	0.029381	0.17849	0.212429	0.17849	0.212429	0.05099	0.032656	0.05099	0.032656	0.05099	0.03266
Pedestrian traffic - hosp	0.10836	0.052653	0.10836	0.052653	0.11234	0.056129004	0.11234	0.056129	0.14650	0.078224	0.14650	0.078224	0.08006	0.015893	0.08006	0.015893	0.08006	0.01589
Water transport accidents	0.05076	0.087927	0.05076	0.087927	0.05076	0.087926723	0.05076	0.087927	0.05076	0.087927	0.05076	0.087927	0.05076	0.087927	0.05076	0.087927	0.05076	0.08793
Air and Space transport accidents	0.03860	0.067134	0.03860	0.067134	0.03860	0.067134352	0.03860	0.067134	0.03860	0.067134	0.03860	0.067134	0.03860	0.067134	0.03860	0.067134	0.03860	0.06713
Falls	0.05418	0.052505	0.05418	0.052505	0.05418	0.052504642	0.05418	0.052505	0.05418	0.052505	0.05418	0.052505	0.05418	0.052505	0.05220	0.031951	0.05220	0.03195
Work/Machine injuries	0.01516	0.026618	0.01516	0.026618	0.01516	0.026617749	0.01516	0.026618	0.01516	0.026618	0.01516	0.026618	0.01516	0.026618	0.01516	0.026618	0.01516	0.02662
Firearm injuries	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273117	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.11727
Drowning	0.04479	0.045148	0.07494	0.119852	0.07494	0.119852028	0.07494	0.119852	0.16686	0.286913	0.14365	0.247599	0.14365	0.247599	0.14744	0.301356	0.14744	0.30136
Inhalation of gastric contents	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273117	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.11727
Fire injuries	0.12451	0.215684	0.12451	0.215684	0.12451	0.215684001	0.12451	0.215684	0.12451	0.215684	0.12451	0.215684	0.12451	0.215684	0.12451	0.215684	0.12451	0.21568
Accidental excessive cold	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273117	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.117273	0.06771	0.11727
Intentional self-harm	0.08579	0.134101	0.08579	0.134101	0.08579	0.134100664	0.07585	0.129364	0.09209	0.14889	0.11380	0.16487	0.12263	0.200287	0.14082	0.21133	0.19996	0.26948
Assault	0.07539	0.130083	0.07539	0.130083	0.07539	0.130082505	0.07539	0.130083	0.07539	0.130083	0.07539	0.130083	0.07539	0.130083	0.07539	0.130083	0.07539	0.13008

Appendix 7: Morbidity cost to the NHS

Conditions	ICD-10 codes	Multiplier	Inpatient visits	Outpatient visits	A&E visits	Ambulance	GP consultation	Nurse visits	Other health care cost	Total cost per person-specific hospitalisation
Alcohol-induced pseudo-Cushing's syndrome	E24.4	2.04	£4,885	£920	£0	£0	£0	£0	£0	£5,805
Mental and behavioural disorders due to use of alcohol	F10	1.05	£1,422	£473	£1,882	£979	£164	£15	£1,006	£5,942
Degeneration	G31.2	3.50	£8,325	£1,977	£2,095	£654	£439	£41	£3,359	£16,890
Alcoholic polyneuropathy	G62.1	2.26	£5,101	£1,532	£1,353	£422	£284	£27	£1,808	£10,526
Alcoholic myopathy	G72.1	2.71	£6,497	£1,834	£1,619	£506	£340	£32	£2,164	£12,991
Alcoholic cardiomyopathy	I42.6	1.86	£3,469	£1,261	£1,670	£1,043	£234	£22	£893	£8,592
Alcoholic gastritis	K29.2	2.63	£2,896	£1,187	£4,718	£2,456	£330	£31	£841	£12,459
Alcoholic liver disease	K70	1.32	£2,538	£297	£788	£492	£83	£8	£421	£4,626
Chronic pancreatitis	K86.0	4.64	£7,821	£2,619	£4,164	£2,601	£582	£54	£1,484	£19,324
Ethanol poisoning	T51.0	1.39	£576	£0	£2,494	£1,558	£0	£0	£0	£4,627
Methanol poisoning	T51.1	1.24	£857	£0	£2,226	£1,391	£0	£0	£0	£4,474
Toxic effect of alcohol, unspecified	T51.9	8.00	£3,531	£0	£14,371	£8,977	£0	£0	£0	£26,879
Accidental poisoning by exposure to alcohol	X45	0.51	£314	£0	£917	£572	£0	£0	£0	£1,803
Malignant neoplasm of lip, oral cavity and pharynx	C00-C14	2.54	£4,924	£1,437	£762	£476	£319	£30	£407	£8,355
Malignant neoplasm of oesophagus	C15	2.43	£2,964	£1,373	£727	£454	£229	£21	£389	£6,158
Malignant neoplasm of colon	C18	3.77	£4,324	£2,130	£1,129	£705	£355	£33	£603	£9,280
Malignant neoplasm of rectum	C20	3.27	£3,751	£1,845	£978	£611	£308	£29	£523	£8,044
Malignant neoplasm of liver and intrahepatic bile ducts	C22	2.19	£3,428	£1,239	£656	£410	£207	£19	£351	£6,310
Malignant neoplasm of larynx	C32	1.65	£3,769	£932	£494	£308	£155	£15	£264	£5,937
Malignant neoplasm of breast	C50	1.77	£2,172	£998	£529	£330	£166	£16	£283	£4,494
Diabetes mellitus (typeII)	E11	2.04	£2,367	£1,150	£199	£1,142	£383	£36		£5,277
Epilepsy and status epilepticus	G40-G41	1.71	£2,612	£773	£2,561	£1,600	£269	£25	£0	£7,840
Hypertensive diseases	I10-I15	2.20	£3,819	£744	£0	£0	£413	£39	£0	£5,015
Ischaemic heart disease	I20-I25	2.04	£2,054	£690	£1,828	£0	£0	£0		£4,572

Cardiac arrhythmias	I47-I48	1.58	£3,269	£712	£1,886	£1,178	£99	£9	£0	£7,153
haemorrhagic stroke	I60-I62, I69.0-I69.2	1.10	£3,517	£498	£990	£619	£104	£10	£0	£5,738
Ischaemic stroke	I66-I66,I69.3, I69.4	2.04	£3,402	£920	£1,828	£1,142	£192	£18		£7,502
Oesophageal varices	I85	2.65	£2,609	£599	£2,379	£1,486	£166	£16	£0	£7,254
Gastro-oesophageal laceration-haemorrhage syndrome	K22.6	0.80	£839	£181	£720	£450	£25	£2	£0	£2,218
Unspecified liver disease	K73, K74	1.54	£2,646	£347	£921	£575	£97	£9	£0	£4,595
Cholelithiasis	k80	2.04	£2,093	£230	£2,437	£0	£0	£0		£4,760
Acute and chronic pancreatitis	K85, K86.1	1.26	£2,466	£568	£1,130	£706	£79	£7	£0	£4,956
Psoriasis	L40 excluding L40.5	2.31	£3,766	£782	£0	£0	£362	£34	£0	£4,944
Spontaneous abortion	O03	1.10	£657	£372	£1,641	£820	£138	£13	£0	£3,639
Road traffic accidents - non pediastrian		2.92	£5,004	£660	£5,243	£3,275	£183	£17	£0	£14,382
Pedestrian traffic accidents		4.95	£9,785	£1,119	£7,412	£4,630	£311	£29	£0	£23,285
Water transport accidents	V90-V94	1.24	£2,294	£279	£1,851	£1,156	£39	£4	£0	£5,624
Air/space transport accidents	V95-V97	2.34	£4,010	£529	£2,101	£1,312	£0	£0	£0	£7,952
Fall injuries	W00-W19	0.82	£1,852	£92	£1,465	£763	£77	£7	£0	£4,255
Work/machine injuries	W24-W31	1.26	£2,162	£142	£1,887	£943	£119	£11	£0	£5,264
Firearm injuries	W32-W34	1.16	£1,562	£131	£1,730	£1,080	£0	£0	£0	£4,502
Drowning	W65-W74	1.05	£1,220	£236	£939	£587	£33	£3	£0	£3,018
Inhalation of gastric contents	W78	0.79	£1,771	£178	£945	£591	£25	£2	£0	£3,513
Fire injuries	X00-X09	0.75	£1,274	£170	£1,125	£703	£24	£2	£0	£3,298
Accidental excessive cold	X31	0.91	£1,636	£103	£1,638	£1,023	£29	£3	£0	£4,432
Intentional self-harm	X60-X84	1.22	£641	£137	£2,182	£1,136	£114	£11	£0	£4,222
Assault	X85-Y09	1.15	£1,252	£130	£2,067	£1,076	£36	£3	£0	£4,564

Appendix 8: Utilities

	11 - 15 years	16 – 17 years	18 - 24 years	25 - 34 years	35 - 44 years	45 - 54 years	55 - 64 years	65 - 74 years	75 +
Alcohol-induced pseudo-cushing	0.608	0.608	0.608	0.587	0.560	0.534	0.507	0.480	0.451
Mental and behavioural disorders	0.569	0.569	0.569	0.550	0.524	0.500	0.475	0.450	0.423
Degeneration of nervous system*****	0.608	0.608	0.608	0.587	0.560	0.534	0.507	0.480	0.451
Alcoholic polyneuropathy	0.608	0.608	0.608	0.587	0.560	0.534	0.507	0.480	0.451
Alcoholic myopathy	0.651	0.651	0.651	0.629	0.600	0.571	0.544	0.515	0.484
Alcoholic cardiomyopathy	0.651	0.651	0.651	0.629	0.600	0.571	0.544	0.515	0.484
Alcoholic gastritis	0.543	0.543	0.543	0.524	0.500	0.476	0.453	0.429	0.403
Alcoholic liver disease	0.563	0.563	0.563	0.544	0.519	0.494	0.470	0.445	0.418
Chronic pancreatitis (alcohol induced)	0.509	0.509	0.509	0.491	0.469	0.447	0.424	0.403	0.377
Ethanol poisoning	0.434	0.434	0.434	0.418	0.400	0.381	0.361	0.343	0.322
Methanol poisoning	0.434	0.434	0.434	0.418	0.400	0.381	0.361	0.343	0.322
Toxic effect of alcohol, unspecified	0.732	0.732	0.732	0.705	0.674	0.642	0.609	0.578	0.542
Accidental poisoning by exposure to alcohol	0.639	0.639	0.639	0.617	0.588	0.562	0.533	0.505	0.474
Malignant neoplast of lip, oral cavity and pharynx	0.716	0.716	0.716	0.691	0.660	0.629	0.598	0.566	0.532
Malignant neoplast of oesophagus	0.784	0.784	0.784	0.756	0.723	0.688	0.653	0.620	0.581
Malignant neoplast of colon	0.841	0.841	0.841	0.812	0.775	0.737	0.702	0.664	0.625
Malignant neoplast of rectum	0.858	0.858	0.858	0.828	0.790	0.752	0.716	0.678	0.637
Malignant neoplast of liver and bile	0.690	0.690	0.690	0.667	0.636	0.607	0.576	0.545	0.513
Malignant neoplast of larynx	0.908	0.908	0.908	0.877	0.836	0.796	0.758	0.717	0.674
Malignant neoplast of breast	0.840	0.840	0.840	0.811	0.774	0.736	0.701	0.664	0.624
Diabetes mellitus (Type II)	0.704	0.704	0.704	0.680	0.649	0.617	0.588	0.556	0.523
Epilepsy and status epilepticus	0.623	0.623	0.623	0.600	0.574	0.546	0.519	0.492	0.461
Hypertensive diseases	0.769	0.769	0.769	0.743	0.709	0.675	0.642	0.608	0.572
Ischaemic Heart Disease	0.734	0.734	0.734	0.707	0.676	0.643	0.611	0.580	0.543
Cardiac arrhythmias	0.795	0.795	0.795	0.768	0.733	0.699	0.664	0.628	0.591
Haemorrhagic stroke	0.750	0.750	0.750	0.724	0.691	0.657	0.626	0.592	0.557
Ischaemic stroke	0.643	0.643	0.643	0.620	0.593	0.564	0.535	0.508	0.476
Oesophageal varices	0.709	0.709	0.709	0.683	0.653	0.622	0.590	0.560	0.525
Gastro_oeso	0.946	0.946	0.946	0.911	0.871	0.829	0.787	0.748	0.701
Unspecified liver disease	0.698	0.698	0.698	0.674	0.643	0.612	0.583	0.552	0.519
Heart failure	0.679	0.679	0.679	0.655	0.625	0.597	0.566	0.536	0.504
Cholelithiasis	0.844	0.844	0.844	0.813	0.777	0.740	0.702	0.667	0.625
Acute an chronic pancreatitis	0.693	0.693	0.693	0.667	0.638	0.607	0.576	0.547	0.513

Psoriasis	0.733	0.733	0.733	0.707	0.676	0.643	0.610	0.580	0.543
Spontaneous abortion	0.932	0.932	0.932	0.900	0.858	0.819	0.778	0.736	0.692
Road traffic accidents – non pedestrian	0.680	0.680	0.680	0.656	0.626	0.598	0.567	0.537	0.505
Pedestrian traffic accidents	0.658	0.658	0.658	0.636	0.606	0.577	0.549	0.520	0.489
Water transport accident	0.680	0.680	0.680	0.656	0.626	0.598	0.567	0.537	0.505
Air/space transport accidents	0.680	0.680	0.680	0.656	0.626	0.598	0.567	0.537	0.505
Fall injuries	0.710	0.710	0.710	0.686	0.655	0.623	0.593	0.561	0.528
Work/machine injuries	0.888	0.888	0.888	0.858	0.818	0.781	0.741	0.701	0.660
Firearm injuries	0.658	0.658	0.658	0.636	0.606	0.577	0.549	0.520	0.489
Drowning	0.658	0.658	0.658	0.636	0.606	0.577	0.549	0.520	0.489
Inhalation of gastric contents and ingestion	0.971	0.971	0.971	0.937	0.894	0.852	0.809	0.767	0.720
Fire injuries	0.658	0.658	0.658	0.636	0.606	0.577	0.549	0.520	0.489
Accidental excessive cold	0.658	0.658	0.658	0.636	0.606	0.577	0.549	0.520	0.489
Intentional self-harm	0.464	0.464	0.464	0.447	0.428	0.407	0.386	0.367	0.344
Assault	0.705	0.705	0.705	0.679	0.650	0.618	0.587	0.557	0.522
General population	0.971	0.971	0.971	0.937	0.894	0.852	0.809	0.767	0.720

Appendix 9: Summary from previous Home Office costs of alcohol attributable crime analysis[64]

Offence code	Offence	Recorded crime 2006/07	Multiplier	Estimated offences	Alcohol related proportion	Estimated total alcohol related offences	Unit cost of crime	Estimated total cost of crime related to alcohol
4.6	Causing death by dangerous driving under the influence, driving after after having consumed excess alcohol	462	1	462	100%	462	£1,458,975	£674,046,450
5	More serious wounding	17,281	1.8	31,106	26%	8,088	£21,422	£173,250,596
8A + 8D	Less serious wounding	487,463	7.7	3,753465	26%	975,901	£8,056	£7,861,857,860
104	Assault on a constable	21,751	7.7	167,483	19%	31,822	£1,440	£45,823,267
105 A+B	Assault without injury	207,067	7.7	1,594416	19%	302,939	£1,440	£436,232,190
56 - 59	Criminal damage	1,185,111	4.3	5,095,977	37%	1,885,512	£866	£1,632,853,046
39	Theft from the person	114,865	4.6	528,379	7%	36,987	£844	£31,216,631
34	Robbery	101,370	3.7	375,069	7%	26,255	£7,282	£191,187,672
34A	Robbery (Business)	9453	3.7	34,976	7%	2,448	£5,000	£12,241,635
28 + 29	Burglary in a dwelling	292,285	2.2	643,027	7%	45,012	£3,268	£147,098,857
30 + 31	Burglary not in a dwelling	329,759	2.1	692,494	7%	48,475	£2,700	£130,881,347
44	Theft of a pedal cycle	110,531	3.6	397,912	7%	27,854	£634	£17,659,317
45	Theft from vehicle	502,663	2.8	1,407,456	34%	478,535	£858	£410,583,181
37.2	Aggravated vehicle taking	10919	1.2	13,103	34%	4,455	£4,138	£18,434,591
48	Theft of vehicle	182,491	1.2	218989	34%	74,456	£4,138	£308,100,285
49	Other theft	536,762	2.7	1,449,257	7%	101,448	£634	£64,318,043
46	Theft from shops	294,304	100	29,430,400	7%	2,060,128	£100	£206,012,800
65	Violent disorder	1744	1.8	3,139	21%	659	£10,407	£6,860,627
	Total sexual offence	57,542	5.2	299,218	21%	62,836	£31,438	£1,975,433,892
1 + 4 + 37	Homicide	1,414	1	1,414	21%	297	£1,458,975	£433,228,037
	Total							**£14,777,320,326**

Appendix 10: Estimated number of offences per age group

Conditions	Codes	11 – 15 yrs		16 – 17 yrs		18 – 24 yrs		25 – 34 yrs		35 – 44 yrs		45 – 54 yrs		55 – 64 yrs		65 – 74 yrs		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Causing death by dangerous driving under the influence, of alcohol	4.6	64	26	43	9	150	30	96	21	9	2	5	1	3	1	1	0	372	90
More serious wounding	5	5,566	2,128	2,838	473	9,932	1,655	5,566	982	819	164	450	90	246	49	123	25	25,540	5,566
Less serious wounding	8A+8D	671,673	256,816	342,421	57,070	1,198,475	199,746	671,673	118,530	98,775	19,755	54,326	10,865	29,633	5,927	14,816	2,963	3,081,792	671,673
Assault on a constable	104	29,971	11,459	15,279	2,547	53,477	8,913	29,971	5,289	4,407	881	2,424	485	1,322	264	661	132	137,512	29,971
Assault without injury	105A+B	285,317	109,092	145,455	24,243	509,094	84,849	285,317	50,350	41,958	8,392	23,077	4,615	12,587	2,517	6,294	1,259	1,309,099	285,317
Criminal damage	56-59	1,486,327	318,499	448,257	47,185	1,568,900	165,147	743,163	106,166	106,166	0	58,391	0	31,850	0	15,925	0	4,458,980	636,997
Theft from the person	39	84,084	53,980	37,371	14,302	130,797	50,058	99,655	33,218	9,343	3,114	5,138	1,713	2,803	934	1,401	467	370,592	157,787
Roberry	34	97,240	27,783	40,131	3,087	140,458	10,804	55,566	0	0	0	0	0	0	0	0	0	333,395	41,674
Roberry (Business)	34A	9,068	2,591	3,742	288	13,098	1,008	5,182	0	0	0	0	0	0	0	0	0	31,090	3,886
Bulgary in a dwelling	28+29	165,532	19,100	63,666	4,244	222,831	14,855	133,699	6,367	6,367	0	3,502	0	1,910	0	955	0	598,461	44,566
Bulgary not in a dwelling	30+31	178,266	20,569	68,564	4,571	239,973	15,998	143,984	6,856	6,856	0	3,771	0	2,057	0	1,028	0	644,499	47,995
Theft of a pedal cycle	44	63,322	40,651	28,143	10,771	98,501	37,698	75,048	25,016	7,036	2,345	3,870	1,290	2,111	704	1,055	352	279,086	118,826
Theft from vehicle	45	223,976	143,787	99,545	38,097	348,408	133,341	265,453	88,484	24,886	8,295	13,687	4,562	7,466	2,489	3,733	1,244	987,155	420,301
Aggravated vehicle taking	37.2	2,085	1,339	927	355	3,244	1,241	2,471	824	232	77	127	42	70	23	35	12	9,190	3,913
Theft of vehicle	48	34,849	22,372	15,488	5,928	54,209	20,747	41,302	13,767	3,872	1,291	2,130	710	1,162	387	581	194	153,593	65,396
Other theft	49	230,628	148,058	102,501	39,229	358,755	137,301	273,337	91,112	25,625	8,542	14,094	4,698	7,688	2,563	3,844	1,281	1,016,473	432,784
Theft from shops	46	5,266,493	2,013,659	2,684,879	447,480	9,397,075	1,566,179	5,266,493	929,381	774,484	154,897	425,966	85,193	232,345	46,469	116,173	23,235	24,163,907	5,266,493
Violent disorder	65	547	194	302	47	1,056	165	564	88	79	9	44	5	24	3	12	1	2,628	511
Total sexual offence		74,805	0	22,164	0	77,575	0	74,805	0	24,935	0	13,714	0	7,480	0	3,740	0	299,218	0
Homicide	1+4+37	253	97	129	21	451	75	253	45	37	7	20	4	11	2	6	1	1,161	253
Total		8,910,064	3,192,199	4,121,846	699,946	14,426,460	2,449,812	8,173,598	1,476,499	1,135,888	207,772	624,738	114,274	340,766	62,331	170,383	31,166	37,903,743	8,233,999

Appendix 11: Slope of the linear function used for crime

		Male		Female	
Offences	**AAF used**	**Under 16 years old**	**16 years and over**	**Under 16 years old**	**16 years and over**
Causing death by dangerous driving under the influence, driving after having consumed excess alcohol	All violent offences	0	0.0292823	0.0195215	0.0658335
More serious wounding	Assault with Injury	0	0.0204662	0.0195215	0.0966432
Less serious wounding	Assault with Injury	0	0.0204662	0.0195215	0.0966432
Assault on a constable	Assault without Injury	0	0.0363766	0.0195215	0.0436861
Assault without injury	Assault without Injury	0	0.0363766	0.0195215	0.0436861
Criminal damage	Criminal damage	0.018368	0.0746887	0.2416419	0.1278472
Theft from the person	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Roberry	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Roberry (Business)	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Burglary in a dwelling	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Burglary not in a dwelling	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Theft of a pedal cycle	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Theft from vehicle	Vehicle related thefts	0	0.0086	1.4436236	0.2575445
Aggravated vehicle taking	Vehicle related thefts	0	0.0086	1.4436236	0.2575445
Theft of vehicle	Vehicle related thefts	0	0.0086	1.4436236	0.2575445
Other theft	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Theft from shops	Other theft	0.0280705	0.0016796	0.0401591	0.0027182
Violent disorder	All violent offences	0	0.0292823	0.0195215	0.0658335
Total sexual offence	All violent offences	0	0.0292823	0.0195215	0.0658335
Homicide	All violent offences	0	0.0292823	0.0195215	0.0658335

Appendix 12: Unit cost of crime used in the model (derived from Dubourg et al and Brand and Price)

Conditions		Defensive expenditure	Insurance administration	Physical and emotional impact on direct victims	Value of property stolen	Property damaged /destroyed	Property recovered	Victim services	Lost output	Health services	Criminal Justice System	Average cost (£)
Causing death by dangerous driving under the influence, driving after having consumed excess alcohol	4.6	145	229	0	0	0	0	2,102	0	770	144,239	147,485
More serious wounding	5	1	1	0	0	0	0	7	1,166	1,348	14,345	16,868
Less serious wounding	8A+8D	1	1	0	0	0	0	7	1,166	1,348	978	3,501
Assault on a constable	104	0	0	0	0	0	0	6	269	123	255	653
Assault without injury	105A+B	0	0	0	0	0	0	6	269	123	255	653
Criminal damage	56-59	13	36	0	0	212	0	2	6	0	126	395
Theft from the person	39	59	52	0	281	69	-36	1	10	0	217	653
Roberry	34	0	21	0	109	12	-19	16	1,011	483	2,601	4,234
Roberry (Business)	34A	1,200	100	0	1,500				120	50	1,400	4,370
Bulgary in a dwelling	28+29	221	177	0	846	187	-22	11	64	0	1,137	2,621
Bulgary not in a dwelling	30+31	900	50	0	1,200	0	0	0	40	0	490	2,680
Theft of a pedal cycle	44	0	33	0	175	17	-13	1	3	0	301	517
Theft from vehicle	45	116	50	0	240	126	-11	1	20	0	50	592
Aggravated vehicle taking	37.2	546	370	0	2,367	349	-542	1	47	0	199	3,337
Theft of vehicle	48	546	370	0	2,367	349	-542	1	47	0	199	3,337
Other theft	49	0	33	0	175	17	-13	1	3	0	301	517
Theft from shops	46	30		0	50						20	100
Violent disorder	65	1	1	0	0	0	0	9	1,648	1,347	1,928	4,934
Total sexual offence		3	5	0	0	0	0	32	4,430	916	3,298	8,684
Homicide	1+4+37	145	229	0	0	0	0	2,102	0	770	144,239	147,485

Appendix 13: Slope for the risk function for absenteeism and unemployment

	Absenteeism		Unemployment	
Age (years)	**Male**	**Female**	**Male**	**Female**
16 – 17	0.032165066	0.052621428	0.008581818	0.0085054
18 – 24	0.024393434	0.026885027	0.024937002	0.0246043
25 – 34	0.022397746	0.01925162	0.042068445	0.0413112
35 – 44	0.015560604	0.012292169	0.059020791	0.058
45 – 54	0.012508971	0.007301323	0.061394295	0.0598779
55 – 64	0.007713999	0.000896239	0.018979162	0.0188283
65 – 74	0.005237434	0.000472704	0.002209442	0.0022043
75+	0.009056513	0	0.000128814	0.0001287

5 REFERENCES

[1] Safe.Sensible.Social: National Alcohol Strategy 2007. Department of Health (2007). [online] http://www.respect.gov.uk/uploadedFiles/Members_site/Documents_and_images/Drinking/AlcoholStrategyJune07_009.pdf (Last accessed: 05 September 2008)

[2] Booth, A., Meier, P., Stockwell, T., Sutton, A., Wilkinson, A., Wong, R., Brennan, A., O'Reilly, D., Purshouse, R., Taylor, K (2008). Independent Review Of The Effects Of Alcohol Pricing And Promotion: Systematic Reviews. School of Health and Related Research. University of Sheffield, UK.

[3] Cabinet Office/Strategy Unit (2003). Alcohol misuse: How much does it cost? London, The Stationary Office.

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

[5] MacDonald, Z., Shields, MA (2004). Does problem drinking affect employment? Evidence from England, *Health Econ* 13(2):139-55.

[6] Office for National Statistics. Labour Force Survey (LFS) 2001 - 2006, London: The Stationary Office.

[7] Office for National Statistics. New Earnings Survey (NES) 2001, London: The Stationary Office.

[8] DTLR (2001) Road Accidents Great Britain and Transport Statistics Great Britain 2001, Department for Transport.

[9] Department of Health. Safe, Sensible, Social – Consultation on further action. Impact Assessments. July 2008 [online] http://www.dh.gov.uk/en/Consultations/Liveconsultations/DH_086412 (Last accessed: 05 September 2008).

[10] The cost of alcohol harm to the NHS in England. An update to the Cabinet Office (2003) study. July 2008. Health Improvement Analytical Team, Department of Health.

[11] Levy, D.T., Bauer, J.E., Hye-ryeon, L (2006). Simulation modeling and tobacco control: Creating more robust public health policies, *American Journal of Public Health* 96(3), 494–498.

[12] Chisholm, D., Rehm, J., Van Ommeren, M., and Monteiro, M (2004). Reducing the global burden of hazardous alcohol use: A comparative cost-effectiveness analysis, *Journal of Studies on Alcohol* 65(6), 782–793.

[13] Tan Torres Edejer, T., Baltussen, R., Adam, T., Hutubessy, R., Acharya, A., Evans D.B., and Murray, C.J.L (2003). Making choices in health: WHO guide to cost effectiveness analysis, Word Health Organisation, Geneva.

[14] Lauer, J.A., Rohrich, K., Wirth, H., Charette, C., Gibble, S., Murray, C.J.L (2003). PopMod: A longitudinal population model with two interacting disease states, *Cost-Effectiveness Resource Allocation* 1(6).

[15] Hollingworth, W., Ebel, B.E., McCarty, C.A., Garrison, M.M., Christakis, D.A., and Rivara, F.P (2006). Prevention of deaths from harmful drinking in the United States: The potential

effects of tax increases and advertising bans on young drinkers, *Journal of Studies on Alcohol* 67(2), 300–308.

[16] Holder, H.D., Blose, J.O (1987). Reduction of community alcohol problems: Computer simulation experiments in three counties, *Journal of Studies on Alcohol* 48(2), 124–135.

[17] Kemm, J (2003). An analysis by birth cohort of alcohol consumption by adults in Great Britain 1978–1998, *Alcohol & Alcoholism* 38(2), 142–147.

[18] Stockwell, T., Donath, S., Cooper-Stanbury, M., Chikritzhs, T., Catalano, P. and Mateo, C. (2004). Under-reporting of alcohol consumption in household surveys: a comparison of quantity-frequency, graduated-frequency and recent recall, *Addiction* 99(8): 1024-33.

[19] Goddard, E (2006). General Household Survey 2005: Smoking and drinking among adults, London, Office for National Statistics.

[20] HM Revenue & Customs [online]. See: *www.hmrc.gov.uk/ (Last accessed: 05 September 2008) .*

[21] Goddard, E (2007). Estimating alcohol consumption from survey data: updated method of converting volumes to units. National Statistics Methodological Series No. 37. London, Office for National Statistics.

[22] Townshend, J.M., Duka, T (2002). Patterns of alcohol drinking in a population of young social drinkers: a comparison of questionnaire and diary measures, *Alcohol* 37(2): 187-92.

[23] Office for National Statistics. General Household Survey (GHS) 2005 - 2006, London: The Stationary Office.

[24] Fuller E, ed (2007) Smoking, Drinking and Drug Use Among Young People in England in 2006 [online]. See: www.dh.gov.uk/en/Publicationsandstatistics/Statistics/StatisticalWorkAreas/Statisticalpublichealth/DH_4032542 (Last accessed: 05 September 2008).

[25] Clements, S., Jotangia, D., Lynch, S., Nicholson, S., Pigott, S (2008). Drug use, smoking and drinking among young people in England in 2007, The Health and Social Care Information Centre.

[26] Fendrich, M., Rosenbaum, D. P (2003). Recanting of substance use reports in a longitudinal prevention study, *Drug Alcohol Depend* 70(3): 241-53.

[27] Percy, A., Mcalister, S., Higgins, K., Mccrystal, P. and Thornton, M (2005). Response consistency in young adolescents' drug use self-reports: a recanting rate analysis, *Addiction* 100(2): 189-96.

[28] Donmall, M., Aldridge, J., Meier, P., Millar, T., Goins, A (forthcoming). Adolescent mental health: Time trends in adolescent drug and alcohol use. Report for the Nuffield Foundation Adolescent Mental Health Programme.

[29] Office for National Statistics. Expenditure and Food Survey (EFS) 2001 - 2005, London: The Stationary Office.

[30] Dunn, E (2008). Family Spending: 2007 edition. London, Office for National Statistics.

[31] © Nielsen 2008.

[32] Wagenaar, A.C, Salois, M.J., Komro, K.A (2008). Effects of Beverage Alcohol Taxes and Prices on Consumption: A Systematic Review and Meta-analysis of 1003 Estimates from 112 Studies. Presented at the 34th Annual Alcohol Epidemiology Symposium of the Kettil Bruun Society for Social and Epidemiological Research on Alcohol Victoria, British Columbia June 2-6, 2008.

[33] Huang, C.D (2003). Econometric Models of Alcohol Demand in the United Kingdom. Government Economic Service Working Paper No.140, May 2003.

[34] Gruenewald, P.J., Ponicki, W.R., Holder, H.D., Romelsjö, A (2006). Alcohol prices, beverage quality, and the demand for alcohol: Quality substitutions and price elasticities, *Alcoholism: Clinical and Experimental Research*, 30(1):96-105.

[35] Manning, W.G., Blumberg, L., Moulton, L.H (1995). The demand for alcohol: The differential response to price, *Journal of Health Economics* 14:123-148.

[36] Gallet, C (2007). The demand for alcohol: a meta-analysis of elasticities, *Australian Journal of Agricultural and Resource Economics* 51(2): 121-135.

[37] Duffy, M (2003). Advertising and Food, Drink and Tobacco Consumption in the United Kingdom: A Dynamic Demand System, *Agricultural Economics* 28 (1), 51-70.

[38] Saffer, H., Dave, D (2006). Alcohol advertising and alcohol consumption by adolescents, *Health Economics* 15(6), 617-637.

[39] Saffer, H., Dave, D (2002). Alcohol consumption and alcohol advertising bans, *Applied Economics* 34(11), 1325-1334.

[40] Babor, TF., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., Grube, J., Gruenewald, P., Hill, L., Holder, H., Homel, R., Osterberg, E., Rehm, J., Room, R., Rossow, I (2003). Alcohol: No Ordinary Commodity. Research and Public Policy. Oxford University Press.

[41] Corrao, G., Bagnardi, V., Zambon, A., La Vecchia, C (2004). A meta-analysis of alcohol consumption and the risk of 15 diseases, *Preventive Medicine* 38, 613-619.

[42] Fillmore, K.M., Stockwell, T., Chikritzhs, T., Bostrom, A., Kerr, W (2007). Moderate alcohol use and reduced mortality risk: systematic error in prospective studies and new hypotheses, *Ann Epidemiol* 17(5 Suppl): S16-23.

[43] Jones, L., Bellis, M., Dedman, D., Sumnall, H., Tocque, K (2008). Alcohol attributable fractions for England. . Liverpool, NW Public Health Observatory [online]. www.nwph.net/nwpho/Publications/AlcoholAttributableFractions.pdf (Last accessed: 05 September 2008).

[44] Hamajima, N., Hirose, K., Tajima, K., Rohan, T., Call, EE et al (2002). Alcohol, tobacco and breast cancer – collaborative reanalysis of individual data from 53 epidemiological studies, including 58,515 women with breast cancer and 95,067 women without the disease, *British Journal of Cancer* 87, 1234-1245.

[45] Gutjahr, E., Gmel, G., Rehm, J (2001). Relation between average alcohol consumption and disease. An overview. *European Addiction Research* 7, 117-127.

[46] Rehm, J., Room, R., Monteiro, M., Gmel, G., Graham, K et al (2004). Alcohol use. In: Comparative quantification of health risks global and regional burden of disease attributable to selected major risk factors. Ezzati M, Lopez AD, Rodgers A, Murray CJL, eds. Geneva, World Health Organisation.

[47] Ridolfo, B., Stevenson, C (2001). The quantification of drug-caused mortality and morbidity in Australia 1998. Canberra, Australian Institute of Health and Welfare.

[48] English, D.R., Holman, C.D.J., Milne, E., Winter, M.J., Hulse, G.K et al. (1995). The quantification of drug-caused morbidity and mortality in Australia 1995. Canberra, Commonwealth Department of Human Services and Health.

[49] Single, E., Robson, L., Xie, X., Rehm, J (1996). The cost of substance abuse in Canada. Ottawa, Canadian Centre on Substance Abuse.

[50] McCutcheon, A.D (2000). Neurological damage and duodenopancreatic reflux in the pathogenesis of alcoholic pancreatitis, *Arch Surg* 135(3):278-85.

[51] Dufour, M,C., Adamson, M.D (2003). The epidemiology of alcohol-induced pancreatitis, *Pancreas* 27(4):286-90.

[52] Preedy, V.R., Richardson, P.J (1994). Ethanol induced cardiovascular disease, *Br Med Bull* 50(1):152-63.

[53] Piano, M.R (2002). Alcoholic cardiomyopathy: incidence, clinical characteristics, and pathophysiology, *Chest* 121(5):1638-50.

[54] Rhen, N (2001). Alcohol in the European Region – consumption, harm and policies. World Health Organisation. [online] http://www.euro.who.int/document/e76240.pdf (Last accessed: 05 September 2008)

[55] Queen's University Belfast (2008), University Road Belfast. [online] http://www.qub.ac.uk/research-centres/nicr/FileStore/PDF/Incidence/Filetoupload,31490,en.pdf (Last accessed: 05 September 2008).

[56] Bartolomei, F (2006). Epilepsy and alcohol, *Epileptic disorders* 8: 72-8, supplement 1, april, epilepsy and other neurological disorders.

[57] Franceschi, S., Levi, F., Dal Maso, L., Talamini, R., Conti, E., Negri, E., La Vecchia, C (2000). Cessation of alcohol drinking and risk of cancer of the oral cavity and pharynx, *Int J Cancer* 15;85(6):787-90.

[58] Altieri, A., Garavello, W., Bosetti, C., Gallus, S., La Vecchia, C (2005). Alcohol consumption and risk of laryngeal cancer, *Oral Oncol* 41(10):956-65.

[59] Norstrom, T., Skog, O.J (2001). Alcohol and Mortality: Methodological and Analytical Issues in Aggregate Analysis, *Addiction* 96: S5-S17.

[60] Office for National Statistics Population data 2006, London: The Stationary Office

[61] Hospital Episode Statistics [online]. See: www.hesonline.nhs.uk/ (Last Accessed: 05 September 2008).

[62] Health Outcomes Data Repository (HODaR). [online] https://www.crc-limited.co.uk/portal/hodar.html (Last Accessed: 05 September 2008).

[63] Kind, P., Dolan, P., Gudex, C., Williams, A (1998). Variations in population health status: results from a United Kingdom national questionnaire survey, *BMJ* 316;736-741.

[64] Consultation on the future of alcohol. Department of Health. July 2008.

[65] Home Office. Research, Development and Statistics Directorate. Offending Surveys and Research, National Centre for Social Research and BMRB. Social Research, Offending, Crime and Justice Survey, 2005 [computer file]. Colchester, Essex: UK Data Archive [distributor], March 2007. SN: 5601.

[66] Brand, S., Price, R (2000). The economic and social costs of crime, Home Office [online]. See: http://www.homeoffice.gov.uk/rds/pdfs/hors217.pdf (Last accessed: 05 September 2008).

[67] Dubourg, R., Hamed, J., Thorns, j (2005). The economic and social costs of crime against individuals and households 2003/04. Home Office [online]. See: http://www.homeoffice.gov.uk/rds/pdfs05/rdsolr3005.pdf (Last accessed: 05 September 2008).

[68] Dolan, P., Loomes, G., Peasgood, T., Tsuchiya, A (2005). Estimating the intangible victim costs of violent crime, *British Journal of Criminology* 45: 958–976.

[69] Carthy, T., Chilton, S., Covey, J., Hopkins, L., Jones-Lee, M., Loomes, G., Pidgeon, N., Spencer, A (1999). The Contingent Valuation of Safety and the Safety of Contingent Valuation, Part 2: The CV/SG 'Chained' Approach, *Journal of Risk and Uncertainty*, 17:187-213.

[70] Roche, A.M., Pidd, K., Berry, J.G., Harrison, J.E (2008). Workers' drinking patterns: the impact on absenteeism in the Australian work-place, *Addiction* 103(5): 738-48.

[71] Note on the 2008 Budget alcohol tax increases and the potential number of lives saved (2008), Health improvement Analytical Team, Department of Health.

[72] Kerr, W.C., Fillmore, K.M., Marvy, P (2000). Beverage-specific alcohol consumption and cirrhosis mortality in a group of English-speaking beer-drinking countries, *Addiction* 95, 339–346.

[73] Ramstedt, M (2004). Alcohol and pancreatitis mortality at the population level: experiences from 14 western countries, *Addiction* 99, 1255-1261.