Modelling to assess the effectiveness and cost-effectiveness of public health related strategies and interventions to reduce alcohol attributable harm in England using the Sheffield Alcohol Policy Model version 2.0

Report to the NICE Public Health Programme Development Group

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Modelling team

Robin Purshouse

Alan Brennan

Nick Latimer

Yang Meng

Rachid Rafia

Lead systematic reviewer

Rachel Jackson

Topic expert

Petra Meier

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EXECUTIVE SUMMARY

Background

The NICE Public Health Collaborating Centre at the University of Sheffield has been tasked to undertake an assessment of the clinical and cost-effectiveness of (i) measures to detect alcohol misuse amongst adults and young people; (ii) brief interventions to manage alcohol misuse among adults and young people; and (iii) wider interventions to improve management of England's alcohol market including pricing policies, restrictions on advertising and measures surrounding alcohol outlet density and licensing hours. This report supplements the systematic reviews of evidence on effectiveness and cost-effectiveness of these measures.

Modelling approach

In 2008, the University of Sheffield developed an economic model (the Sheffield Alcohol Policy Model version 1-1) to analyse the effects of alcohol pricing and promotion for the Department of Health (Brennan *et al.*, 2008). The general framework involves an understanding of baseline alcohol consumption from large-scale surveys (the General Household Survey (GHS) and Expenditure and Food Survey (EFS)), an econometric modelling approach using the EFS to quantify own-price and cross-price elasticities for 16 categories of alcohol for moderate drinkers separately from hazardous and harmful drinkers, and simulating alternative pricing strategies to estimate effects on prices and hence on the distribution of alcohol consumption in 54 population subgroups defined by age, sex and three levels of baseline consumption (moderate, hazardous and harmful). The second half of the modelling then consists of quantified relationships between levels of consumption, defined both in terms of mean weekly consumption and peak daily consumption and alcohol attributable harms in three domains: health, crime and workplace. Health harms considered 47 separate acute and chronic conditions related to wholly or partially to alcohol. Crime harms included violence, criminal damage and theft, robbery and other related crimes. Workplace harms examined were days absence from work due to alcohol and unemployment. A broad valuation of harms analysis, applying financial costs to each type of harm, allowed an estimate of total financial value of the harms avoided by a pricing strategy.

This report, directed by NICE and the Programme Development Group for Alcohol, has extended that work in a number of substantial areas, resulting in a new integrated suite of models: the Sheffield Alcohol Policy Model version 2.0.

Screening and brief intervention

The first new component consists of modelling the relationship between possible screening and brief intervention policies and resulting shifts in alcohol consumption and harms. This involves integrating routine data on registrations and attendances in general practice and Accident & Emergency, cost information, data linking scores on the AUDIT screening instrument to baseline consumption levels and published research evidence on the effectiveness of brief interventions. The analysis estimates a set of possible policies implemented over an assumed ten year screening programme, quantifying the costs of implementation, the effects on the 47 health conditions, which are summarised using a quality adjusted life years (QALYs) gained framework and savings in healthcare costs. Crime and workplace harms are excluded. Cost-effectiveness ratios are estimated in terms of healthcare costs per QALY gained, in a similar way to a NICE technology appraisal.

Pricing policies

The second component re-examines pricing strategies including general price increases, minimum price per unit of alcohol at various thresholds and restrictions on price based promotions. This work has involved several minor changes to the model parameters and assumptions in line with the NICE public health programme approaches, but in particular has undertaken uncertainty analysis around estimates of the effect of pricing policies in two ways. First a series of one way sensitivity analyses based on alternative published evidence on alcohol price elasticities have been undertaken. Second, account has been taken of the uncertainty in estimated elasticities from our earlier analysis of the EFS by undertaking probabilistic sensitivity analysis on the econometric model and producing a distribution of estimated effects for some selected pricing policies.

Outlet density, licensing hours and advertising

The third component consists of broader, more exploratory analyses of the potential effects of changes in outlet density, licensing hours and alcohol advertising. These analyses are less related to specific policies. Instead, they are illustrative of the potential scale of effects of controlling alcohol availability given evidence from the literature. Partly this is because policies on outlet density and licensing hours may well be implemented in localities rather than on a national basis, and partly it is due to lack of easily available routine national data-sets on outlet density and licensing hours. Thus for example, there is no detailed modelling of the outlet density of on-trade or off-trade licensed premises in different geographical locations across England. Rather a broader analysis is undertaken, based on the published evidence relating changes in outlet density to changes in alcohol consumption, to estimate the consumption and harm effects in England of a hypothetical 10% reduction in outlet density (or licensing hours) applied across the country. Finally, some specific what-if scenarios are analysed around (1) a potential requirement that public health messages be carried in alcohol advertising; (2) a restriction on under 18s' exposure to television advertising of alcohol; and

(3) a total advertising ban. Again published literature evidence is used for estimates of effect on consumption, with subsequent modelling of health, crime and employment harms.

The detailed results for all modelled scenarios are presented in Section 3 of the report. The key modelling findings are presented in Section 4 of the report and replicated here.

Modelling findings on screening and brief interventions

M1. Screening and brief intervention policies have been examined in three contexts: for the intervention to take place at the next GP consultation, the next registration with a new GP, or the next accident and emergency attendance. The analysis compares health and social care costs versus health benefits in a similar fashion to NICE technology appraisals (excluding crime and workplace harms) and does not explicitly rank alternative settings in terms of cost-effectiveness, since it is clear that other factors, especially implementation issues, are going to be important for decision makers. In each context the analysis suggests that screening and brief intervention would be cost effective; indeed several examples are estimated as cost saving (provide additional health benefits and an overall reduced health service cost) , when compared against a 'do nothing' option.

M2. A policy of screening and brief intervention at next GP registration is a more phased approach over time than screening at next GP consultation. The former approach would screen an estimated 39% of the population, with 36% of hazardous and harmful drinkers receiving a brief intervention over the modelled 10 year screening programme. A policy of screening and brief intervention at next GP consultation is a very large-scale implementation, with an estimated 96% of the population screened after ten years (of whom the majority would be screened in the first year of implementation), and 79% of hazardous and harmful drinkers receiving a brief intervention.

M3. Screening and brief intervention in an accident and emergency setting is estimated to screen 78% of the population within ten years, but because the estimated uptake of brief interventions is just 30%, only 18% of hazardous and harmful drinkers are estimated to receive the brief intervention.

M4. Policy makers and local decision makers may need to balance the timing and scale of impact on the NHS in implementing such programmes with the health costs and health gains which are expected to accrue.

M5. Analysis has not been undertaken on implementing both GP based and A&E based screening and brief intervention policies at the same time. Implicitly we have assumed that an individual already given screening and brief intervention in one context would not take up the opportunity if offered in a second context.

M6. Sensitivity analysis shows that even fairly long brief interventions (eg. 25 minutes) would appear cost-effective versus a 'do nothing' policy. There is currently no conclusive evidence of differential effectiveness of delivery of the intervention by different types of staff. On this basis, decision makers might consider the less costly staffing options that were modeled for screening and intervention to be attractive. Evidence around the differential effectiveness of interventions of different duration is also inconclusive. Sensitivity analyses show that shorter duration interventions remain cost-effective when using the best available evidence on the relationship between duration and effectiveness.

M7. Screening and brief intervention appears more cost effective for men compared to women. This is because on average women incur lower levels of alcohol-attributable harm than males at baseline, and since the percentage reduction in alcohol consumption due to brief interventions is assumed to be the same for males and females, the estimated absolute reduction in harm is smaller for females.

Modelling findings on pricing strategies

M8. Pricing policies including general price increases, minimum price per unit of alcohol and restrictions to off-trade discounting have been examined. The direct costs to the government of implementing such policies are likely to be small and are not examined here. The analysis shows the estimated extent of changes in: (1) alcohol consumption; (2) health outcomes in terms of illnesses and deaths, hospitalisations and associated NHS costs, and quality adjusted life years; (3) crime outcomes in terms of volume of crimes, costs of crime and quality adjusted life years of victims of crime; and (4) workplace outcomes in terms of days absence and numbers of people unemployed. The total financial value of the direct costs savings in health and crime, quality of life year gains and the workplace harms reductions has been calculated. Also provided for information – as requested by policymakers – are the effects on changes in consumer spending as a result of price increases, increased income to alcohol retailers and the changes in duty and VAT income for government. It is very important to be clear that these increased costs to consumers, and increased sales value to retailers, cannot directly be interpreted as 'costs of the intervention' against which the 'savings of the intervention' (eg. in terms of public sector health and crime or wider workforce savings) should be balanced. Such an approach would require a dynamic analysis of the full effects of redistribution through the economic system. Finally, the public sector focus of NICE economic evaluations also excludes consideration of welfare losses (consumer surplus) arising from reduced consumption of alcohol and this is excluded from our analysis.

Modelling findings on general price increases

M9. General price increases (which equally affect all products in the on-trade and off-trade at once) tend to exhibit relatively large reductions in mean consumption for the population. This is partly due to limited scope for switching between products (because prices increase across the board) and partly because all consumer groups are targeted equally. As would be expected, greater overall price increases lead to larger consumption reductions. As an example an across-the-board price increase of 10% has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
-4.2%	-1,455	-50,000	-64,000	-294,000	-11,800

M10. Policies targeting price changes specifically on low-priced products lead to smaller changes in consumption, as they only cover a part of the market and induce substitution for other products by consumers.

Modelling findings on minimum pricing options

M11. 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: --0.0%, -0.1%, -0.4%, -1.1%, -2.4%, -4.3%, -6.7%, -11.9% and -17.7%. Higher minimum prices reduce switching effects. Note that estimates for lower minimum prices are subject to less modelling uncertainty than those for higher minimum prices. This is because the consideration of supply-side responses, and in particular a possible restructuring of the market following large mandated price increases in sections of the market, was outside the scope of the model. As an example a minimum price of 40p per unit has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons**

					p.a.)
-2.4%	-1,149	-39,000	-9,000	-91,000	-11,000

M12. Minimum prices targeted at particular beverages are less effective than all-product minimum prices, and only minimum prices for beer show noticeable effects.

M13. Differential minimum pricing for on-trade and off-trade lead to somewhat greater reductions in consumption (eg. 40p off-trade minimum together with £1 on-trade minimum gives -2.8% consumption compared to -2.4% for 40p only). Note that this is the most significant difference between the previously published results for the Department of Health, which showed more substantial effects of adding in on-trade minimum prices at thresholds between 60p and £1, and the new version 2 of the model. This is due to the availability of new data on on-trade prices from CGA which suggests that the prevalence of beverages retailing at substantially less than £1 per unit in the on-trade is lower than the earlier estimates based on raw EFS data. Higher differential on-trade thresholds would produce a greater overall effect.

Modelling findings on restrictions for off-trade price promotions

M14. Bans of off-trade ‘buy one get one free’ offers have very 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 greater than 30% (covering “3 for the price of 2” offers) and greater than 20% (covering up to “5 for the price of 4”) lead to overall consumption changes of -0.3% and -0.8% respectively. As an example a ban of discounts greater than 20% has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
-0.8%	-329	-12,000	-5,600	-51,000	-2,100

M15. Bans on discounts only for lower-priced alcohol (within the lower price quartile for beer, wine, spirit or RTD) are not effective in reducing consumption. A total ban on off-trade discounting is estimated to change consumption by -2.7%.

Modelling findings: Policy effects on consumer spending, retail sales, duty and VAT

M16. For all policies in which prices are increased the overall spending on alcohol is estimated to increase. This is because overall the price elasticity magnitude is less than 1, so that for example a 10% price rise produces an estimated reduction in consumption of 4.2%, and an average increase in spending of around 5.7%.

M17. 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 spending for moderate drinkers affected very little.

M18. In general, increases in prices are estimated to increase the value of sales to alcohol retailers (since the overall price elasticity magnitude is smaller than 1). 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 prompt switching behaviour to on-trade consumption.

M19. Effects on sales tax (VAT) and duty receipts are estimated to be relatively small. 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).

Modelling findings on policy effects on health harms

M20. 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 and potentially dying from chronic disease.

M21. 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 one year post implementation for chronic diseases are estimated to be around one tenth of the level that will accrue when the full effect of consumption changes occurs.

Modelling findings on policy effects on crime harms

M22. 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 40p is estimated to reduce total crimes by 9,000 per annum.

M23. The evidence base for underage purchasing is limited (because the youngest ages for which purchasing data exists in EFS are 16 and 17, and there are concerns on reliability even for this). Given this caveat, crime harms are estimated to reduce particularly for 11 to 18 year olds because they are disproportionately involved in alcohol-related crime and are affected significantly by targeting price rises at low-priced products.

M24. 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 than polices that also affect the on-trade sector.

Modelling findings on policy effects on workplace harms

M25. Unemployment harm estimates reduce 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.

M26. Unemployment due to alcohol problems is focused on harmful drinkers and is estimated to reduce as prices increase: eg. 2,900 avoided unemployment cases for 30p versus 11,000 for 40p minimum price. Absence reductions are particularly focussed on hazardous and harmful drinkers: eg. for 40p, the 91,000 estimated reduction in days absence is made up of 26,000 days for hazardous and 44,000 days for harmful drinkers.

M27. Note that the estimated unemployment effects are based on evidence of association studies, rather than detailed prospective analysis of the dynamic effects of employed people becoming unemployed as a consequence of their drinking behaviour, or of unemployed people becoming employed again as consequence of reductions in alcohol consumption. The benefits estimated make no assumption about the directions of these effects and there is no analysis of how the current economic climate might affect these findings.

Modelling findings on financial valuation of policies

M28. 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. For example, a 40p minimum price is valued at £3.8bn over the ten year period. The financial value of harm reductions becomes larger as prices are increased.

M29. 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: eg. the value of health related QALY loss avoided changes from -£169m for the 30p minimum price to -£724m for 40p.

M30. Crime costs are also estimated to reduce as prices increase. Savings are minimal for minimum prices below 40p per unit and are greatest for policies that raise prices in the on-trade (£29m saving from a 25% increase in the price of lower priced off-trade products compared to £297m for the on-trade equivalent).

M31. 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.

M32. The largest financially valued component of harm avoided due to policies is in the estimated unemployment reductions (for example, representing £3b of the overall £3.8b for a 40p minimum price).

Modelling findings on differential effectiveness for priority groups

M33. 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.

M34. Harmful drinkers are expected to reduce their absolute consumption most, but in the more effective policy options also spend significantly more on their purchases.

M35. Policies which target low-priced alcohol affect harmful drinkers disproportionately. This is because moderate drinkers tend to drink a smaller proportion of the very low priced products available.

M36. There are significant effects on harmful drinkers, but important health gains also occur in hazardous and moderate drinkers. Even though moderate drinkers are at a lower risk of health-related harms, small changes in the consumption of the large number of moderate drinkers feed through in the model to small changes in risk and appreciable changes in population health.

M37. 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.

M38. 11 to 18 year old drinkers, and the 18 to 24 year old hazardous drinkers group 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 and any long-term effects beyond the ten year horizon of the policy appraisal are not considered.

M39. 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.

M40. When estimating policy impacts, crime avoided comes more from the harmful and hazardous drinking groups than 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 drink to intoxication and within the model it is this behaviour, i.e. the maximum daily intake of alcohol, that is related to risk of committing crime.

Modelling findings: Sensitivity analysis and uncertainty surrounding elasticities

M41. Sensitivity analysis, which provides information on the robustness of the modeled findings to changes in assumptions, has focused on the 'active ingredient' for pricing policies i.e. price elasticities. The most important is the probabilistic sensitivity analysis on the econometric modeling. The results found fairly tight confidence intervals for changes in alcohol consumption given the uncertainty in cross-price and own-price elasticities. For a 40p minimum price policy the confidence interval for change in alcohol consumption is -2.4% +/- 0.2%. For a general 10% price increase the confidence interval for change in alcohol consumption is -4.2% +/- 0.1%

M42. Other sensitivity analyses use alternative published evidence rather than the elasticity estimates from UK data derived specifically for the study. The first used long-run price-elasticity estimates from the UK (Huang 2003), in which own-price and cross-price elasticities are substantially larger than those from the EFS, applied to the model via a series of assumptions. For a 40p minimum price policy the estimated change in alcohol consumption is -2.2% (rather than -2.4%). For a general 10% price increase the estimated change in alcohol consumption is -9.1% (rather than -4.2%). This difference is because of much larger cross-price elasticities for on-trade alcohol in Huang (2003). As expected, the general price rise has a greater effect when using long-run rather than short-run elasticities.

M43. The second alternative published evidence used was a modelling assumption made by Chisholm et al. (2004) which reduces the elasticity estimates for hazardous and harmful drinkers by one third. For a 40p minimum price policy the estimated change in alcohol consumption is -2.0% (rather than -2.4%). For a general 10% price increase the estimated change in alcohol consumption is -2.7% (rather than -4.2%). For a 40p minimum price policy the estimated change in alcohol consumption is -2.0% (rather than -2.4%). Using the Chisholm et al. assumptions, minimum price policies are still estimated to have greater effects on harmful drinkers than moderate drinkers, eg. for a 40p minimum price the changes in consumption are -1.2% (moderate), -1.5% (hazardous), and -3% (harmful).

M44. A further sensitivity analysis re-examined the EFS data to align the EFS purchasing with GHS consumption by age-sex group because there was a concern that some alcohol purchased by females in the EFS was actually consumed by males in the household. The effect was to reallocate some purchases of alcohol from females to males in the baseline EFS. A new elasticity matrix was then estimated. The results showed very small differences from our original base-case analysis. For a 40p minimum price policy the estimated change in alcohol consumption is -2.7% (rather than -2.4%). For a general 10% price increase the estimated change in alcohol consumption is -4.0% (rather than -4.2%).

M45. In version 1-1 of the modelling published in 2008, a series of other sensitivity analyses were undertaken showing relatively small effect. These have not been re-run in version 2.0 but included: 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 Each had some small or modest effect (+/-25% of the basecase for 10-year cumulative value of harm) except for the relative risk of not working for harmful drinkers (+68%). All of these sensitivity analyses were 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.

Summary of modelling findings on pricing

M46. In summary, pricing strategies have been examined in detail and inducement of higher pricing for alcohol is likely to be effective in reducing consumption and harm, whether through general price increase, minimum price per unit policies or restrictions on discounting. It is left to policymakers to consider the balance between effects on health, crime and workplace harms and the higher prices paid by consumers in different age, sex and drinker sub-groups (moderate, hazardous and harmful).

Modelling findings on outlet density

M47. Most of the published evidence for outlet density signals a clear positive relationship between increased outlet density and alcohol consumption. One model (Blake and Nied model 1) suggests the opposite, but this model seems an outlier compared with other evidence and is based largely on effects seen in cider rather than all alcohol.

M48. The modelling undertaken examines reductions in outlet density in both on-trade and off-trade together at the same time. This is due to the absence of evidence concerning cross-trade elasticities, ie. switching from the on-trade to the off-trade when outlet densities in one sector are changed.

M49. In general, elasticities for outlet density appear smaller than for price eg. a 1% reduction in outlet density produces a range of estimates from -0.03 to -0.37 versus an overall implied elasticity for price of -0.42.

M50. Though smaller than price effects, outlet density reductions have been proven to reduce both consumption and harm. As an example, the 10% reduction in outlet density (assuming the 1997 UK based study model 3 of Blake and Nied) has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
- 2.3%	-692	-26,000	-41,000	-190,000	-7,700

M51. As is the case for pricing policies, the analysis of outlet density policies has not examined incremental cost-effectiveness because of a lack of available evidence/ data on the costs of implementation. Also note that these analyses are less specifically related to a policy and more illustrative of the potential scale of effects given evidence from the literature. Partly this is because policies on outlet density may well be implemented in localities rather than on a national basis, and partly it due to lack of easily available routine national data-sets on outlet density.

Modelling findings on licensing hours

M52. Evidence is limited on the effects of changes in licensing hours on consumption. The recent study of UK licensing hours changes by government agencies concluded that there was little evidence of large scale changes in consumption (via the GHS) and that the level of harms was relatively unchanged, though some crime and accidents had shifted to later times in the evening and night (for more details, see the accompanying systematic review by Jackson *et al.*, 2009). Unfortunately, these studies did not compute any detailed relationship between marginal changes in consumption and marginal changes in licensing hours, i.e. they did not compute a licensing hours elasticity.

M53. Three published studies have shown quantified relationships between licensing hours and consumption. All are non-UK. Two show reductions in off-trade licensing hours associated with reductions in alcohol consumption (one from Canada and one from Sweden). The other shows reductions in on-trade licensing hours being associated with a small increase in alcohol consumption; a possible reason being limited time for drinking perhaps causing drinkers to drink faster.

M54. Modelling a 10% change in licensing hours produces changes in alcohol consumption based on these three studies of -1.2% (Canadian), +0.2% (US), and -3.5% (Swedish). As an example, the 10% reduction in licensing hours (assuming the Carpenter & Eisenberg study results from Canada) has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
- 1.2%	-406	-15,600	-20,000	-99,000	-3,200

Modelling findings on advertising

M55. 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.

M56. 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 one sixth of advertising be devoted to public health messages is modelled assuming no beneficial effects on consumption but a reduction in total pro-alcohol advertising by one sixth. 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 £0.2bn to £2.6bn.

M57. Similar exploratory analyses for the total elimination of exposure to TV 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 £0.2bn to £0.6bn.

M58. 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 a gain of £28.4bn to a loss of £6.4bn. 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.

M59. In summary, outlet density, licensing hours and advertising policy analyses are more exploratory due to a more limited evidence base and less available UK data on the baseline position. In each case the elasticities from the literature appear somewhat smaller than for prices and the corresponding harm reduction what-if analyses for a 10% reduction on a national basis are correspondingly slightly lower than those for a what-if 10% price increase analysis.

Modelling findings on combined effects of policies

M60. The analyses undertaken here have focused on screening and brief interventions and on the macro-level policy areas of pricing, outlet density, licensing hours, and advertising separately rather than in combination. Decision makers will be mindful of the need to recognise that complex interactions occur and that simple addition of separate policy results to produce a combined effect estimate may not be valid, whilst being aware that combined policy action over time may be needed to achieve harm reductions.

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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 Expenditure and Food Survey, General Household Survey, Labour Force Survey, Offending Crime and Justice Survey and the Survey of Smoking Drinking and Drug Use Among Young People data sets downloaded from the Economic and Social Data Service and used in this study.

AUTHOR CONTRIBUTIONS

To follow post-consultation.

1 INTRODUCTION

1.1 Scope of the modelling

The NICE Public Health Collaborating Centre at the University of Sheffield has been tasked to undertake an assessment of the clinical and cost-effectiveness of (i) measures to detect alcohol misuse amongst adults and young people; (ii) brief interventions to manage alcohol misuse among adults and young people; and (iii) interventions to improve management of England's alcohol market. The main aim of the modelling studies, documented here, is to supplement the literature reviews of cost-effectiveness where necessary and to provide assessment of the likely effectiveness and cost-effectiveness of interventions when applied to an English population.

1.2 Summary of interventions to be assessed

The interventions are framed around a set of key topics to be addressed by the effectiveness and cost-effectiveness work:

Review 1: *The effectiveness and cost-effectiveness of price controls in reducing alcohol consumption, alcohol misuse, alcohol-related harm or alcohol-related social problems among adults and young people.*

Interventions covered:

- General price increases – since the state does not set alcohol prices in the UK this is not a realistic policy as such, but does provide an indication of the impact of different configurations of price changes on alcohol-related harm.
- Minimum unit pricing – setting a floor price for retail sales of alcohol, defined by the ethanol content of the product; sales below the minimum price are prohibited.
- Restricting price-based promotion in the off-trade – prohibiting discounts from list price of more than a certain magnitude.

Review 2: *The effectiveness and cost-effectiveness of interventions in managing alcohol availability to reduce levels of consumption, alcohol misuse, alcohol-related harm or alcohol-related social problems among adults and young people.*

The study contains exploratory analyses concerning two key sub-topics:

- Licensing hours and days of sale
- Alcohol outlet density.

Modelling of specific interventions relating to availability is out of scope of the study.

Review 3: *The effectiveness and cost-effectiveness of the control of alcohol promotion (eg. advertising) in reducing levels of consumption, alcohol misuse, alcohol-related harm or alcohol-related social problems among adults and young people.*

The study contains exploratory analyses concerning the potential impact of restrictions on advertising:

- Counter-advertising – requiring a proportion of alcohol advertising content (defined in terms of time) to be used for public health messages
- Eliminating exposure of under 18s to television-based marketing (the means by which this might be achieved are not addressed by the study)
- Introduction of a total ban on alcohol advertising.

Review 5: *The effectiveness and cost-effectiveness of alcohol screening questionnaires, biochemical indicators and clinical indicators of alcohol misuse in identifying adults and young people who currently misuse or are at risk of misusing alcohol.*

Review 6*: The effectiveness and cost-effectiveness of brief interventions in preventing hazardous and harmful drinking among adults and young people.*

Screening and brief interventions are closely related (with a positive screening result expected to be followed-up with an invitation for a brief intervention or a referral to treatment services) and so, for cost-effectiveness assessment purposes, the two areas are combined in the modelling study. Screening and brief intervention (SBI) is analysed in three separate contexts:

- Next GP registration – SBI is initiated when a patient registers with a new practice
- Next GP consultation – the patient is screened when next attending for a face-to-face appointment with a doctor, nurse or other primary care specialist
- Next A&E consultation – the patient is screened when next attending a major A&E department, single specialty A&E department, walk-in centre or minor injuries unit.

2 METHODS

2.1 Overview of conceptual modelling framework

At its most fundamental, the conceptual model has two components:

1. The impact of an intervention on patterns of alcohol consumption at a population level

2. The impact of changes to such patterns of alcohol consumption on societal outcomes.

This is a suitable framework for representing the impact of policies which aim to reduce harmful outcomes through reductions in alcohol consumption, such as pricing policies and brief interventions. It is less appropriate for policies which may reduce harm without necessarily reducing consumption, such as staggered closing times for on-licensed premises.

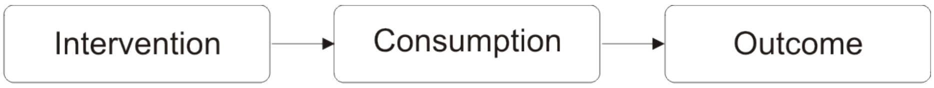

Figure 2.1: High-level conceptual model

The first component of the conceptual model also has two aspects: (i) the impact of an intervention on an identified factor of interest (eg. the impact of a minimum price policy on alcohol prices) and (ii) how changes to the factor affect patterns of consumption (eg. how the price change impacts on consumption). Note that the underlying causal chain is not fully understood for most types of intervention.

The spectrum of societal outcomes to be considered by the model depends on the adopted perspective. For a conventional NICE technology assessment review this would be restricted to National Health Service (NHS) and Personal and Social Services (PSS) costs and health-related quality of life changes for patients. NICE public health reviews normally consider a public sector perspective, in which the cost base is widened to include the impacts on other government services (such as the criminal justice system). The Cabinet Office assessment of the cost of alcohol misuse in England considered a range of health, crime and workplace harms, not all of which were limited to the public sector. This range of harms was subsequently adopted by the University of Sheffield in the original (v1) Sheffield Alcohol Model, together with a set of other outcomes (consumer spending, industry revenue, Treasury revenue) that are not part of a traditional economic analysis. In this study, the Sheffield model v1 outputs are retained, from which cost-effectiveness or valuation of harm reduction metrics are constructed, depending on the type of intervention being assessed.

2.2 Quantification of alcohol consumption

Population surveys continue to provide the main approach to assessing alcohol consumption in the population of England. 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 (ABV) of different types of drink. From 2006, UK government surveys have started to implement a revised methodology of unit counting which addresses several reasons for underestimating consumption.[3]

Importantly, it is generally accepted that this self-reported data underestimates actual consumption by as much as 50%.[4] For example, in the 2005 General Household Survey, males and females reported an average weekly alcohol consumption of 15.8 units and 6.5 units respectively,[5] whereas the estimate for all adults based on clearance data from HMRC was 21.9.[6] It is important to understand not only the magnitude of such underestimation, but also the potential biases:

- **Under-sampling:** household and school-based surveys under-represent some of the groups who drink the most (eg. those in unstable living conditions, school excludees, drop-outs or truants)[4]

- **Variation in under-reporting by pattern of consumption:** when asked about typical drinking, people do not take into account heavy drinking occasions[3,4]

- **Variation in under-reporting by drinker type:** heavier drinkers tend to underestimate their drinking more than moderate drinkers (eg. {Townshend, 2002 3981 /id}).

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 (ie. heavy episodic or ‘binge’ drinking).

Until recently, drinkers in England were classified in three drinking categories based on their mean intake per week (the terminology has since been updated, but the definitions remain broadly the same):

- *Moderate drinkers* – drinkers with an intake of alcohol less likely to damage health and/or be associated with negative consequences (no more than 21 units per week for men or 14 units per week for women).

- *Hazardous drinkers* – drinkers with an increased risk of psychological consequences (such as mood disturbance) and physical consequences (such as injuries) due to alcohol intake (more than 21 but less than 50 units per week for men; more than 14 but less than 35 units for women).

- *Harmful drinkers* – drinkers with an intake that is likely to adversely affect health and/or have other negative consequences (more than 50 units per week for men and more than 35 units per week for women).

An individual is classified as a *binge drinker* if he or she exceeds 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 (ie. 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 General Household Survey

Estimates of alcohol consumption for people in England aged 16 and over are taken from the General Household Survey (GHS).

The GHS 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 alcoholic beverage, 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 estimates for each individual (along with detailed demographic characteristics such as age, gender and income) of:

- Number of weekly units consumed (split by beer, wine, spirit and RTD) – 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.

Data for the most recent year of the survey – GHS 2006 – is used to represent baseline consumption in the model. Only the English section of the sample is included. 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/or a maximum daily intake of 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 (ie. no split between off-trade and on-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 (under 16 years of age)
- Information on some at-risk groups (eg. homeless people).

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 2.2). Figures for the number units drunk on the heaviest drinking day are 6.03 ± 6.55 and 3.64 ± 4.52 respectively (Figure 2.3).

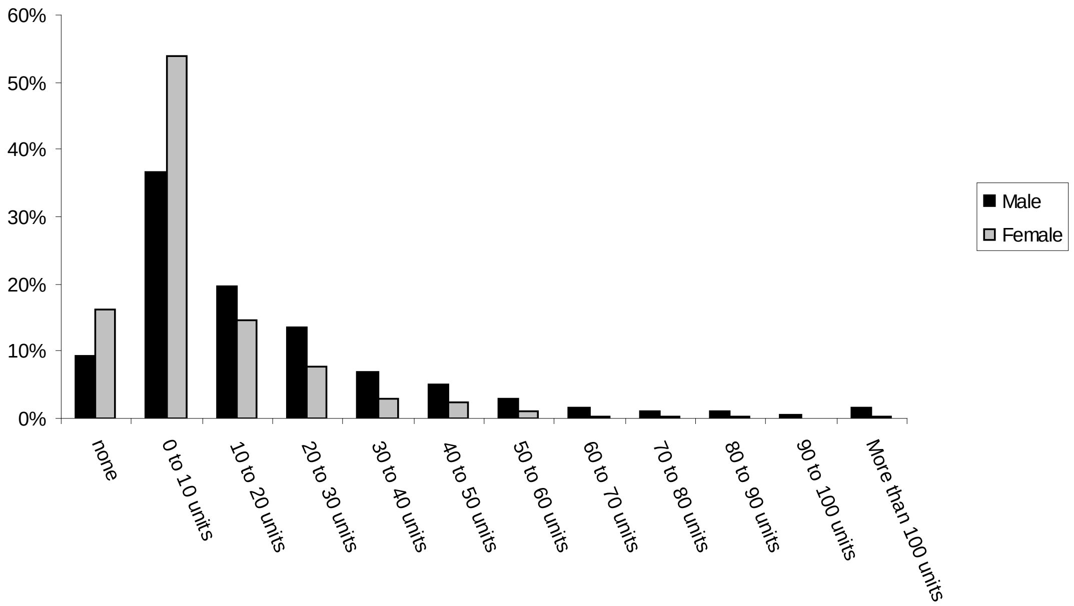

Figure 2.2: Distribution of mean weekly intake among individuals aged 18 years and over (GHS, 2006)

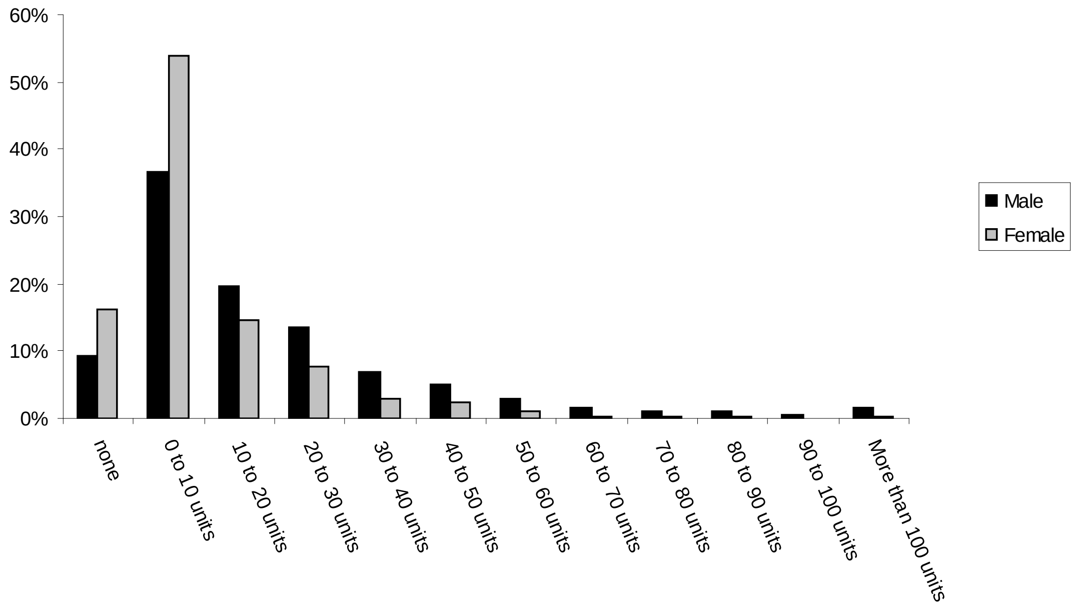

Figure 2.3: Distribution of the maximum units drunk on the heaviest drinking day over the last week among individuals aged 18 and over (GHS, 2006)

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

2.2.2 Smoking, Drinking and Drug Use Survey

Estimates of alcohol consumption for people in England aged between 11 and 15 are taken from the Smoking, Drinking and Drug Use Survey (SDD).

Information on childhood drinking is available from the SDD – a national annual cross-sectional school survey covering pupils in grades 7 through to 11 (ages 11-15). In the model data is used from the most recent survey in 2007, which 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 schools 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, 2008 4006 /id} 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.[7,8] 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)
- Past-week quantity consumed, broken down by beverage type.[9]

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

In terms of limitations, the SDD does not provide:

- Information on prices paid for alcohol
- Information on location of purchase or consumption (ie. no split between off-trade and on-trade)
- Information on binge drinking
- Information on some at-risk groups who are known to drink more frequently and more heavily (ie. those not in mainstream schools: truants, young offenders, those in pupil referral units[10]) leading to likely underestimation of young people's drinking levels.

2.3 Modelling the relationship between consumption and harm

2.3.1 Model structure

An epidemiological approach is used to model the relationship between consumption and harm, relating changes in the prevalence of alcohol consumption to changes in prevalence of risk of experiencing harmful outcomes. Risk functions relating consumption (however described) to level of risk are the fundamental components of the model.

The 'consumption-to-harm' model considers the impact of consumption on harms in three sectors: health (including the impact of both mortality and morbidity), crime and the workplace. The high-level conceptual framework is shown in Figure 2.4.

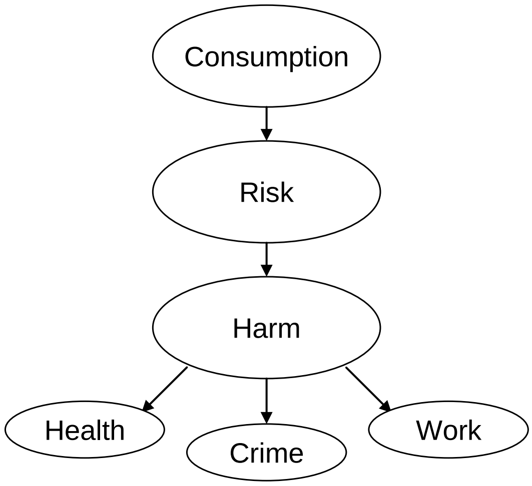

Figure 2.4: High-level conceptual framework for the consumption-to-harm model

2.3.1.1 Alcohol-attributable fractions and potential impact fractions

The methodology is similar to that used in Gunning-Scheper's (1984) Prevent model, being based on the notion of the alcohol-attributable fraction (AAF) and its more general form, the potential impact fraction (PIF).

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, AAFs 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 (not just in the health sector).

The AAF can be calculated using the following formula:

Equation 2.1: Alcohol attributable fraction

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

where RR_i is the relative risk of exposure to alcohol at consumption state i, p_i is the proportion of the population exposed to alcohol at consumption state i, and n is the number of consumption states.

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 certain levels of alcohol consumption reduce the risk of an outcome (eg. coronary heart disease) the AAF can be negative and would describe the additional cases that would have occurred if everyone was an abstainer.

Note that there are methodological difficulties with AAF 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 findings of 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.*[11] 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.

The potential impact fraction (PIF) is a generalisation of the AAF based on arbitrary changes to the prevalence of alcohol consumption (rather than assuming all drinkers become abstainers). Note that a lag may exist between the exposure to alcohol and the resulting change in risk. The PIF can be calculated using the following formula:

Equation 2.2: Potential impact fraction

$$PIF = 1 - \frac{\sum_{i=0}^{n} \overline{p_i} RR_i}{\sum_{i=0}^{n} p_i RR_i},$$

where $\overline{p_i}$ is the modified prevalence for consumption state i and state 0 corresponds to abstention.

In the model, alcohol consumption in a population sub-group is described non-parametrically by the associated observations from the GHS/SDD. For any harmful outcome, risk levels are associated with consumption level for each of the observations (note that these are not person-level risk functions). The associated prevalence for the observation is simply defined by its sample weight from the survey. Therefore, the PIF is implemented in the model as:

Equation 2.3: Potential impact fraction (as implemented in the model)

$$PIF = 1 - \frac{\sum_{i=0}^{N} w_i \overline{RR_i}}{\sum_{i=0}^{N} w_i RR_i},$$

where w_i is the weight for observation i, $\overline{RR_i}$ is the modified risk for the new consumption level and N is the number of samples.

2.3.1.2 Derivation of risk functions

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.

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 underestimate or overestimate the risk beyond the last data point. This was notably the case in chronic health 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.[1]

Deriving a relative risk function from the AAF

For some types of harms, such as crime and acute health harms, evidence is available for AAF but not risk functions. Such evidence can be used to derive a relative risk function assuming the relationship described in Equation 2.1 since the AAF is a positive function of the prevalence of drinking and the relative risk function.

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 unity (ie. harm is not associated with alcohol). A linear function was selected for the analysis due to the lack of data in the literature.

The consequences of alcohol consumption tend to be distinguished in terns of those due to average drinking levels (chronic harms) and those due to levels of intoxication (acute harms). Different thresholds were thus used according to the link between harms and drinking pattern:

- The risk was assumed to start from 3 units per day for males and 2 units per day for females for harms related to mean consumption. These thresholds were derived from the NHS recommendations for moderate drinking described in Section 2.2.

- 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. 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 (for which a slope is defined) and threshold as follows:

Equation 2.4: Relative risk linear function

$$
\begin{aligned}
RR(c) &= 1 \text{ if } c < T \\
&= \beta\left(c - T\right) + 1 \text{ otherwise}
\end{aligned}
$$

where c = consumption level, T = threshold and β=slope parameter.

An example of a linear function constructed from an AAF is shown in Figure 2.5.

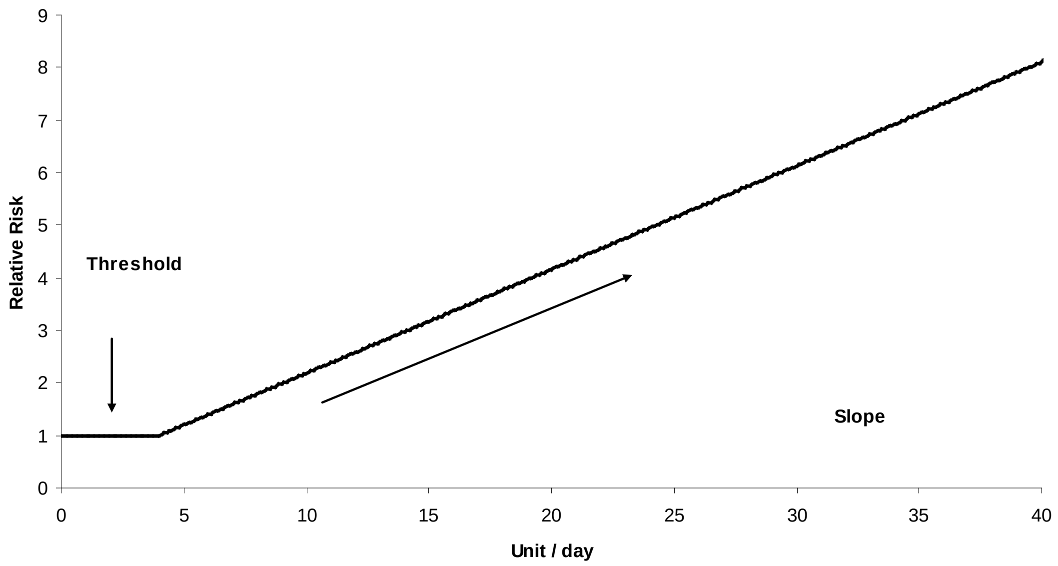

Figure 2.5: Illustrative linear relative risk function for a partially attributable chronic harm (threshold of 4 units)

Estimating absolute risk functions for wholly attributable harms

While it was possible to estimate relative risk functions for most harms, it was impossible to derive such functions 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 relative risk functions, assumptions were necessary about the curve form and the starting threshold. The same assumptions as for relative risks were used for consistency.

An example of a linear absolute risk function constructed from the number of deaths is presented in Figure 2.6. The function is composed of three parameters: the threshold, the slope and the scale (or constant).

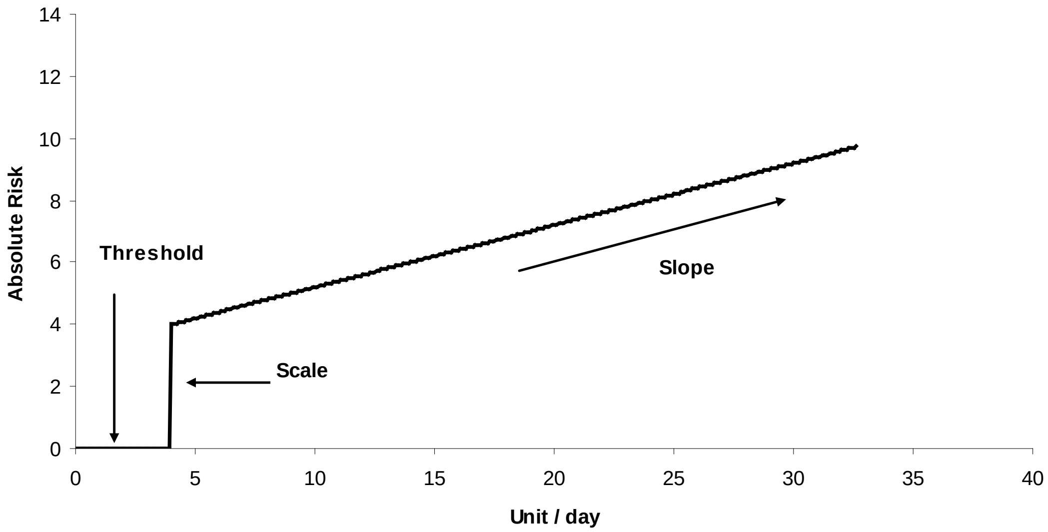

Figure 2.6: Illustrative linear absolute risk function for a wholly attributable chronic harm (threshold of 4 units)

2.3.1.3 Health model structure

The model aims to capture policy impacts for the large number of health conditions for which evidence suggests alcohol plays a contributory role. The actual set of conditions used is taken from North West Public Health Observatory's 2008 report on alcohol-attributable mortality and hospital admissions in England.[12]

NWPHO classified harms 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 (eg. 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 (eg. 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 (eg. 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 (eg. falls, ICD10 code = W00-W19, or assault, ICD10 = X85-Y09).

The same set of conditions is assessed in the modelling, with one exception: heart failure was excluded from the analysis due to the very small AAF reported in the NWPHO study. The list of 47 conditions is presented.

	Condition	**ICD-10 code**	**Con. type**	**Source of AAF or risk function**
Wholly attributable chronic conditions	Alcohol-induced pseudo-Cushing's syndrome	E24.4	Mean	100% attributable
	Degeneration of the nervous system	G31.2	Mean	
	Alcoholic polyneuropathy	G62.1	Mean	
	Alcoholic myopathy	G72.1	Mean	
	Alcoholic cardiomyopathy	I42.6	Mean	
	Alcoholic gastritis	K29.2	Mean	
	Alcoholic liver disease	K70	Mean	
	Chronic pancreatitis	K86.0	Mean	
Wholly attr. Acute conds	Mental and behavioural disorders due to use of alc.	F10	Peak	
	Ethanol poisoning	T51.0	Peak	
	Methanol poisoning	T51.1	Peak	
	Toxic effect of alcohol, unspecified	T51.9	Peak	
	Accidental poisoning by exposure to alcohol	X45	Peak	
Partially attributable chronic conditions	Malignant neoplasm of lip, oral cavity and pharynx	C00-C14	Mean	Corrao et al (2004)
	Malignant neoplasm of oesophagus	C15	Mean	
	Malignant neoplasm of colon	C18	Mean	
	Malignant neoplasm of rectum	C20	Mean	
	Malig. neoplasm of liver and intrahepatic bile ducts	C22	Mean	
	Malignant neoplasm of larynx	C32	Mean	
	Malignant neoplasm of breast	C50	Mean	Hamajima et al (2002)
	Diabetes mellitus (type II)	E11	Mean	Gutjahr et al (2001)
	Epilepsy and status epilepticus	G40-G41	Mean	Rehm et al (2004)
	Hypertensive diseases	I10-I15	Mean	Corrao et al (2004)
	Ischaemic heart disease	I20-I25	Mean	Corrao et al (1999)
	Cardiac arrhythmias	I47-I48	Mean	Gutjahr et al (2001)
	Haemorrhagic stroke	I60-I62, I69.0-I69.2	Mean	Corrao et al (2004)
	Ischaemic stroke	I66-I66,I69.3, I69.4	Mean	
	Oesophageal varices	I85	Mean	
	Gastro-oesophageal laceration-haemorrhage synd.	K22.6	Mean	English et al (1995)
	Unspecified liver disease	K73, K74	Mean	Corrao et al (2004)
	Cholelithiasis	K80	Mean	Gutjahr et al (2001)
	Acute and chronic pancreatitis	K85, K86.1	Mean	Corrao et al (2004)
	Psoriasis	L40 excludes L40.5	Mean	Gutjahr et al (2001)
	Spontaneous abortion	O03	Mean	
Partially attributable acute conditions	Road traffic accidents - non pedestrian	V (various)	Peak	Ridolfo et al (2001)
	Pedestrian traffic accidents	V (various)	Peak	
	Water transport accidents	V90-V94	Peak	Single et al (1996)
	Air/space transport accidents	V95-V97	Peak	
	Fall injuries	W00-W19	Peak	Ridolfo et al (2001)
	Work/machine injuries	W24-W31	Peak	English et al (1995)
	Firearm injuries	W32-W34	Peak	Single et al (1996)
	Drowning	W65-W74	Peak	English et al (1995)

	Condition	ICD-10 code	Con. type	Source of AAF or risk function
	Inhalation of gastric contents	W78	Peak	Single et al (1996)
	Fire injuries	X00-X09	Peak	
	Accidental excessive cold	X31	Peak	
	Intentional self-harm	X60-X84	Peak	English et al (1995)
	Assault	X85-Y09	Peak	Single et al (1996)

Table 2.1: Health conditions included in the model

2.3.1.4 Mortality model structure

A simplified version of the model structure for mortality is presented in Figure 2.7. The model is developed to represent the population of England in a life table. Separate life tables have been implemented for males and females.

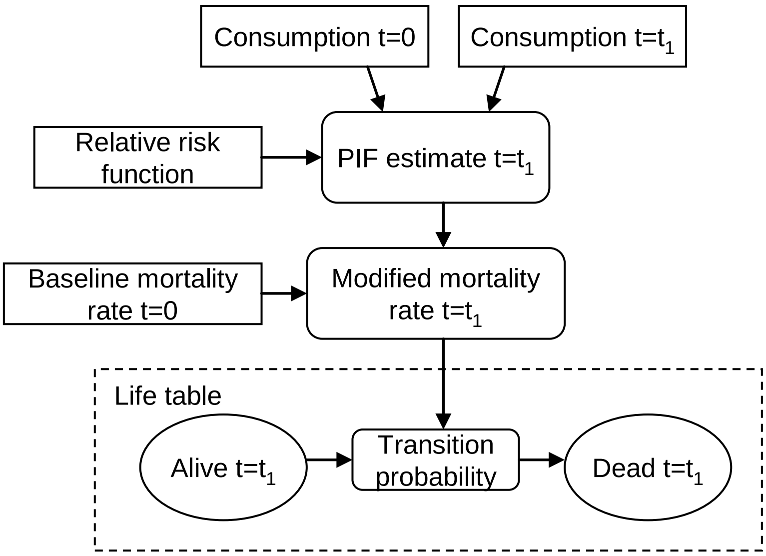

Figure 2.7: Simplified mortality model structure

The life table 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:

Equation 2.5: Potential impact fraction, as implemented in the model, showing time variation

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

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.

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 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 2.3.1.5).

2.3.1.5 Morbidity model structure

A simplified schematic of the morbidity model is shown in Figure 2.8. The model focuses on the expected disease prevalence for population cohorts and as such is quite simple. Note that 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 population sub-group would be needed.

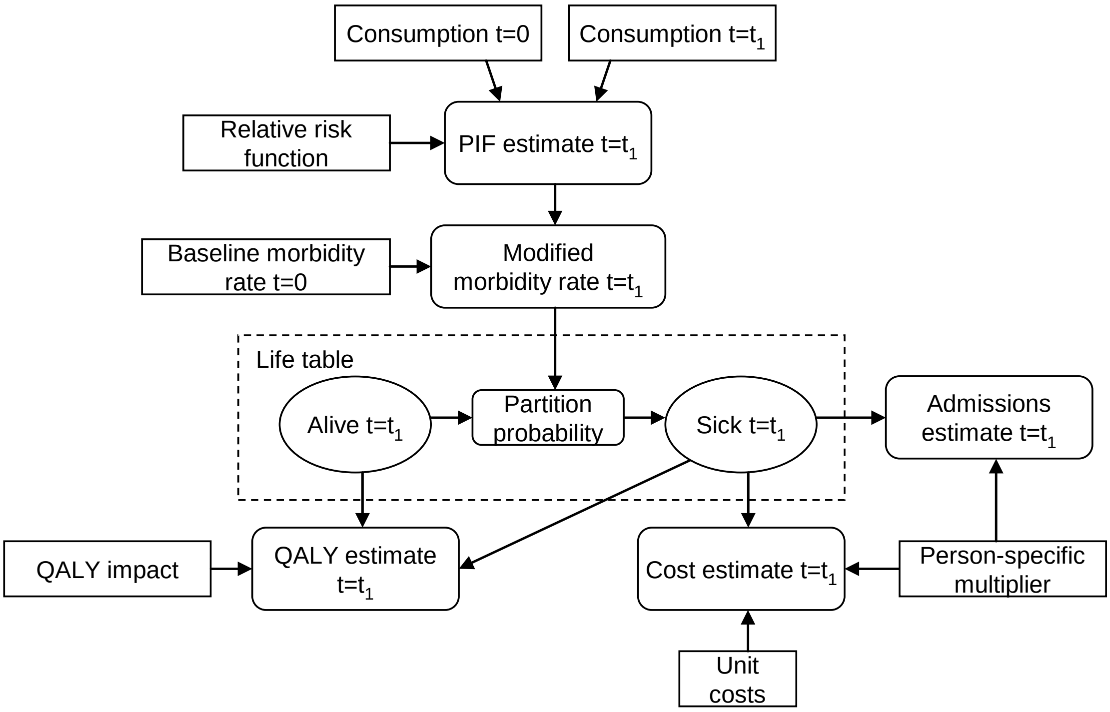

Figure 2.8: Simplified structure of morbidity model

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 person-specific disease prevalence rates calculated from the NWPHO work.

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 (ie. 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) are 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. Note that because a life table approach has been adopted, the method to estimate QALY change for morbidity also encompasses the mortality valuation.

2.3.1.6 Time lag effects for chronic harms

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

A review of the literature found little evidence for population-level time lags for chronic conditions. However evidence was found for the time lag between onset of chronic consumption and onset of disease in individuals. The average time lag to full effect varies between 5 and 15 years, depending on the condition. Such evidence was reported for neurological disorders, chronic pancreatitis induced by alcohol, alcohol cardiomyopathy, alcoholic liver disease, oesophageal cancer, epilepsy, heart failure and oral cancer, 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).

A mean lag of 10 years was assumed for all chronic conditions. While such a lag may under/over-estimate the true mean time lag for some conditions, given the lack of consensus it is considered 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.

The 10 year lag compares well to that reported by Norstrom and Skog,[13] the only paper identified which specifically mentions population-level 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 is similar for both morbidity and mortality which is unlikely to be true for many conditions. However in the absence of data and consensus, such an 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 λ=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 one tenth of the expected full benefits. One tenth of full benefits will be achieved each year up to year 10. An illustration is shown in Figure 2.9.

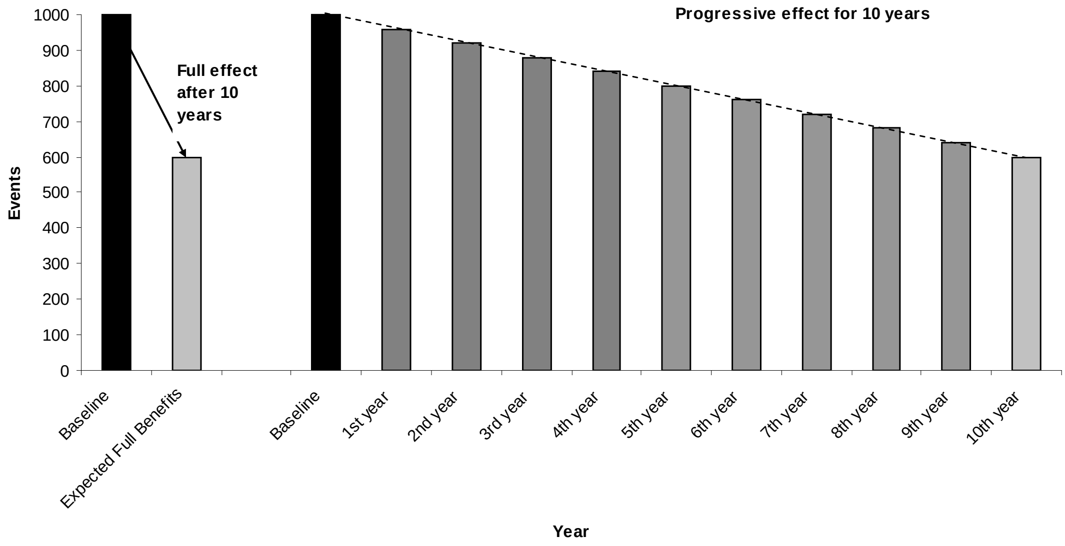

Figure 2.9: Illustrative example of the time lag effect for chronic conditions

2.3.1.7 Crime model structure

The modelling of crime-related harms adapts original work by the Cabinet Office, recently updated by the Home Office. The HO analysis examined 20 alcohol-related crimes and all of these are included in the model. Note that low-level anti-social behaviour is not currently included in the modelling.

Crime	Offence code
Causing death by dangerous driving	4.6
More serious wounding	5
Less serious wounding	8A, 8D
Assault on a constable	104
Assault without injury	105A, 105B
Criminal damage	56-59
Theft from a person	39
Robbery	34
Robbery (business)	34A
Burglary in a dwelling	28, 29
Burglary not in a dwelling	30,31
Theft of a pedal cycle	41
Theft from vehicle	45
Aggravated vehicle taking	37.2
Theft of vehicle	48
Other theft	49
Theft from shops	46
Violent disorder	65
Sexual offences	
Homicide	1,4, 37

Table 2.2: Crime categories included in the modelling

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 function. 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 average drinking (and so there is no time delay between change in exposure to alcohol and subsequent change in risk of committing a crime)

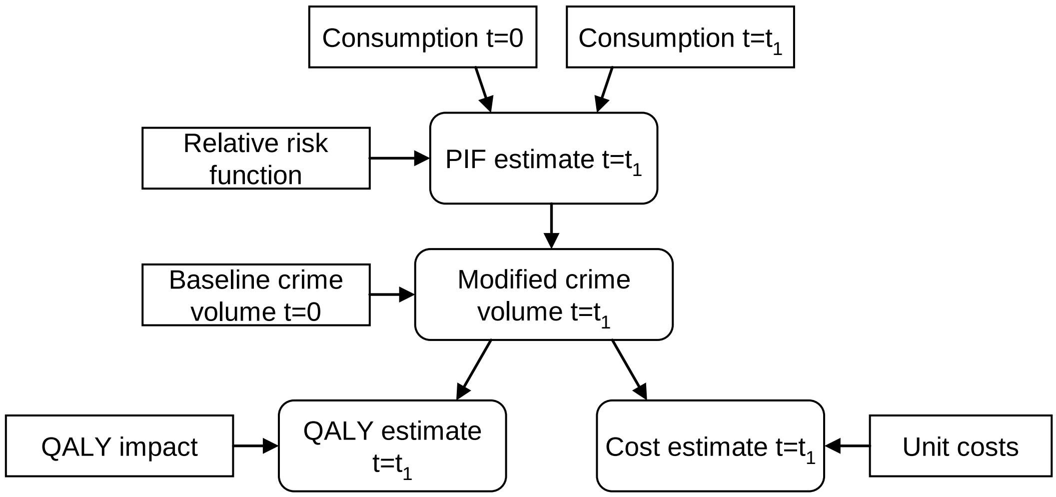

Figure 2.10: Simplified structure of crime model

Outcomes are presented in terms of number of offences and associated cost of crime and QALY impact to the victim. The outcomes from ‘do nothing’ and the policy scenario are then compared to estimate the incremental effect of the implementation of the policy.

2.3.1.8 Workplace model structure

The 2003 Cabinet Office report examined three separate effects of alcohol on workplace-related issues{Cabinet Office/Strategy Unit, 2003 3963 /id}. The resulting cost estimates were revised for inflation in the recent update by DH/HO. The three components in these studies are:

- Absence from work
- Unemployment
- Lost outputs due to early death.

In the model, loss of outputs due to premature mortality are excluded to avoid double-counting the social value of life years lost already estimated in the health and crime models. Therefore, the workplace model focuses on two components: absenteeism and unemployment.

The absenteeism model 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) as shown in Figure 2.11. Based on baseline consumption, consumption at time *t* and 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 change in exposure to alcohol and subsequent change in risk of absenteeism. A similar approach is adopted for unemployment, although the latter is assumed to be associated with average drinking.

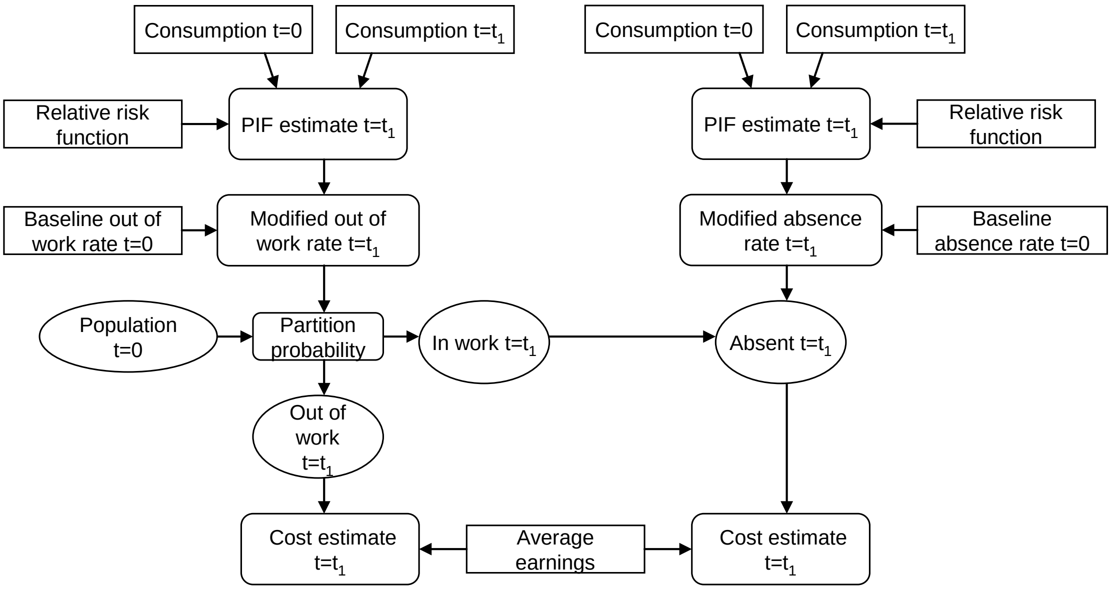

Figure 2.11: Simplified structure of workplace model

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

2.3.2 Model parameters

2.3.2.1 Mortality model parameters

Mortality rates are derived from ONS population statistics for England & Wales for 2006. Risk functions (for chronic conditions) and AAFs (for acute conditions) are taken from the papers summarised in the NWPHO report.

2.3.2.2 Morbidity model parameters

Morbidity rates

Mortality prevalence rates are based on person-specific hospitalisations (from the Hospital Episodes Statistics – HES – database), as calculated by NWPHO. Because the HES 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 (eg. 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. Clearly, using the NWPHO data as a proxy for disease prevalence has some major limitations, particularly since persons with an alcohol-attributable disease who are not hospitalised during the year are not included in the dataset. 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, 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.

As for mortality, risk functions (for chronic conditions) and AAFs (for acute conditions) are taken from the papers summarised in the NWPHO report. These are often identical to the mortality versions, since often the risk functions are based on combined mortality and morbidity data.

Mapping between person-specific hospitalisations and total hospital admissions

Since morbidity has been assessed using person-specific hospitalisations, it is necessary to translate this figure to a total number of hospital admissions to estimate costs. Therefore multipliers have been estimated to create a mapping between the two measures for each condition. The multiplier is calculated from the volume of total hospital admissions related to alcohol (Department of Health personal communication, 2008) in 2006 and the number of person-specific hospitalisations 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. The multipliers used are presented in the Appendix.

Healthcare costs to NHS and PSS

Costs to the NHS have been derived from recent work by the Department of Health on NHS costs of alcohol attributable diseases. This cost is 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 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) and the NWPHO (2008) for AAF. Inpatient costs and admissions for other conditions were directly extracted from the original DH analysis (personal communication, 2008). The cost per hospital admission for each condition is reported in the Appendix.

Since the DH report did not report the breakdown per condition for other costs to the NHS (eg. outpatient, A&E, ambulance, GP costs), an alternative method was used to estimate the breakdown of events (consultations) per condition. After discussion with clinical colleagues, costs were derived using the estimated total number of consultations due to alcohol in England and the likelihood of a 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 for the total cost of alcohol to the NHS.

Health-related quality of life

Utilities for all 47 conditions included in the model were derived from a single source, the Health Outcomes Data Repository (HODaR), to avoid potential bias and variability between studies. The HODaR data measures utilities using the EQ-5D, a widely used generic (disease non-specific) quality of life instrument as recommended by 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 for utilities in the general population.[14] Utilities for individuals aged below 18 years were assumed to be similar to the utility in individuals aged 18–24 years. The utility was also assumed to be similar for males and females.

For conditions where 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. 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 were assumed to be similar to pedestrian traffic accident.

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

There are some limitations relating to use of the HODaR data in the model. 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 consequences 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 it is assumed that the 6 week utility score is representative of the score for a full year in the model. This may underestimate or overestimate the QALY gains 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. 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.

In the original analysis for DH, 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 valuing harm reduction, 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. In this revised analysis for NICE, QALYs are discounted at 3.5% and a financial valuation of £20,000 per QALY is used, consistent with NICE guidelines for cost-effectiveness.

2.3.2.3 Crime model parameters

Baseline volume of offences

The annual volume of offences for 2006 is taken from the Home Office report (including the multipliers used to uplift recorded crime statistics to estimate the actual total number of offences, accounting for under-reporting). Unfortunately this data does not provide a breakdown of offences by age and gender. This information has been derived from the distribution of offenders found guilty or cautioned in 2003. Distributions were available for the 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 (shown in the Appendix). Mapping to the model age groups was also necessary: the distribution of 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 in the group. 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. It was judged that a decrease in 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. 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 use of criminal justice system (CJS) statistics is not ideal and may overestimate or underestimate the distribution for particular age/sex groups. For example, a bias could have been introduced since young offenders may be more or less likely to be found guilty or cautioned than older offenders.

Risk function parameters

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 AAFs based purely on identified consumption, be this due to self-reporting, judgment by a third party (eg. 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 – a self-reported survey of young people (aged 10 to 25) in England and Wales – 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, he had undertaken the offence because he was 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, where multiple responses are allowed). The Home Office update to the Cabinet Office costings for alcohol-related crime used results from Q1. 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.

A more conservative approach is adopted for the modelling, basing AAFs on responses to Q2 (since AAFs from Q1 are generally higher than those estimated from Q2, eg. the respective AAFs for wounding for males aged 16 to 25 are 26% and 11% - and compared to 37% in the original Cabinet Office study based on the presence of alcohol in arrestees' urine samples).

It was possible to derive AAFs from the OCJS 2005 for males and females aged under 16 years old and 16 to 25 years old separately. Further sub-group breakdowns were not possible due to the small sample sizes in the survey. Risk functions were estimated from the AFs, based on a mapping of crime categories from OCJS to the modelled crime types. The risk functions for 16-25 year olds was re-used for over 25s due to the lack of data for the latter. This approach is not ideal since it is likely that AAFs for older individuals are different to those for younger individuals. Whilst this is a limitation, it is not likely to impact greatly on the modelling results since individuals over 25 years old contribute to less than 30% of all crimes. Estimated AAF are reported in Table 2.3. Relative risk functions are shown in Figure 2.12, Figure 2.13, Figure 2.14 and Figure 2.15.

		Reason for committing 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%**

Table 2.3: AAFs for each crime category from the OCJS

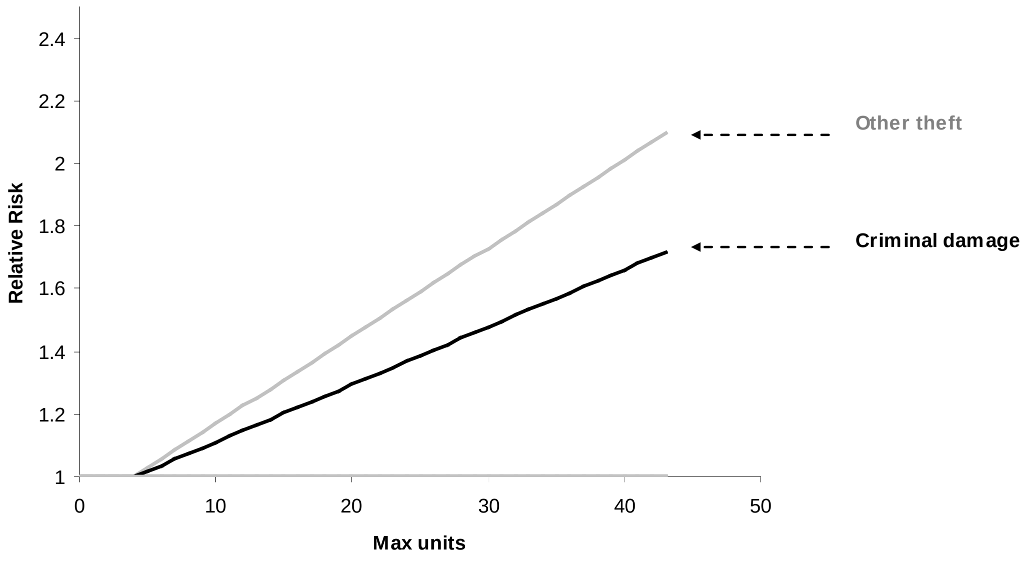

Figure 2.12: Relative risk functions in males aged less than 16

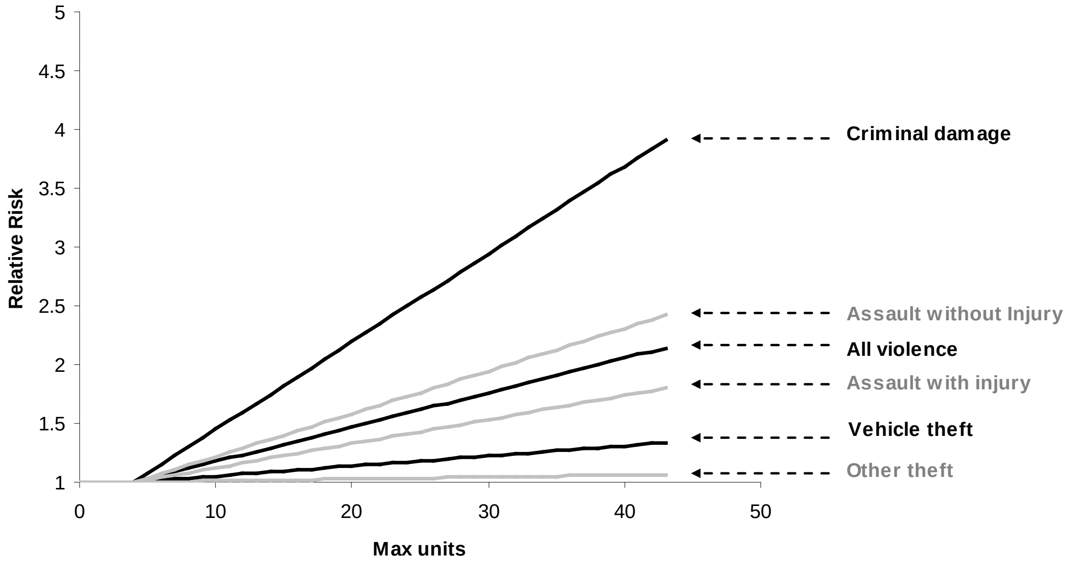

Figure 2.13: Relative risk functions in males aged 16 to 25

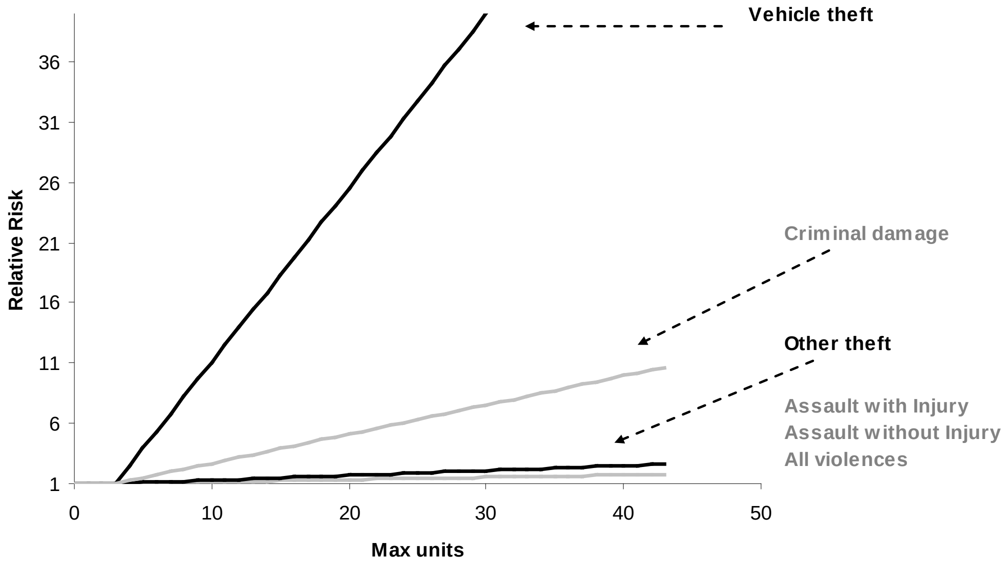

Figure 2.14: Relative risk functions in females aged less than 16

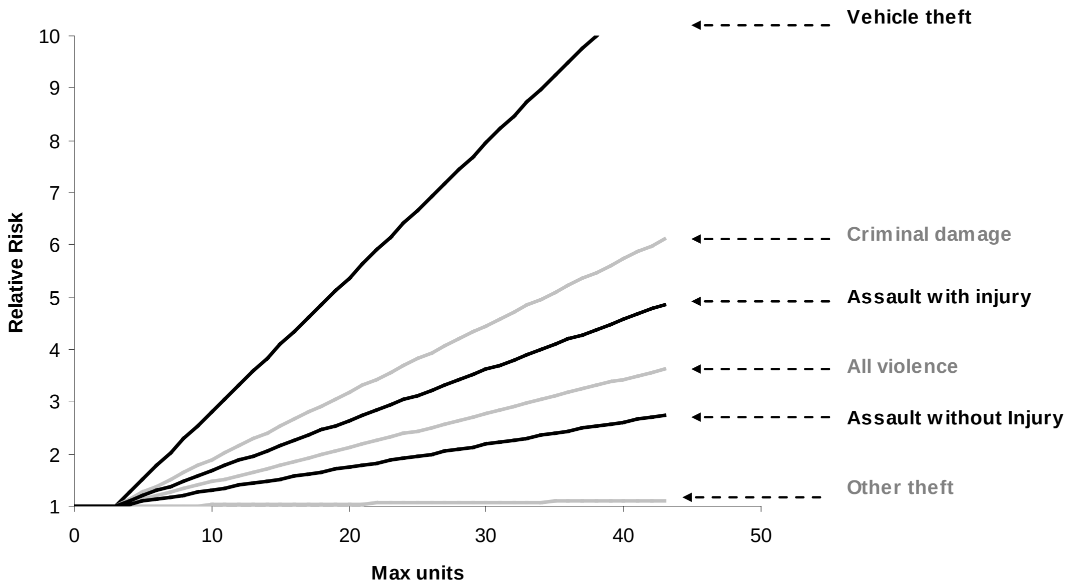

Figure 2.15: Relative risk functions in females aged 16 to 25

Costs and utilities

Unit costs of crime were extracted from Brand and Price (2000)[15] and Dubourg et al (2005)[16] as in the recent Home Office analysis. 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) to obtain estimates of the quality of life impact of different crimes (see Table 2.1 in Dubourg *et al*, 2005). 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).[17] 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 the 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 (ie. if they were counted as an alcohol-related death and/or hospital admission). There is no data available to quantify these effects and double counting in this regard is anticipated 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 proportions would be very low.

Unit costs used are summarised in the Appendix. Crimes committed in future years have their value discounted at an annual rate of 3.5%. In this revised analysis, QALYs are also discounted at 3.5% (as opposed to 1.5% in the original 2008 study).

2.3.2.4 Workplace model parameters

Unemployment

Few studies have reported on the association between excessive drinking and unemployment. MacDonald and Shields (2004)[18] 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 (1997-98) and focused on males aged 22 to 64. This study showed that being a problem drinker lead to a reduction in the probability of working of between 7% and 31%. This evidence was used by the Cabinet Office (2003) to estimate the impact of alcohol misuse on unemployment, assuming a reduction in the probability of working of 6.9% for males and females. For consistency with the recent impact assessment, this value is also adopted in the modelling. However it is based on frequency of daily drinking, whilst MacDonald and Shields (2004) also report a higher effect size for mean weekly intake, which may provide a better approximation.

As for health and crime harms, it was necessary to develop risk functions to examine the impact of a small shift in consumption. The excessive risk of not working can be derived from the mean participation rate, the proportion of problem drinkers (considered equivalent to harmful drinkers here, and therefore related to mean consumption level) and the reduced probability of not working if someone is a problem drinker. The probability of working was assumed to be driven by mean consumption rather than peak consumption. Excess 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 harmful drinker definition.

Risk functions are presented in Figure 2.16 and Figure 2.17 for males and females respectively. The coefficients (or slopes) are presented in the Appendix.

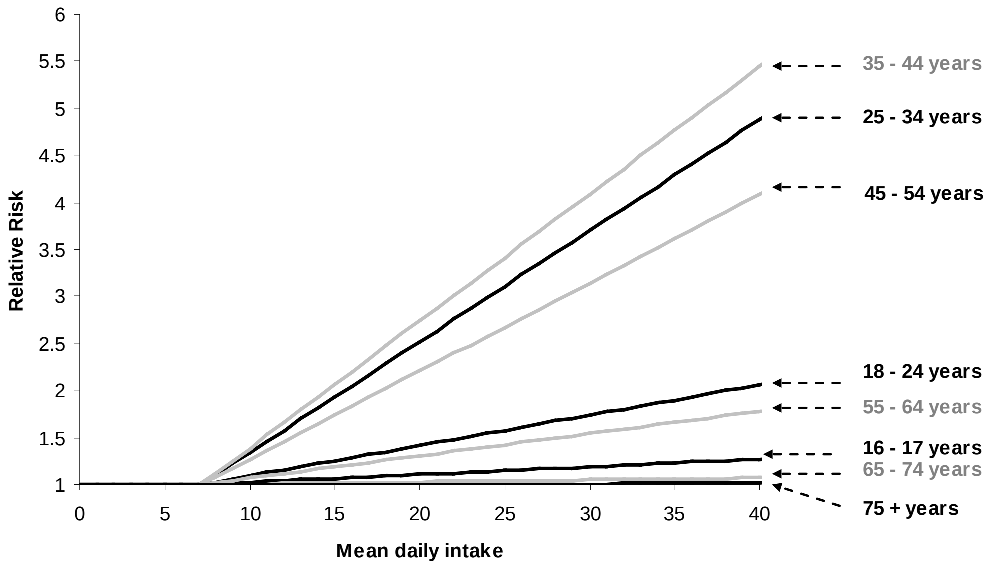

Figure 2.16: Risk functions for unemployment in males

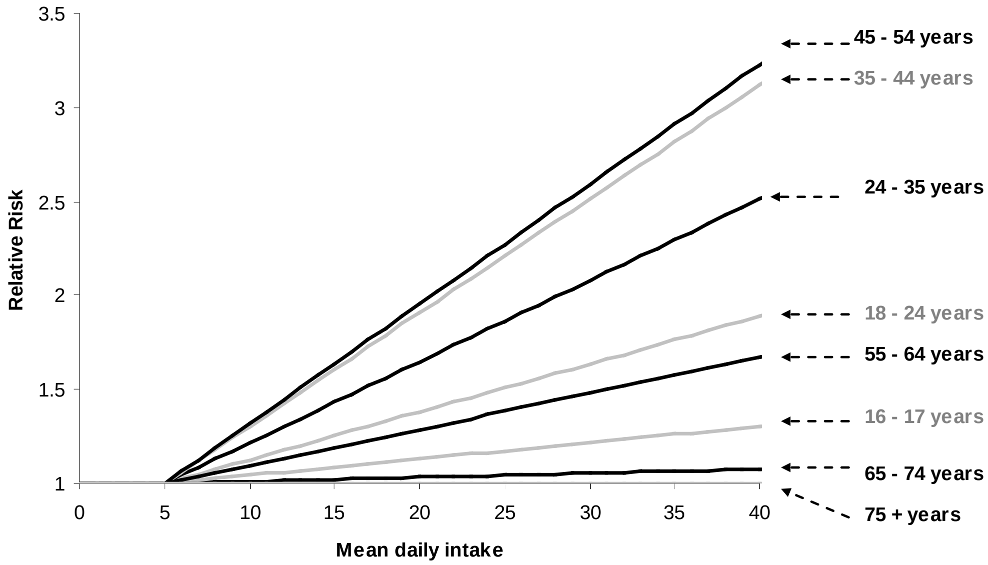

Figure 2.17: Risk functions for unemployment in females

Absenteeism

The original Cabinet Office (2003) work used the Whitehall 2 study of civil servant health and employment to estimate the effects of alcohol on absenteeism (reproduced in Table 2.4). The Cabinet Office assumes relative risks of absenteeism of 1.20 and 1.19 for alcohol over certain ranges, based on the relative risk of absence from work due to injury (although this is actually applied to volumes of absence for any reason).

Units per week		**Rate ratios for males and females combined**	
Males	**Females**	**Spells due to injury**	**Spells for all reasons**
0	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

Table 2.4: 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

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 2.4 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, ie. people who drink more have lower absence rates. This is probably due to people with significant illnesses and higher absence rates drinking less alcohol.

In searching the literature, one important non-UK study was identified that enables some further analysis and assessment of the appropriateness of the Cabinet Office assumption: an article by Roche *et al.* (2008)[19] examining absenteeism due to alcohol in Australia. The study provides useful further evidence because it explicitly asks respondents whether their absence was caused by alcohol. The study suggests 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, Roche *et al* (2008) 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).

	Male workers		**Female workers**	
Age	**Estimated workforce (millions)** **(95% CI)**	**Proportion absent for at least one day** **(95% CI)**	**Estimated workforce (millions)** **(95% CI)**	**Proportion absent for at least one 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%)

Table 2.5: Reproduction of Table 5 from Roche et al (2008) – proportion absent from work

Whilst the findings from the Whitehall II study were England-specific, evidence from Roche *et al* (2008) was preferred for the model baseline due to the absence of a split by age and gender groups in the former 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.

AAFs for absenteeism were calculated according as follows:

Equation 2.6: Absenteeism AAF

$$AAF = \frac{a_{alc}}{a_{alc} + a_{inj/ill}},$$

where a_{ak} is the proportion of absence of a least one day due to alcohol and $a_{inj/ill}$ is the proportion of absence of at least one day due to injury or illness.

The AAFs for absenteeism by age and sex group are reported in Table 2.5.

Age	**Males**	**Females**
16 – 17	10.8%	13.6%
18 – 24	14.5%	10.5%
25 – 34	13.2%	6.8%
35 – 44	8.4%	4.1%
45 – 54	6.1%	2.2%
55 – 64	3.4%	0.2%
65 – 74	1.6%	0.0%
75+	1.6%	0.0%

Table 2.6: Estimated AAFs for absenteeism based on Roche et al (2008)

Relative risk functions were calculated for each age/sex group derived from the AAFs in the usual way. Absenteeism due to alcohol was assumed to be a consequence of the acute consumption (supported by Roche *et al*'s (2008) findings). Excess risk was assumed to start after a threshold of 4 units for men and 3 units for women, as for other acute harms. The estimated risk functions for absenteeism are presented in Figure 2.18 and Figure 2.19 for males and females respectively.

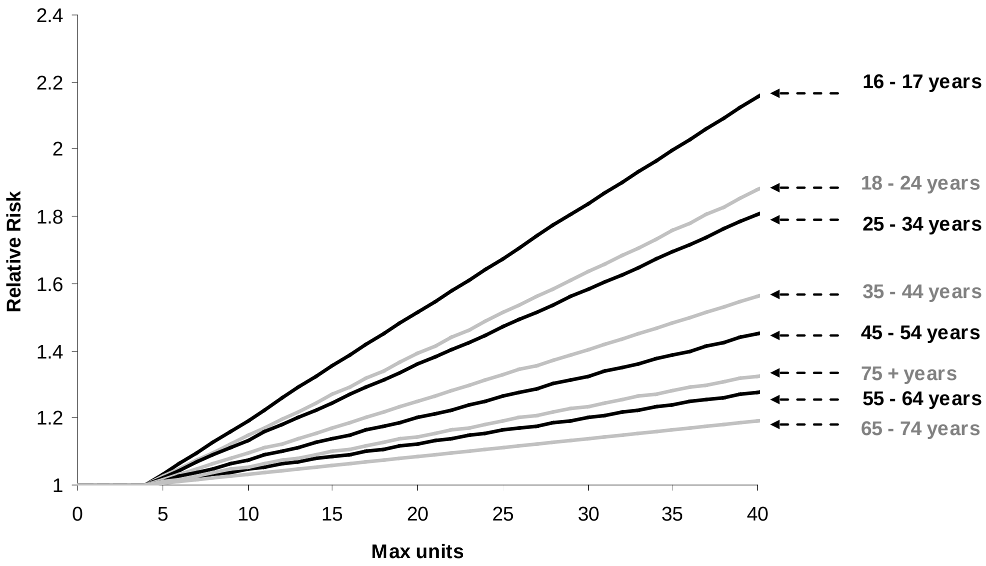

Figure 2.18: Risk functions for absenteeism in males

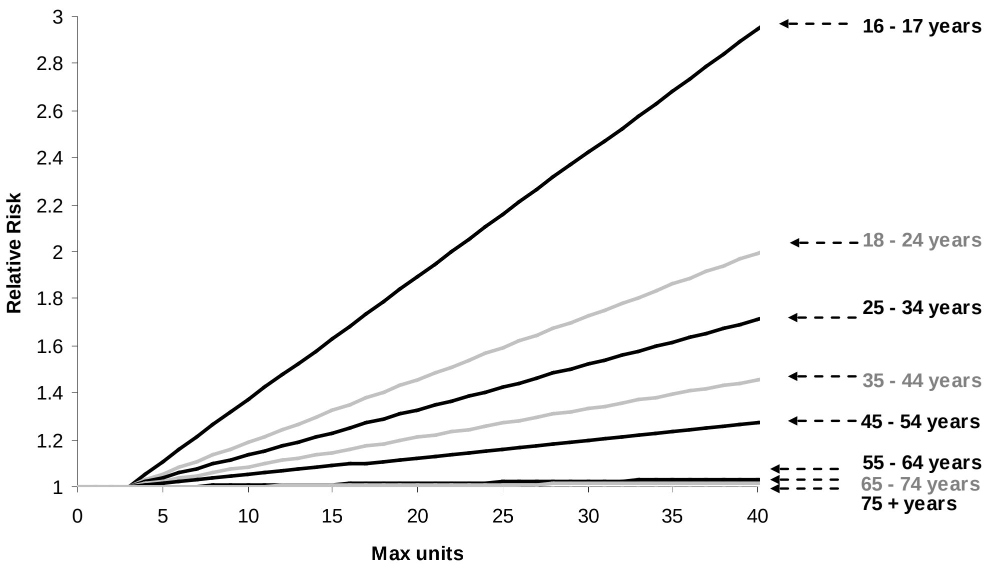

Figure 2.19: Risk functions for absenteeism in females

2.4 Framework and perspective for the economic appraisals

2.4.1 Assessment framework for screening and brief interventions

The analysis undertaken for assessing the cost-effectiveness of screening and brief interventions is similar to that undertaken for NICE technology appraisals of healthcare interventions. The costs of the intervention incurred by the NHS and social services are examined and balanced against the health benefits gained in terms of quality adjusted life years, with account also taken of any financial savings to health and social care due to reduced illness. The analysis calculates an incremental cost-effectiveness ratio for implementation of the intervention versus current practice in terms of the incremental cost per quality adjusted life year gained.

2.4.2 Assessment framework for pricing policies and other macro-level interventions

There are extended challenges in applying economic modelling to macro-level interventions, beyond those commonly encountered in NICE health technology assessments. In particular, the range of costs and benefits to be included can be difficult to determine, especially when decision-maker and stakeholder concerns may not be limited to the immediate and direct effects of an intervention. The inclusions and exclusions concerning direct and indirect economic effects of macro-level alcohol interventions are discussed below.

2.4.2.1 Conventional assessment framework

Policy implementation costs to government and public sector savings

In general, NICE is interested in a public sector perspective on the costs and financial benefits of a public health intervention. However for regulation of alcohol prices, advertising, outlet density or licensing hours, the public sector borne costs of the intervention are likely to be minimal (consisting of legislative processes, implementation and enforcement through existing mechanisms). These costs will almost certainly be outweighed by the public sector savings from the direct costs of services considered (healthcare, social care and criminal justice system). At this stage, the potential direct costs on government and the public sector for each of the policies examined are excluded from the analysis.

Valuation of health and crime harm reductions

The effectiveness of the macro-level interventions, in terms of reductions in health and crime harms are estimated using a quality adjusted life years gained framework (to patients and victims respectively). A financial value for a health-related QALY and a crime-related QALY is subsequently applied.

2.4.2.2 Extended assessment framework

Some might argue for a purely public sector stance to be taken by decision makers for macro-level policies. Ignoring wider issues, the modelling results would show that larger price increases would produce larger health gains and larger financial value of harms avoided with small, fixed implementation costs. This would imply that larger price increases should be considered more 'cost-effective' than smaller price increases. However, it is recognised that such an economic framework cannot fully capture the wider economic effects of possible policies. Other factors, not all of which have been quantified in the current analyses, may need to be considered as discussed below.

Valuation of workplace harm reductions

For the purposes of the original analysis using the Sheffield Alcohol Policy Model for the Department of Health on pricing and promotion, reductions in the workplace harms of sickness absence and unemployment were quantified financially based on average salaries. From a public sector perspective the costs to be included would be the lost productivity from public sector employees and possibly the sickness and unemployment benefit payments across the remaining population. There is some debate about the latter costs, since it could be argued that these should be treated as transfer payments (a redistribution of income in the market system which does not directly absorb resources or create output) and therefore be excluded. Only the lost productivity is included in the current analysis, but the public sector component has not been separated out.

Costs to individuals (consumers of alcohol), retailers and the wider economy

Costs to individuals are outwith the scope of NICE economic assessments, although they may be considered in terms of equity implications. In the case of alcohol pricing policies, regulation to increase prices could cause increased expenditure by consumers. Such direct effects were included in the original DH analyses at the request of policymakers, together with the effect on "consumers' pockets" (the hypothetical increase in expenditure faced by a drinker prior to a reduction in consumption). These effects continue to be reported for information in the new analyses.

For retailers, the model produces estimates of changes in volumes of alcohol expected to be sold as a consequence of each policy, which are then combined with price information to derive, for the country as a whole, the retail sales value (£) of different types of alcohol in both the off-trade and on-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. Some other transitional costs are not examined here, including effects on the advertising or media industry.

It is important not to misinterpret the increased costs to consumers and increased sales values to retailers: the changes in consumer expenditure under the different scenarios are not 'net effects' and cannot be interpreted as 'costs of the intervention' against which the 'savings of the intervention' (eg. in terms of public sector health and crime or wider workforce savings) should be balanced. This is because the increased expenditure by consumers has to be considered in conjunction with the increased revenue to the alcohol industry (producers, wholesalers and retailers) and possibly reduced revenue to other sectors of the economy. The increased revenue to the alcohol industry will return to the wider economy in a variety of ways; for example, wages and salaries to industry employees, profits to individual and institutional shareholders, including pension funds, and potential price reductions on other goods where retailers have been using alcohol as a loss leader. The analysis presented here does not include this dynamic analysis of the full effects of redistribution through the economic system.

Tax and duty revenues to government

Expected changes in tax revenue income to government are modelled for information purposes. Alcohol sales are implicitly divided in three main revenues: retail sale, duty and value-added tax (VAT). The duty schedule is different for each beverage type (beer, wine, spirit), can vary within these types, and is calculated either based on the unit of alcohol or litre of product.

The average amount of duty (including the VAT associated with the duty) per litre of product was extracted from a recent analysis conducted by DH. For the purpose of the model, this figure was transformed into the amount of duty per unit of ethanol derived from the ABV used in the same study. Note that the 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 RTD was assumed to be similar to the duty per unit of ethanol for spirit. Average duty per unit of alcohol used in the model is presented in Table 2.7. VAT is assumed to be 17.5% for both the duty and retail components of the sale (the analysis has not been updated with the revised 15% rate).

Beverage type	Duty (in £, excluding VAT)
Beer	0.129
Wine	0.148
Spirit	0.196
RTD	0.196

Table 2.7: Estimated duty per unit of alcohol

Thus model results for volume of sales (in units) and value of sales (in £) can be used 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 for each policy scenario.

Again it should be emphasised that these are not necessarily ‘net effects’ and are included for information, rather than for direct trade-off calculations in relation to public sector benefits. If increased revenue were to accrue to the Treasury, then this can be conceived of as returning to the wider economy in the form of increases in government services or reductions in other taxes.

Consumer welfare

The public sector focus of NICE economic evaluations also excludes consideration of welfare losses (typically defined by consumer surplus – an economic measure of consumer satisfaction that is based on the difference between the price of a product and the price a consumer is willing to pay) arising from reduced consumption of alcohol. Hence consumer welfare analysis has not been undertaken as part of this study. Such an analysis would need to account for potential increases in consumer surplus from any price reductions elsewhere in the economy and the problems of estimating a ‘pure’ demand curve for alcoholic beverages.

2.5 Intervention model 1: Screening and brief intervention

2.5.1 Model structure

2.5.1.1 Screening

Three general scenarios for screening are examined:

1. Screening at next GP registration (when patients move GP)
2. Screening at next primary care appointment
3. Screening in an emergency care setting (ie. A&E)

All the screening scenarios modelled are opportunistic (considering the time to next attendance). The primary care scenarios apply to all of the English population aged 11 years and over; the A&E scenario is restricted to persons aged 18 and over. An arrival profile is estimated for which a proportion of each population sub-group (defined in terms of gender, age group and consumption level, for compatibility with the consumption-to-harm model) attends in the first year of the screening programme, a further proportion in the second year and so on. Repeat screening at subsequent attendances is assumed not to occur.

The model operates on the sampled individuals in the General Household Survey. Using the arrival profile for a population sub-group, a subset of individuals within the group is selected (randomly, without replacement and accounting for the sample weights of the GHS observations) to be screened in each year.

The results of the screening are simulated using a statistical model, estimating the probability of a positive screening result for each individual given mean consumption, gender and age group. The estimates vary depending on the configuration of the screening instrument. The parameters for the statistical models are estimated using logistic regression methods, and are described further in section 2.5.2.4.

2.5.1.2 Brief intervention

All individual samples screening positive are assumed to be offered a brief intervention. The subsequent take-up of the BI depends on screening context. For GP scenarios, it is assumed that the SBI process takes place as part of a more general conversation with a patient, with no explicit separation of the screening and BI steps (Peter Anderson, personal communication, 2009). In this case, 100% take-up appears an appropriate assumption. For A&E scenarios, the BI is offered as a separate appointment on a day subsequent to the screening. Trials of this approach have yielded approximately 30% take-up of the BI (Programme Development Group expert opinion, 2009).

The effect of delivery of a brief intervention at time *T* on the consumption of an individual at time *T*+1 is modelled as a percentage reduction in mean consumption based on evidence of effectiveness at one year from trials. The relative reduction is assumed to apply regardless of whether the individual sample detected by the screening is a true positive or false positive. Mean consumption in future years for the individual is then further adjusted using 'rebound to baseline' assumptions. Changes to peak consumption are modelled indirectly using the existing statistical model relating mean consumption to peak consumption, developed to analyse the impact of pricing policies in v1 of the Sheffield model (see Section 2.6.1.4).

For those patients in the A&E scenario who do not take up the offer of a brief intervention, mean consumption is assumed to remain at its baseline level. This may be a conservative assumption, since there is some evidence to suggest that screening in isolation may have some degree of effectiveness.[20]

The resulting simulated changes in consumption over time are used in the consumption-to-harms model to estimate the impacts on mortality and morbidity, and therefore the resulting impacts on healthcare costs and health-related quality of life.

2.5.1.3 A note on age cohort assumptions

The existing infrastructure of the Sheffield model v1 is used as the basis of the SBI model. Due to the lack of evidence on transitions between patterns of drinking, the Sheffield model necessarily uses an age-cohort approach. Analyses need to account for this structure when estimating the effects of SBI interventions over time. For example, consider the impact of a hypothetical brief intervention given only to 35-44 year olds at a time *T* that reduces their consumption by 12.3%, where the reduction is sustained in future years. In year *T*+1, a proportion of this population (the original 44 year olds) will now have left the age cohort and, in the model, will take on the current consumption behaviour of 45-54 year olds (who did not receive SBI). In the model, the impact of the brief intervention will be curtailed for these people (ie. the model underestimates the effectiveness of SBI). Also, the sub-population of original 34 year olds will have joined the 35-44 age cohort. In the model, this group will now experience the impact of the brief intervention even though they did not receive (ie. the model overestimates the effectiveness of SBI). Since mortality and morbidity rates are generally higher in older populations, overall the model would be likely to underestimate the health benefits of SBI over the lifetime horizon of the baseline population. An alternative model structure would be required to fully address these effects, which was beyond the bounds of investment in this study. In the actual scenarios analysed, the impact of the estimation effect is mitigated since SBI is not confined to specific age groups and effectiveness also decays quite rapidly to zero. More caution would be required when analysing strategies targeting only specific age ranges in the population.

2.5.2 Model parameters

The core assumptions required for the SBI model relate to the screening arrival profile, the diagnostic properties of the screening instrument, the effectiveness of the brief intervention and the resource requirements for SBI (both time and materials).

2.5.2.1 Next GP registration data

In this scenario, patients are screened when they register with a new GP, as recommended by the 2008/09 clinical directed enhanced services (DES) guidance.[21] The proportion of the population newly registering in each year was derived from UK migration statistics for 2001 (ONS, 2005). The statistics report the percentage of the population who have changed address in the last 12 months, split by gender and age group (a small adjustment is required to translate these age groups into those used in the model). Information on alcohol consumption levels is not available and therefore it is not possible to differentiate the profiles for moderate, hazardous and harmful drinkers within each gender/age category. Some changes of address will not result in a change of GP provider: the volumes are therefore reduced to account for the 43% of individuals who move to a location less than 2 miles from their previous address. A ten year profile of next registrations is constructed assuming that the probability of changing address is independent of any previous address changes. Profiles for each population sub-group are provided in the Appendix.

2.5.2.2 Next GP consultation data

In this scenario, patients are screened when they next attend for a primary care appointment[1]. Following a specific request for the purposes of this study, Department of Health analysts (NHS, 2009) constructed consultation frequencies for patients in England for the period 2004 to 2008, split by gender and age group. The anonymised data shows the proportion of registered patients attending each year (ie. at least once in each of the 5 years), in 4 out of 5 years and so on, through to those patients who did not attend at all in the 5 year period. This data is then used to construct a ten year arrival profile. Information on alcohol consumption or diagnosis is not available and therefore it is not possible to differentiate the profiles for moderate, hazardous and harmful drinkers within each gender/age category. Profiles for each population sub-group are provided in the Appendix.

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[1] Most consultations with a doctor or practice nurse are covered in the definition used by the modelling. Prescription collection and attendance for tests are excluded. Please contact the authors for a comprehensive set of inclusions and exclusions.

2.5.2.3 Next A&E consultation data

In this scenario, patients are screened prior to discharge from their next A&E consultation. Following the format of the Paddington Alcohol Test screening questionnaire,[22] it is assumed that a pre-screen is applied depending on the reason for attendance or nature of the diagnosis (screening is triggered by: fall, collapse, head injury, assault, accident, unwell, non-specific gastro-intestinal, cardiac, repeat attender). To derive a profile of arrivals, data has been obtained from the NHS Information Centre on A&E attendances in 2007/08. Note that only a single year of data is available. There are also concerns about some aspects of the data, particularly in terms of response rate and quality of diagnosis coding (Health and Social Care Information Centre, 2009). Person-specific consultation rates have been derived for each gender/age sub-group for both attendance reason (9 codes) and 2-character diagnosis (39 codes). Filters are then applied to exclude consultations not covered by the PAT pre-screen. High-level attributable fractions for chronic and acute conditions (estimated using the consumption-to-harm model from more detailed AAFs for 47 conditions) are then used to estimate the consultation rates for moderate, hazardous and harmful drinkers. Profiles (incorporating the pre-screen) for each population sub-group are provided in the Appendix.

2.5.2.4 Screening instrument sensitivity and specificity data

Screening results need to be generated for every sample individual in the model, requiring a relationship to be constructed between consumption and screening score. Whilst high-level diagnostic properties for the various instruments are available in the literature (for example, in terms of the ability to detect hazardous or harmful levels of consumption), no mathematical relationships between alcohol intake (as a continuous variable, in units of alcohol) and screening score have been identified. However, the 2000 Psychiatric Morbidity Survey contains data for respondents on both mean consumption (in units of alcohol) and scores on the individual questions of the AUDIT screening tool[2]. The English sample within the survey can be used to derive an England-specific statistical relationship between mean consumption and the probability of a positive score, for any chosen screening threshold, for any instrument derived from AUDIT questions (including AUDIT-C and FAST in addition to the full AUDIT itself). Logistic regression is used to compute parameter estimates for every screening configuration used in the model – these are provided in the Appendix.

[2] A limitation of the 2000 Psychiatric Morbidity Survey is that consumption is not measured fully independently from the AUDIT questionnaire. The measurement is also cruder than that available from the GHS or Health Survey for England.

The emergent diagnostic properties of each instrument found via the model have been compared to similar results from the literature to check the face validity of the statistical modelling.

2.5.2.5 Effectiveness estimates

The Cochrane review of brief interventions in primary care [23] presented a meta-analysis which suggested that the mean reduction in alcohol consumption for people receiving a BI (compared to those in control arms) was 38.4 grams per week. Since the mean baseline consumption in the included trials was 313 grams per week, the reduction is equivalent to 12.3%. This effectiveness level is taken as the baseline in the model for *T*+1, independently of the duration of the intervention (the mean was 24.9 minutes in the included trials).

The evidence base is inconclusive as to the link between intervention duration and level of effectiveness (see linked systematic review by Jackson *et al.,* 2009). The Cochrane meta-regression estimated that an increase in BI duration of 1 minute was associated with a 1 gram per week reduction in consumption (95% confidence interval: -0.1 to 2.2g/wk). Since the analysis showed that a mean duration of 24.9 minutes was associated with a mean reduction of 38.4 grams per week, it could be postulated that a 5 minute intervention would be associated with an 18.5g/wk reduction (equivalent to 5.9% for a baseline consumption of 313g). This reduced level of effectiveness is used as a sensitivity analysis for the 5 minute interventions modelled here.

There is limited evidence on the duration of effect for BI, however Fleming et al. (2002) [24] identified some remaining effect 4 years after the BI was delivered. Using a simple extrapolation of this evidence, the baseline model assumes that effectiveness decays linearly to zero after 7 years. Given the considerable uncertainty, a more rapid rebound (3 years) is also considered as a sensitivity analysis.

Evidence of the effectiveness of BI in an emergency care setting is taken from Crawford *et al.* (2004),[25] based on the observed reduction in the mean units consumed per drinking day between experimental and control groups. In the study, results are available at 6 month follow-up and 12 month follow-up. The latter is selected as the *T*+1 impact for a BI given at time *T*. The decay in effectiveness over the six months is linearly extrapolated, such that at *T*+2 effectiveness has declined to a reduction of just 1% from baseline; by *T*+3 consumption is assumed to have returned to baseline.

Two potential BI variables were excluded from the scope of the modelling due to a lack of (or inconclusive) evidence from the systematic review of effectiveness: (i) any analysis of the potential impact of booster sessions; (ii) any variation in effectiveness according to the types of staff delivering the intervention.

2.5.2.6 Cost estimates

The cost of screening is assumed to be comprised purely of the staff time required to perform the screen. Screening tools which are fully self-completed by patients are excluded from the analysis due to a lack of evidence for these. Based on expert input from the Programme Development Group (2009), it is assumed that the interviewer first establishes whether or not the patient abstains from alcohol (AUDIT Q1, requiring 30 seconds on average). If the patient is not an abstainer, the interviewer then introduces the screening tool (30 seconds), asks the appropriate number of questions (20 seconds each) and goes through the results with the patient (60 seconds, where this is assumed not to form part of the BI). All timings are based on expert opinion (Programme Development Group expert opinion, 2009). The staff type assumed to perform the screening varies with the setting: in the baseline cases for next GP registration, next GP consultation and next A&E consultation the staff types are Practice Nurse (£0.55 per minute), General Practitioner (£2.72 per minute) and Staff Nurse (£0.72 per minute) respectively. National unit costs are used to estimate staff costs (Curtis, 2008). Some example cost breakdowns for AUDIT-C (administered under DES) are shown in Table 2.8.

Route	**AUDIT Q1**	**Introduction**	**AUDIT Q2 and Q3**	**AUDIT Q4 to Q10**	**Discussion**	**Total time**	**Total cost (for GP)**
Negative Q1	30 secs	n/a	n/a	n/a	n/a	30 secs	£1.36
Negative AUDIT-C	30 secs	30 secs	40 secs	n/a	60 secs	160 secs	£7.25
Positive AUDIT-C	30 secs	30 secs	40 secs	140 secs	60 secs	300 secs	£13.60

Table 2.8: Example screening resource costs (assumptions)

The cost of the BI involves both staff time and materials. Two separate intervention durations are used in the baseline analyses: 24.9 minutes and 5 minutes (the former gives the closest match to the effectiveness evidence but the latter is the DES recommendation). For the primary care scenarios, the staff type is assumed to be the same as for screening (since SBI is assumed to take place as a single process). For the A&E scenario, the BI is assumed to be delivered by an alcohol specialist nurse (£1.08 per minute). Materials costs are sourced from a recent UK economic evaluation of an alcohol brief intervention.[26] The material costs are adjusted to a 2007 cost year using the standard RPI index (rather than a healthcare specific index, since this cost does not relate to health product) and are annuitized (assuming a 10 year replacement period and 3.5% discount rate[3]). The resulting materials cost is £8.84 per BI. Some example BI cost breakdowns are shown in Table 2.9.

Duration	**Staff cost (GP)**	**Material cost**	**Total cost**
24.9 mins	£67.73	£8.84	£76.56
5 mins	£13.58	£8.84	£22.42

Table 2.9: Example brief intervention resource costs (assumptions)

2.6 Intervention model 2: Pricing and price-based promotion policies

2.6.1 Model structure

2.6.1.1 Conceptual model

The pricing model uses a simulation framework based on classical econometrics. The fundamental concept, shown in Figure 2.20, is that (i) a current consumption dataset is held for the population; (ii) a policy gives rise to a mean change in price; (iii) a change in consumption is estimated from the price change using the price elasticity of demand; (iv) the consumption change is used to update the current consumption dataset. Due to data limitations, some supplementary structures must be built into the model; these are described in detail in the sub-sections below. The implementation of the framework is referred to as the 'price-to-consumption' model.

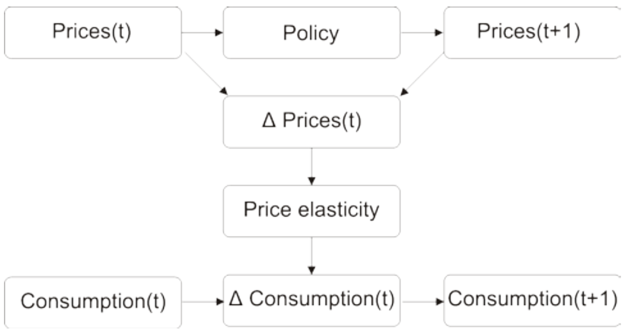

Figure 2.20: High-level conceptual framework of the pricing model

2.6.1.2 Population sub-groups

The population sub-groups – defined by gender, age group and baseline consumption status – form the building blocks of the price-to-consumption model. For each sub-group, a 16 element beverage preference vector is defined. The vector describes how mean consumption is split, on average, between different categories of beverage. Beverage categories are defined

[3] Lock *et al* (2006) use a 6.5% discount rate, but 3.5% is used in the modelling to comply with the NICE recommendations for economic assessments.

by three dimensions: beverage type (ie. beer, wine, spirit and RTD), retail type (ie. off-trade or on-trade) and price point (ie. higher and lower, about a defined threshold). Hence beverage categories range from lower-priced off-trade beer through to higher-priced on-trade RTD.

For each beverage category, a detailed price distribution is defined in terms of £ per unit. Since pricing policies may affect price distributions in quite complex ways, a non-parametric representation is preferred.

2.6.1.3 Econometric model

An econometric model has been developed to examine the relationship between the purchasing of units of the 16 beverage categories, and of other non-durable goods, (on the left hand side) and their prices, the income of the individual and covariates around gender, ethnicity, age, education, region, household composition, household size and employment status (on the right hand side). The econometric model is described in more detail in Brennan *et al.* (2008). The resulting system of equations is analysed using iterative three-stage least-squares regression to estimate coefficients for all relevant terms. Elasticities of demand can be computed for the various products from these coefficients. In particular, a 16x16 matrix of price elasticities is obtained.

The 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 (eg. lower-priced off-trade wine) if the price of the first category of alcohol (eg. lower-priced 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.

2.6.1.4 Relationship between mean consumption and binge drinking

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 (such as falls or assaults). 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 ideal 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.

Issues in linking data on binge drinking to purchasing

There are difficulties linking data on binge drinking (from GHS/SDD) with data on price and purchasing. 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.

The Expenditure & Food Survey provides evidence on purchasing in both on-trade 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-trade and off-trade consumption (Hughes *et al.*, 2008). Attempts to produce a 16x16 matrix of elasticities for 6 subgroups (ie. moderate, hazardous and harmful drinkers by on-trade binge/off-trade binge) were unsuccessful due insufficient observations in the sub-datasets.

An alternative approach has therefore been developed, based on the observation that in the GHS, probability and scale of binging is related to the mean weekly intake of alcohol (in 2006, 20% of moderate drinkers reported binge drinking on at least one day in the last week, whereas figures for hazardous and harmful drinkers are 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. The chosen solution to this is presented below, together with a discussion of limitations.

Regression model to predict the scale of the binge

One main advantage of the GHS 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.

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 drinking day (original data from the EFS).

2.6.2 Model parameters

2.6.2.1 Expenditure & Food Survey

The Expenditure & Food Survey (EFS) 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 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, purchasing can readily be classified into beer, wine, spirit and RTD 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 the new ONS methodology outlined in Goddard *et al* (2007) is adopted. Data is included 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 transaction-level EFS diary data for individuals was obtained directly from DEFRA after a special data request. Over these five years, records exist for 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, specific RPI inflators for alcoholic beverages are applied to provide the complete dataset in 2008 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).

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 (beer, wine, spirit and RTD) and by on-trade versus off-trade purchasing.

- 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 not provide:

- 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 (eg. those who are homeless).

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. 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.

2.6.2.2 Off-trade market research data (AC Nielsen)

Data has been made available to the research team from AC Nielsen which allows an examination of the sales 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 is discarded. Whilst the detailed data provides a wealth of material, Nielsen does not provide any demographic data on purchasers (eg. no age/sex data), nor does it provide any direct information on actual consumption (as distinct from purchase) of alcohol.

For the database known as *Grocery Multiples channel*, which is essentially supermarket chains, sales data is stored at ‘stock keeping unit (SKU) level’. An SKU would, for example, be a 4-pack of 440ml cans of Carling and is defined by a unique bar-code. 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 (in litres of beverage – Nielsen are unable to convert to units of alcohol using ABV), value of sales (in £), a flag identifying whether these sales were on promotion or not, and 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 list (also referred to as list price or 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 (ie. 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.

The model performs analysis at the aggregated level of beers, wines, spirit and RTD, requiring aggregation of the Nielsen product categories. The aggregation requires a transformation from litres of beverage to units of alcohol. This is achieved by applying ABV estimates (shown in the Appendix) to the volume of the product to obtain ethanol quantity and then converting to units (1 UK unit = 10ml ethanol).

For SKU anonymity reasons, Nielsen limited the number of categories of price range for which data was to be summarised to 10. These were defined at product level in terms of price per litre of beverage, with the prices selected such that each category mapped back to an equivalent price per unit of alcohol (see Table 2.10).

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

Table 2.10: Price ranges for the Nielsen data

Data is available for Great Britain and can also be partitioned for England & Wales. Data for England in isolation is not available. Hence, data from England and Wales was used for the analysis. Nielsen also collects data for off-trade retailers other than supermarkets – known as the *Impulse channel*. The data is not sufficiently detailed to allow analysis of price-based promotions but it is used in developing the off-trade price distributions for the model. The promotional distributions for off-trade beer, wine, spirit and RTD are shown in the Appendix. High-level findings are shown in Table 2.11.

Beverage	**% on deal**	**Mean discount**
Beer	49.8%	13.4%
Wine	54.7%	14.6%
Spirit	34.1%	9.2%
RTD	43.1%	8.8%

All	47.5%	13.1%

Table 2.11: Estimated mean proportion of alcohol units consumed on a price-based promotion and mean discount size on promoted products

2.6.2.3 On-trade market research data (CGA Strategy)

Data has been made available to the study from CGA Strategy, a market research company specialising in on-trade information. The data contains evidence for both prices and price-based promotions for beer, wine, spirit and RTD purchases in the on-trade.

CGA Strategy maintain a pricing database for the on-trade (known as *Ons Prices*) which records price information for products in a sample of approximately 5,500 outlets, selected to be representative of the entire on-trade universe. Unique products are defined by brand and method of serve (eg. for beer, a product could be a 4 pint jug of draught Carling or a 330ml bottle of Becks). Since June 2008, CGA have been recording observed promotions as part of this survey. The data is currently available to the end of November 2008, at which point approximately 3,500 outlets have been refreshed using the enhanced survey. Promotions are currently only recorded where they are visible to the CGA researcher in the outlet and therefore under-reporting may be a concern.

To construct a price distribution, sales volumes (in terms of alcohol units) are required. Unfortunately CGA's pricing database does not include data of this type. However a separate sales database (known as *Managed House EPoS Pricing Data Pool*) does record total daily sales value (in £) and sales volume (in litres of beverage) for approximately 6,000 outlets (of which 485 are also represented in the pricing database). For most products, ABV information is also recorded, enabling volume to be converted to units of alcohol.

For the outlets appearing in both databases, price and promotional details can be matched to sales value and sales volume for each product sold. Making an assumption that the observed promotions were the only ones active during the time between refreshes of the price database, then the sales volumes can be separated into alcohol sold at the list price and alcohol sold at the promoted price:

Equation 2.7: Separation of on-trade promoted and non-promoted volumes

$$Vol_{LIST} = \frac{Val - \alpha \times Vol \times P_{LIST}}{P_{LIST}(1-\alpha)}, \; Vol_{PROM} = \frac{Vol \times P_{LIST} - Val}{P_{LIST}(1-\alpha)}$$

where *Vol* is total volume sales, *Val* is total value sales, P_{LIST} is the list price and α is the promotional discount.

Promotions offering discounted prices on a particular beverage for either a limited period of time (eg. a “happy hour”) or if larger quantities are purchased (eg. a “double-up for a pound” offer on a spirit) are included in the analysis. Currently, promotions relating to linked or mixed products (including drinks linked to food purchases) and repeat purchasing are excluded, principally due to difficulties in interpreting the magnitude of the discount on the alcohol component of the purchase.

The above process enables price and price-based promotion distributions to be estimated for beer, wine, spirit and RTD retailed in 485 on-trade outlets. Unfortunately, these outlets cannot be considered representative of the wider on-trade (they are mostly what are referred to as *Managed Pubs* – outlets owned by a brewer or multiple pub owner which are operated by a full-time employee – which comprise only 26% of total on-trade alcohol units). Therefore the relationship between cumulative product offerings in the price database and cumulative sales volumes in the sales database for the 485 outlets is used to adjust the cumulative product offerings in the wider on-trade to produce complete on-trade estimates of pricing and promotion. Note that this conversion makes the assumption that the relationship between product offerings and subsequent product sales observed for Managed Pubs holds for the wider on-trade.

2.6.2.4 Purchasing preferences

By using combined purchasing data from EFS, Nielsen and CGA it is possible to estimate the parameters at sub-group level for the beverage preference vector and the 16 price distributions.

The EFS provides the basis for the price distributions (comprised of individual transactions, defined by purchase price, purchase volume and sample weight). In the off-trade, the more aggregated but more accurate Nielsen data is used to adjust the EFS cumulative distribution so that it matches the Nielsen data at the known price points. The CGA data is used in the same manner for the on-trade data. The EFS data is then linearly interpolated between the known market research price points (retaining the maximum and minimum EFS prices as the boundaries of the distribution). This process results in 8 price distributions: for beer, wine, spirit and RTD in both the off-trade and on-trade. These distributions are shown in Figure 2.21 and Figure 2.22.

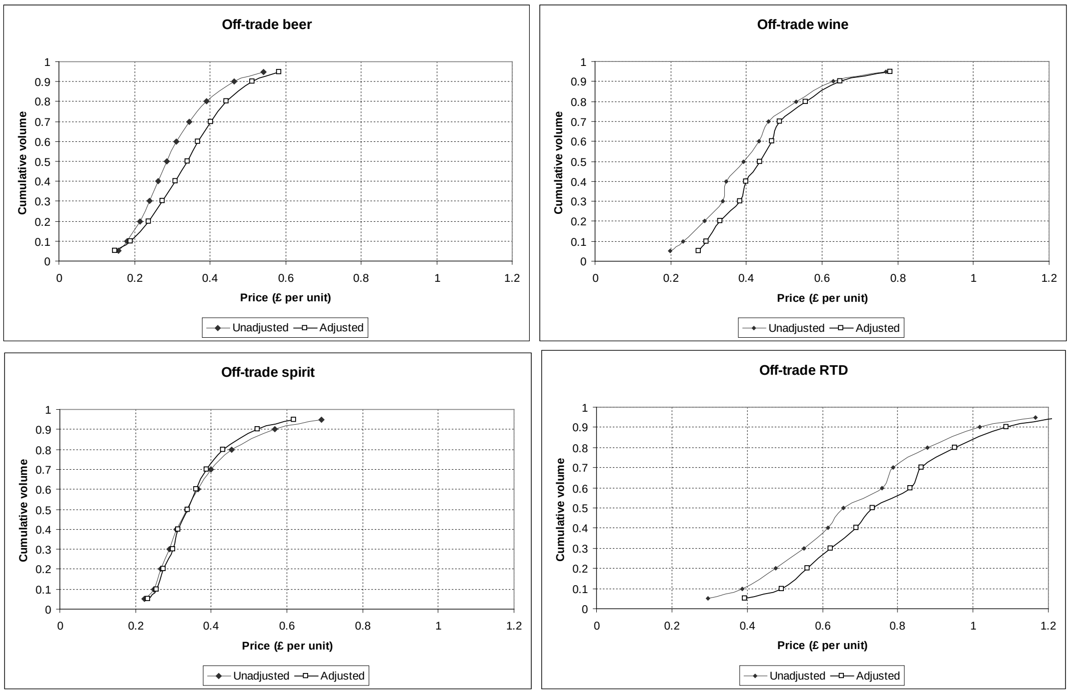

Figure 2.21: Unadjusted (EFS) and adjusted (via Nielsen data) off-trade price distributions for beer, wine, spirit and RTD

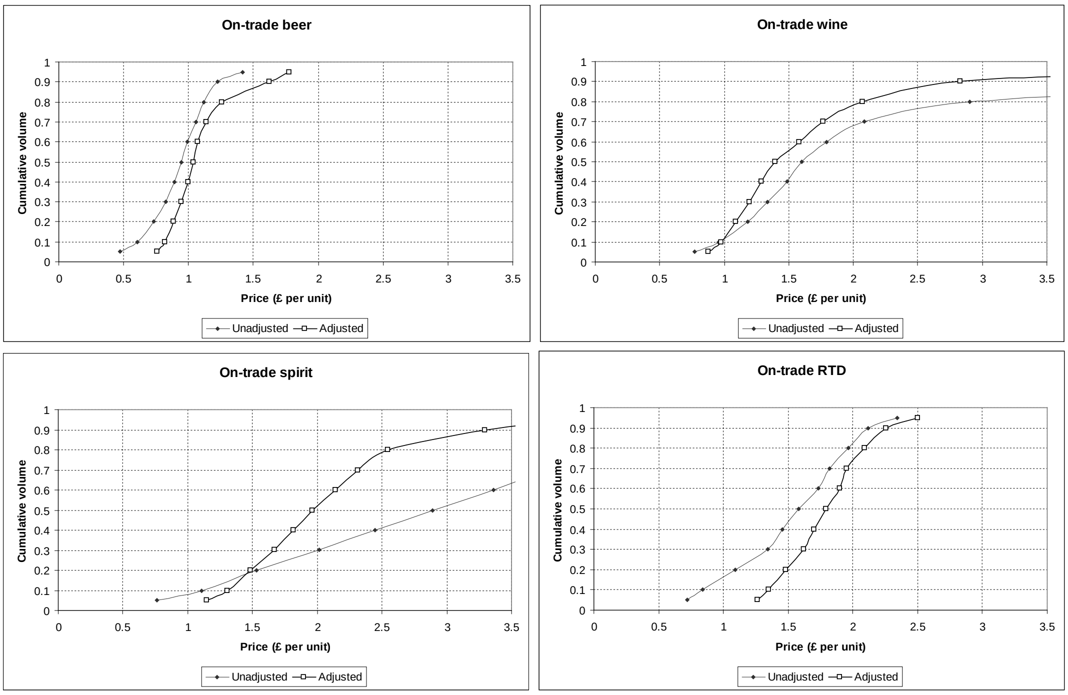

Figure 2.22: Unadjusted (EFS) and adjusted (via CGA data) on-trade price distributions for beer, wine, spirit and RTD

Each of these price distributions is then split into lower-price and higher-priced distributions using a threshold price point (in the original analysis this was selected as 30p per unit in the off-trade and 80p per unit in the on-trade). Elements of the resulting 16 price distributions are then assigned to the sub-groups based on demographic data from the EFS (gender and age) and total volume of alcohol purchasing in an individual's diary (defined as moderate, hazardous or harmful).

2.6.2.5 Binge model parameters

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

To illustrate the functionality of the binge model, consider a GHS sample for a male aged 25 with a mean daily intake at baseline of 8 units (ie. a harmful drinker) who drunk 20 units on the heaviest drinking day. Consider a policy that reduces the mean daily intake by 2 units. This changes the mean consumption from 8 units to 6 units, a reduction of 25%. The models predict a corresponding reduction of 14% in the scale of binge, ie. a reduction from 20 units to 17.5 units.

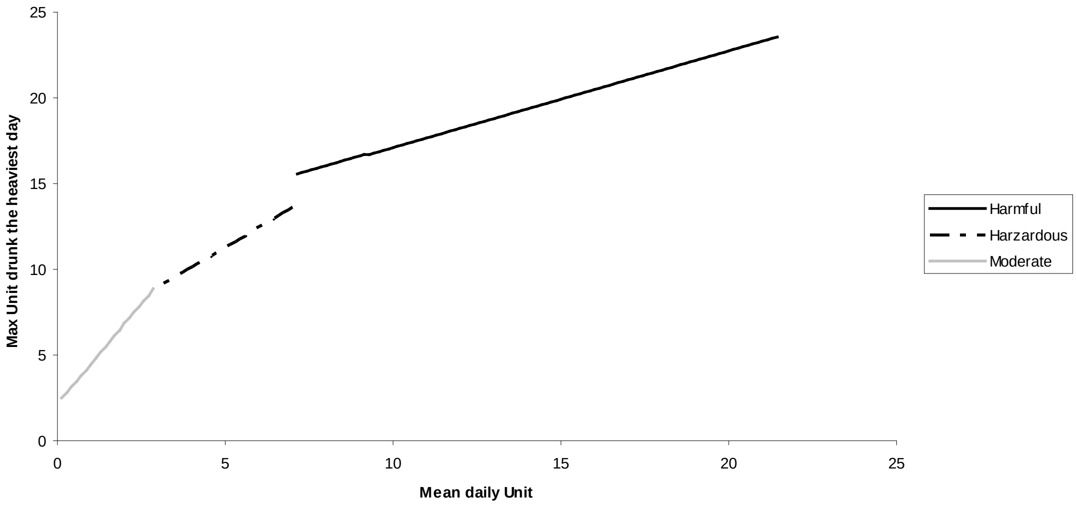

Figure 2.23: Illustrative example of binge relationship in males aged 25 to 34

2.6.2.6 Price elasticity estimates

16x16 elasticity matrices have been estimated for moderate drinkers and the combination of hazardous and harmful drinkers. The results are shown in Table 2.12 and Table 2.13 respectively. Note that the ideal scenario would be to produce 16x16 matrices for every sub-group in the model (eg. 18-24 year old male hazardous drinkers); however there is insufficient data in the five-year EFS sample to enable the regression algorithm to converge satisfactorily on a robust solution.

As a simple example of how to interpret the elasticity matrices, consider the moderate drinker 16x16 matrix shown in Table 2.12. The lead diagonal shown in bold in the table contains the own-price elasticities. For example, the table shows an own-price elasticity of -0.4030 for off-trade lower-priced beer, indicating 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 this beverage. Complement 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 2.12 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%.

The elasticity matrices on their own are not sufficient to reveal the likely behaviour of the population to particular price policies, since these also depend on the preferences for beverage, drinking location and price point that the different sub-groups exhibit. The detail of the matrices goes beyond any similar econometric analysis in the literature, which makes comparisons with other studies difficult. However limited face validity checking is possible.

Recent systematic reviews and meta-analyses by Gallet (2007)[27] and Wagenaar et al (2008)[28] found, respectively, a median elasticity for alcohol of -0.535 and a mean elasticity for alcohol of -0.51. These results are a similar order of magnitude to most of the own-price terms estimated here.

In terms of a more detailed decomposition by beverage type, Gallet (2007) collated -0.360 for beer compared with own-price estimates of -0.4017 to -0.6665; -0.700 for wine compared with -0.2614 to -0.6431; and -0.679 for spirit compared with -0.1559 to -2.2207. 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)[29] 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), the new analysis identifies a larger elasticity for off-trade beer than on-trade beer, although in relative terms the observed difference is somewhat smaller.

Huang was also able to estimate cross-elasticities between beverage types, as was Gruenewald *et al* (2006)[30] in a study of off-trade Swedish price and sales data. Both studies tend to produce larger cross-price elasticities than those observed in the 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. This behaviour tends not to be observed to any great degree for the policy analyses in this report.

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) [31]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). It should be noted that the definition of moderate drinkers in the paper is different to those in the current study (which also includes ‘light’ drinkers in its definition of moderate, and these drinkers are also found to be less price elastic in the paper). Wagenaar *et al*’s (2008) meta-analysis computes a mean elasticity of -0.28 for heavy drinkers compared to the overall -0.51 described earlier, although it should be noted that the definition of consumption is often related to binging rather than mean consumption in the underlying studies. By contrast, the elasticity estimates generated here tend to show own-price elasticities with greater magnitude for hazardous/harmful drinkers compared to moderate drinkers. However the relationship between overall price elasticity and level of drinking is more complex due to the inclusion of cross-elasticities, with hazardous/harmful drinkers showing a greater level of substitution behaviour, which in some cases is an order of magnitude greater than that estimated for moderate drinkers.

		Consumption	Off								On							
			Beer		Wine		Spirit		RTD		Beer		Wine		Spirit		RTD	
Price			Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Off	Beer	Low	**-0.4030**	0.0061	0.0029	0.0075	0.0008	0.0043	0.0006	0.0036	0.0066	0.0157	0.0011	0.0003	0.0083	0.0040	0.0010	0.0042
		High	0.0014	**-0.4378**	0.0022	0.0095	0.0006	0.0052	0.0005	0.0026	0.0080	0.0215	0.0009	0.0013	0.0101	0.0055	0.0012	0.0048
	Wine	Low	0.0020	0.0106	**-0.4346**	0.0034	0.0008	0.0034	0.0002	0.0019	0.0069	0.0140	0.0002	-0.0002	0.0067	0.0033	0.0003	0.0037
		High	0.0014	0.0097	0.0010	**-0.4729**	0.0007	0.0037	0.0005	0.0015	0.0069	0.0176	0.0001	0.0012	0.0073	0.0042	0.0008	0.0044
	Spirit	Low	0.0002	0.0147	0.0027	0.0121	**-0.5140**	0.0030	0.0003	0.0008	0.0068	0.0176	-0.0008	-0.0009	0.0059	0.0029	0.0008	0.0031
		High	0.0022	0.0083	0.0013	0.0082	0.0005	**-0.5237**	0.0002	0.0017	0.0068	0.0200	0.0009	-0.0003	0.0067	0.0035	0.0008	0.0034
	RTD	Low	0.0010	0.0276	-0.0003	0.0007	0.0003	0.0039	**-0.3234**	0.0006	0.0085	0.0129	0.0016	-0.0016	-0.0422	0.0030	0.0010	0.0032
		High	0.0013	0.0119	0.0001	0.0067	0.0013	0.0025	0.0002	**-0.3433**	0.0068	0.0090	0.0001	0.0019	0.0084	0.0045	0.0011	0.0035
On	Beer	Low	0.0019	0.0101	0.0033	0.0078	0.0009	0.0053	0.0006	0.0022	**-0.4017**	0.0322	0.0016	0.0015	0.0101	0.0076	0.0025	0.0063
		High	0.0023	0.0128	0.0019	0.0100	0.0007	0.0052	0.0005	0.0025	0.0126	**-0.4211**	0.0017	-0.0002	0.0193	0.0104	0.0014	0.0064
	Wine	Low	0.0005	0.0027	0.0006	0.0033	0.0004	0.0032	0.0000	0.0004	0.0104	0.0224	**-0.2614**	0.0012	0.0078	0.0037	0.0012	0.0028
		High	0.0006	0.0051	0.0009	0.0055	0.0004	0.0037	0.0004	0.0007	0.0057	0.0061	0.0002	**-0.2799**	0.0025	0.0053	0.0013	0.0045
	Spirit	Low	0.0004	0.0017	0.0014	0.0051	0.0003	0.0001	0.0015	0.0012	-0.0069	-0.0117	-0.0005	0.0004	**-1.0965**	0.0046	-0.0022	-0.0048
		High	0.0006	0.0021	0.0007	0.0018	0.0002	-0.0002	0.0000	0.0002	-0.0001	-0.0111	-0.0030	-0.0068	0.0013	**-0.1559**	0.0013	-0.0007
	RTD	Low	0.0006	0.0030	0.0000	-0.0008	0.0004	0.0006	-0.0001	0.0010	0.0075	-0.0021	0.0011	0.0050	0.0136	-0.0086	**-0.3477**	0.0067
		High	0.0005	0.0025	-0.0005	0.0023	0.0003	0.0034	0.0001	0.0007	0.0064	0.0030	0.0004	0.0048	0.0010	-0.0051	0.0013	**-0.3356**

Table 2.12: Price elasticity estimates for 16 beverage categories (moderate drinkers)

		Consumption	Off								On							
			Beer		Wine		Spirit		RTD		Beer		Wine		Spirit		RTD	
Price			Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Off	Beer	Low	**-0.5834**	0.0138	0.0102	0.0377	0.0028	0.0069	0.0000	0.0011	0.0086	0.0321	-0.0006	0.0042	0.0138	0.0039	0.0011	0.0035
		High	0.0044	**-0.6040**	0.0082	0.0377	0.0038	0.0052	0.0007	0.0001	0.0083	0.0305	0.0010	0.0030	0.0098	0.0071	0.0015	0.0049
	Wine	Low	0.0092	0.0258	**-0.5883**	0.0117	0.0011	0.0088	0.0007	0.0041	0.0162	0.0393	-0.0002	0.0005	0.0119	0.0038	0.0013	0.0034
		High	0.0065	0.0269	0.0046	**-0.6431**	0.0028	0.0086	0.0002	0.0013	0.0166	0.0512	-0.0001	0.0020	0.0122	0.0072	0.0016	0.0030
	Spirit	Low	0.0009	0.0192	0.0014	0.0219	**-0.6160**	0.0018	0.0001	0.0008	0.0070	0.0269	0.0011	0.0035	0.0012	-0.0005	0.0010	0.0000
		High	0.0029	0.0094	0.0043	0.0185	0.0013	**-0.6545**	-0.0003	0.0007	0.0117	0.0321	0.0007	0.0023	0.0005	-0.0005	0.0005	0.0006
	RTD	Low	0.0139	-0.0181	0.0167	0.0222	0.0003	0.0062	**-0.4318**	-0.0001	0.0016	-0.0016	-0.0030	-0.0003	-0.0428	0.0051	0.0005	-0.0001
		High	0.0019	-0.0042	0.0115	0.0030	0.0000	0.0092	0.0000	**-0.4245**	-0.0001	0.0125	0.0000	0.0012	0.0079	0.0039	0.0002	0.0005
On	Beer	Low	0.0088	0.0305	0.0111	0.0473	0.0039	0.0092	0.0004	0.0029	**-0.6665**	0.0726	-0.0037	0.0075	0.0211	0.0021	-0.0003	0.0060
		High	0.0089	0.0327	0.0118	0.0476	0.0047	0.0071	0.0011	0.0011	0.0194	**-0.6561**	-0.0008	-0.0018	0.0276	0.0018	0.0009	0.0041
	Wine	Low	0.0038	0.0006	0.0000	0.0043	0.0014	0.0079	-0.0003	-0.0013	0.0003	0.0044	**-0.3930**	0.0009	0.0392	-0.0012	0.0051	-0.0007
		High	0.0044	0.0125	0.0015	0.0118	0.0016	0.0062	-0.0006	0.0018	0.0108	-0.0107	0.0005	**-0.3884**	-0.0256	-0.0106	0.0010	0.0050
	Spirit	Low	0.0040	0.0127	0.0064	0.0261	0.0002	-0.0014	0.0002	0.0010	-0.0068	-0.0254	0.0019	-0.0024	**-2.2207**	0.0102	-0.0088	-0.0001
		High	0.0042	0.0020	0.0047	0.0145	-0.0004	-0.0024	-0.0017	-0.0018	-0.0016	-0.0199	-0.0005	0.0008	0.0177	**-0.2368**	-0.0006	-0.0023
	RTD	Low	0.0040	0.0062	-0.0008	0.0012	-0.0032	0.0013	0.0003	0.0001	0.0010	0.0416	0.0050	-0.0009	-0.2048	0.0016	**-0.4428**	0.0094
		High	0.0009	0.0003	0.0055	0.0127	0.0007	0.0003	0.0004	0.0000	0.0082	0.0042	0.0005	0.0110	0.0121	-0.0059	0.0035	**-0.4414**

Table 2.13: Price elasticity estimates for 16 beverage categories (hazardous and harmful drinkers)

2.6.3 Revisions to Sheffield model v1 price-to-consumption model

Several modifications have been made to the original model used in the DH analysis, with the aim of further improving the accuracy of the price distributions used in the model and the estimates of sub-group responsiveness to price changes:

- **Calibration of on-trade prices using market research data.** In the original model, the off-trade cumulative price distribution estimated via the EFS exhibited differences from a 2008 price distribution obtained from Nielsen. This is unsurprising particularly because the EFS data is recorded over the period 2001 to 2005 and must be deflated using price indices (ONS codes DOBI, DOBJ, DOBL and DOBM). The EFS is also subject to the uncertainty introduced by a self-reported sample, whilst the Nielsen data is based on EPOS systems. Therefore the EFS data was interpolated to match the known points of the distribution available from Nielsen. However, no equivalent data was available for on-trade prices and therefore the associated distributions were based on unadjusted EFS data. The new data from CGA Strategy provides the first opportunity to adjust on-trade prices using market research data and so the EFS data has been interpolated accordingly in Sheffield model v2. Adjusted and unadjusted price distributions are shown in Figure 2.22. Note in particular the large differences seen for spirit: these arise primarily because the EFS data includes the soft drink element of 'spirit with mixer' beverages (eg. vodka and tonic) in the price per unit but these alcoholic and non-alcoholic components are conventionally regarded as separate purchases in the on-trade (and therefore are not included in the price per unit in the CGA data).

- **Use of calibrated prices in the econometrics.** The original econometric analysis used unadjusted prices from the EFS. Elasticities for Sheffield model v2 are based on prices calibrated using Nielsen and CGA data.

- **Revised price thresholds for higher and lower prices.** The original 30p and 80p thresholds for the off-trade and on-trade respectively were chosen such that approximately 25% of the price distribution for each beverage was defined as lower-priced. Identical thresholds were chosen for the four beverage types to enhance the tractability of the analysis. However incorporation of the CGA data suggests that the original on-trade threshold is no longer appropriate. Also, a threshold for beer is unlikely to be appropriate for the other beverage types. Therefore, the basis for the definition of the threshold has been changed to the price corresponding to 25% of the cumulative price distribution for each individual beverage. The resulting revised thresholds are shown in Table 2.14.

Beverage	Off-trade (£ per unit)	On-trade (£ per unit)
Beer	0.2543	0.9165
Wine	0.3497	1.1438
Spirit	0.2839	1.5756
RTD	0.5926	1.5447

Table 2.14: Price thresholds for beer, wine, spirit and RTD in the off-trade and on-trade

- **Increased robustness of price distributions.** Despite the EFS for England including 146,363 individual transactions for alcohol over the period 2001 to 2005, within particular beverages for particular sub-groups the number of samples that comprise a price distribution can be quite small. In the revised model, price distributions are supplemented with data from adjacent sub-groups where necessary to ensure that each distribution is described by at least 5 data points. The occasions where this is necessary are (1) under 18 year old harmful male and female drinkers, where prices are also included from under 18 hazardous drinkers; (2) 75 and older moderate male drinkers, where RTD prices are also included from 65-74 year old moderate male drinkers. Note that, for the majority sub-groups, each price distribution is described by several dozen sample prices.

Note that the EFS records beverage quantity in terms of millilitres of product. To generate the price distributions for the model, independent estimates of alcohol strength for each EFS beverage code have been used to convert millilitres of product to units of alcohol. However the survey does in fact contain its own estimates for the alcohol content of beverages, but this has for the most part not been updated since 2001 (since when, as described by Goddard (2007), beverage strengths have changed). DEFRA are currently undertaking a large scale review of their nutrient conversion factors and new estimates for alcohol strength will be considered for inclusion in further versions of the model, should these become available.

2.6.4 Sensitivity analyses

The revised analysis of pricing policies includes a suite of sensitivity analyses that attempt to account for the uncertainty in the representation of both current alcohol purchasing and consumption in England and how changes to price might influence consumer behaviour. The analyses focus on the econometric elements of the overall model since the price elasticity of demand is the key active ingredient for estimating pricing policy impacts.

Sensitivity analyses included:

- **Cross-price weighting** – attempts to account for differences between sub-groups in terms of responsiveness to price changes
- **Probabilistic sensitivity analysis** – considers the impact of uncertainty in the parameter estimates from the econometric model, from which elasticities are derived
- **Aggregation error** – relaxes the assumption that the purchaser of alcohol is also the consumer
- **Differential responsiveness of heavy drinkers** – considers the implications of a what-if? scenario in which hazardous and harmful drinkers are comprehensively less responsive to price changes than moderate drinkers
- **Long-run elasticity estimates for England** – uses alternative elasticity estimates for England, based on long-run price changes calculated from population-level statistics rather than short-run changes based on individual-level data.

2.6.4.1 Cross-price weighting

The model operates on 54 sub-groups defined by gender, age and baseline consumption level; however since the econometric calculations require a large number of observations to achieve convergence, elasticity matrices are only available for moderate drinkers and the combination of hazardous and harmful drinkers. Since the beverage preferences from both the GHS and EFS indicate that differences exist between the genders and between age groups, it may not be entirely appropriate to apply the aggregated elasticity matrices when estimating the responses of individual sub-groups. To account for these differences, in Sheffield model v2, cross-price elasticities are weighted for each sub-group according to how the sub-group beverage preferences compare to the mean preferences for the aggregation of sub-groups used to estimate each elasticity matrix. An example is shown for 35-44 year old moderate males and females in Table 2.15.

	Low-price off-trade beer	**High-price off-trade beer**	**Low-price off-trade wine**	**High-price off-trade wine**	**...**
Moderate mean preferences	1.2%	7.9%	8.1%	26.8%	…
35-44 year old moderate male preferences	2.0%	13.7%	4.1%	21.5%	…
35-44 year old moderate female preferences	1.5%	8.0%	9.6%	42.4%	…

35-44 year old moderate male cross-price weights	1.7	1.7	0.5	0.8	…
35-44 year old moderate female cross-price weights	1.3	1.0	1.2	1.6	…

Table 2.15: Example of cross-price weighting for 35-44 year old moderate males and females

2.6.4.2 Probabilistic sensitivity analysis

The impact of alcohol pricing policies on society is quite extensive (even within individual sectors, such as healthcare where 47 separate conditions are related to consumption) and as a result the model contains a large number of model parameters which must be estimated. All of these parameters are subject to uncertainty as to their true value. In this analysis, probability distributions are fitted to the core econometric modelling parameters that drive the impact of policies. Fitting probability distributions to all model parameters is not feasible within the scope of the current study, and is arguably not a priority since alcohol policy modelling is also subject to considerable structural uncertainty (ie. the errors that are introduced when real-world processes are represented in a mathematical model).

The three-stage least-squares regression of the system of equations used to estimate price elasticities produces a series of variance-covariance matrices. In these circumstance, assuming conditions of multivariate normality, Cholesky decomposition can be used to sample alternative parameter estimates (from which own-price an cross-price elasticities can directly be derived). The model is then re-run with the new parameter estimates to generate fresh outcomes. The process is repeated a large number of times (100 here, but ideally more) to produce a distribution of outcomes. From this, the likelihood of exceeding a particular threshold for an outcome can be estimated.

Due to time constraints, the model runs have been restricted to just consider the impact on consumption (rather than going on to consider the subsequent impact on harms) for two policy options: a 40p minimum price and a 10% general price increase. Estimates of the 95% confidence interval around consumption reductions have been obtained.

2.6.4.3 Aggregation error

Estimates of alcohol purchasing and alcohol consumption for the English population necessarily come from separate surveys, and are combined in the model to estimate mean and peak consumption levels and preferences for price point and purchase location for each sub-group. However differences between survey designs, the assumption that purchasing over the two week period of the EFS diary is equivalent to mean consumption by the purchaser may, when combined with the relatively fine-grain sub-group decomposition used, introduce multiple matching errors between purchasing and consumption at sub-group level.

A detailed comparison of the EFS relative purchasing volumes of beer, wine, spirit and RTD against GHS relative consumption of these beverages suggests discrepancies between purchasing and consumption, particularly apparent for females over the age of 35. One possible reason for this is females purchasing off-trade alcohol, perhaps as part of a trip to purchase groceries for the household, which is subsequently consumed by other members of the household. To address this issue, a sensitivity analysis is performed in which alcohol transactions in the EFS are reallocated according to a stochastic heuristic:

For women whose beer or spirit consumption exceeds 30% in the EFS data, 70% of their off-trade beer transactions and 40% of their off-trade spirit transactions are randomly reallocated to men. For older women (age 25 or older) whose beer or spirit consumption exceeds 30%, 4% of their off-trade wine transactions are reallocated to younger women.

The reallocation affects 9,269 shopping records out of a total of 146,363 records. After the reallocation, there is an improved match between the EFS and GHS consumption data, both at the aggregate and beverage breakdown level. To illustrate the impact of the heuristic, the GHS beverage breakdown for females is compared to the original EFS and adjusted EFS in Figure 2.24, Figure 2.25 and Figure 2.26 respectively.

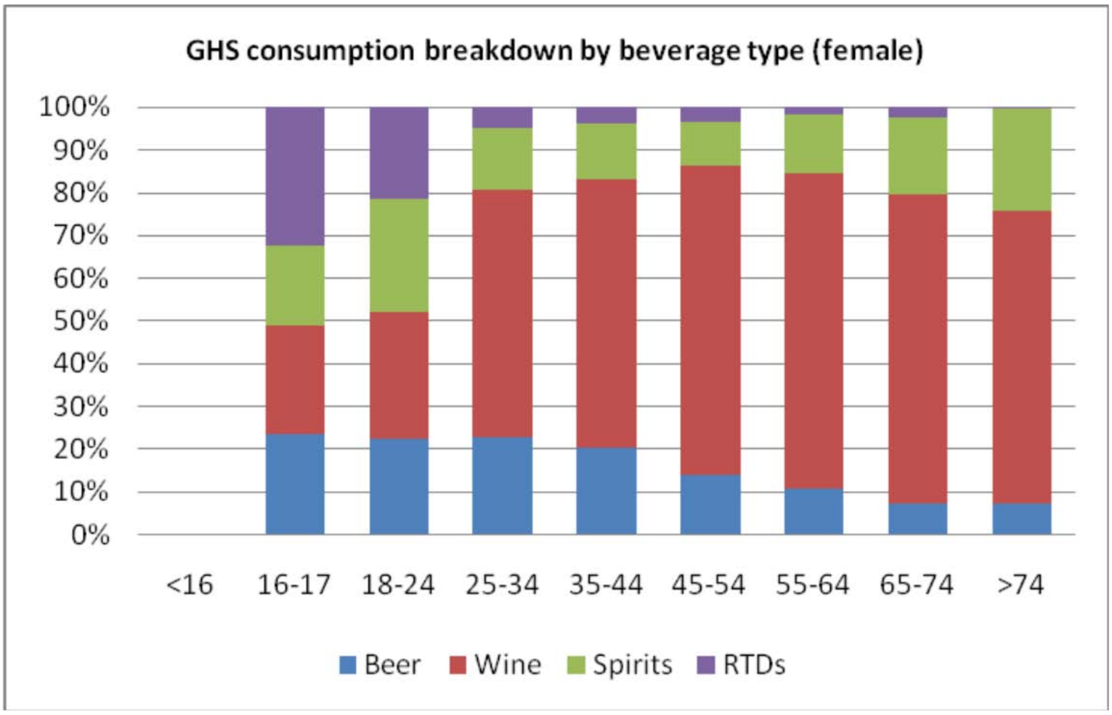

Figure 2.24: GHS breakdown of beverage type by age group for females

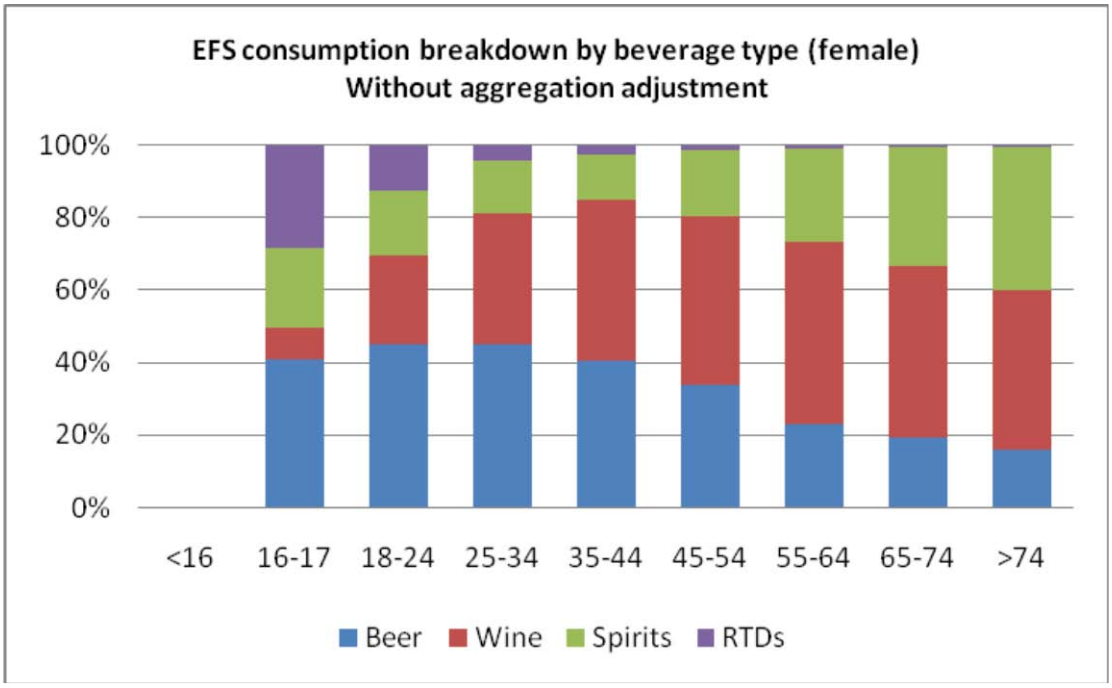

Figure 2.25: EFS breakdown of beverage type by age group for females – before adjustment

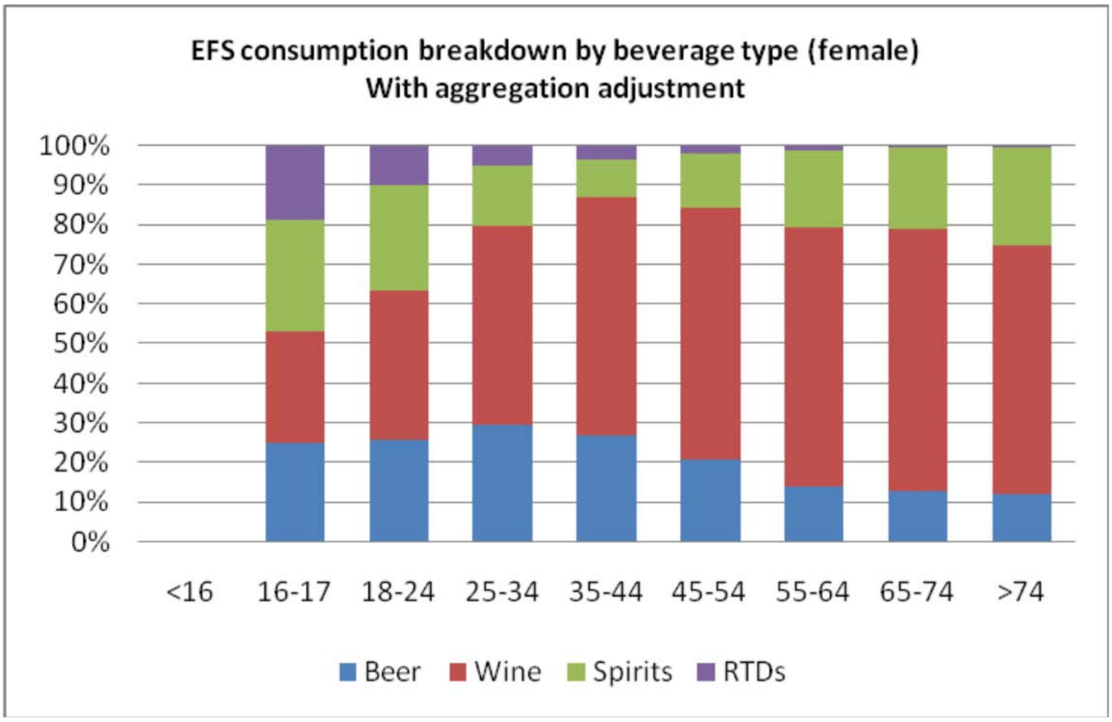

Figure 2.26: EFS breakdown of beverage type by age group for females – after adjustment

2.6.4.4 Differential responsiveness of heavy drinkers

The differential impact of pricing policies on the consumption of moderate versus heavier (hazardous or harmful) drinkers estimated by the Sheffield model has come under external scrutiny. In an analysis of the model methodology and results, funded by the brewer SAB

Miller, the Centre for Economics and Business Research (CEBR, 2009), suggested that the implied overall elasticities for a 10% across-the-board price increase (0.35, 0.47 and 0.45 for moderate, hazardous and harmful drinker respectively – based on results from the original study) were inconsistent with other findings from the literature. This is because the results suggest that moderate drinkers are less responsive to price than heavier drinkers.

Caution is required when comparing elasticities in the literature, since the demand metric can vary between studies. This is particularly the case for the meta-analysis of elasticities for heavy drinkers conducted by Wagenaar *et al* (2008), where several of the elasticities in the individual studies related to the frequency or magnitude of heavy episodic drinking (or binging). Comparing these findings against elasticities based on mean levels of consumption may lead to invalid conclusions since the bases of demand are different. However studies do exist which suggest that price responsiveness may reduce with increasing levels of mean consumption. Manning *et al* (1995) identified a non-linear relationship between consumption and price elasticity, with moderate (but not light) drinkers exhibiting the greatest elasticity. However the data used to generate the estimates relates to a survey of the US population in 1983 and its relevance to England in 2009 is open to question.

Most of the estimates available in the literature consider a limited decomposition of beverage types. These may arguably be unable to represent the heterogeneity in consumer response (for example, the most popular beverage in a country is often found to be the least price elastic) and certainly offer limited support to the requirement to understand substitution between beverage types, beverage quality, and the on-trade and off-trade. The 256-element elasticity matrix used in the model was specifically designed to facilitate such an analysis. A what-if? sensitivity analysis is considered here in which the combined hazardous and harmful drinker matrix is attenuated across all elements by comparison to the moderate drinker matrix. The Chisholm et al (2004) assumption that heavy drinkers are one third less responsive than moderate drinkers is used. The revised hazardous-harmful matrix is shown in the Appendix.

2.6.4.5 Long-run elasticity estimates for England

Various different econometric methods can be used to estimate elasticities (for an interesting meta-regression, refer to Gallet (2007)). Depending on the data and the method, estimates may relate to immediate variations in prices or longer-term changes over several years. Such estimates are referred to as ‘short-run’ and ‘long-run’ respectively. It is widely considered that long-run estimates of price elasticities tend to suggest a greater degree of elasticity than short-run estimates, as recently demonstrated in the meta-analyses of price elasticities by Wagenaar *et al* (2008). Short-run elasticities for England were calculated for the original model; however Huang (2003) managed to produce long-run estimates for the UK. Note that Huang used high-level time-series data and, as such, was unable to estimate differential elasticities for different population demographics. RTDs were also excluded from the analysis. Huang's estimates are shown in Table 2.16. As expected for a long-run method, both the own-price and cross-price elasticities are greater than those derived via EFS. However the cross-price terms appear quite exceptionally large, with strong substitution behaviour identified from off-trade beer to on-trade beer and other beverage types.

Consumption / **Price**	On-trade beer	Off-trade beer	Spirit	Wine
On-trade beer	-0.48	0.06	-0.95	-0.71
Off-trade beer	0.43	-1.03	0.46	0.56
Spirit	-0.15	-0.29	-1.31	-0.33
Wine	-0.32	-0.07	0.30	-0.75

Table 2.16: Huang's (2003) own-price and cross-price elasticities, based on long-run static equations

For inclusion in the Sheffield model, the Huang estimates must be translated into a 16x16 format. This has been achieved by a process of (1) replicating own-price elasticities for missing categories of beverage (eg. -1.03 for both lower-priced off-trade beer and higher-priced off-trade beer); (2) assuming that RTD own-price responses are similar to spirit (eg. -1.31 for lower-priced on-trade RTD); and (3) that cross-price effects are apportioned according to value sales (preferred over volume sales since Huang's demand metric is based on recorded sales value). The resulting 16x16 matrix is shown in the Appendix. Given that the reported estimates are based on total population behaviour, no decomposition into moderate and hazardous-harmful drinker matrices is attempted.

2.7 Intervention model 3: Availability and advertising restrictions

The modelling of availability covers, in broad terms, possible changes in the permitted density of outlets retailing alcohol and the hours during which alcohol may be sold. Advertising modelling covers: (i) the possible effects of proposals to include public health messages in one sixth of all alcohol advertising; (ii) eliminating exposure of under 18s to television based advertising; (iii) a total ban on all alcohol advertising.

Several difficulties arise in modelling these complex issues. Due to an absence of routine national data on outlet densities, opening hours and volume of marketing effort, it is not possible to establish a robust baseline for England for any of these factors, or their relationship to current patterns of consumption in England. Furthermore, policies relating to outlet licensing are conventionally implemented at a local level, with the national legislation merely acting as an enabler for local action, in tandem with other availability interventions such as server training. In these circumstances, the population-level modelling approach embodied by the Sheffield alcohol policy model version 2 has its limitations. In future, other techniques such as agent-based modelling could be useful.

There is significant debate in the alcohol research community on whether advertising effects can be adequately estimated using the currently published methodologies and available data. The main criticisms of existing approaches are: (i) oversimplification of consumer decision-making processes and disregard of the mechanisms through which advertising influences consumers, especially in the longer term, and (ii) in markets where alcohol advertising is saturated it may be difficult to detect the effects of marginal changes to advertising levels.

Given these issues, the modelling of availability and advertising undertaken here is exploratory in nature, rather than providing the final definitive estimates of effectiveness and cost-effectiveness of policies. The modelling makes use of international evidence on the links between these factors and alcohol consumption (set out in the Systematic Reviews) to model the impact on English consumption levels and to provide an indication of the likely benefits in terms of reduced alcohol-related harm. A range of evidence from different sources is used in sensitivity analyses to provide an indication of the likely minimum and maximum effects that might be expected from the interventions.

2.7.1 Model structure

The model structure for these exploratory analyses is very straightforward:

1. A relative change in the factor of interest (ie. outlet density, licensing hours or advertising spending) is assumed based on evidence or as an indicative assumption

2. An appropriate elasticity estimate for the factor of interest is selected from available evidence linking percentage change in the factor to percentage change in mean alcohol consumption

3. The relative change in consumption is applied to all GHS and SDD individual samples to produce revised absolute consumption levels

These revised consumption levels are assumed to be maintained over the next ten year period, and the consumption-to-harm model is used to estimate the harm reductions for subgroups and the total England population.

2.7.2 Model parameters

The sources of evidence for the modelling of each factor have been taken from the systematic reviews and are presented below.

2.7.2.1 Outlet density elasticities

Five key studies have been identified for outlet density analyses.

<table>
<tr><th>Source</th><th>Derived elasticity estimate (effect size)</th><th>Comments</th></tr>
<tr><td>Blake & Nied (1997)[32]

Based on UK data for the period 1952 to 1991.</td><td>Based on three-stage budgeting model:
<table>
<tr><td>Beverage</td><td>Off-trade</td><td>On-trade</td></tr>
<tr><td>Beer</td><td>-1.381</td><td>-1.610</td></tr>
<tr><td>Wine</td><td>-2.077</td><td>2.168</td></tr>
<tr><td>Spirit</td><td>0</td><td>0</td></tr>
<tr><td>RTD</td><td>0</td><td>0</td></tr>
</table>
Based on one-stage budgeting model:
<table>
<tr><td>Beverage</td><td>Off-trade</td><td>On-trade</td></tr>
<tr><td>Beer</td><td>0.810</td><td>0.379</td></tr>
<tr><td>Wine</td><td>0</td><td>0</td></tr>
<tr><td>Spirit</td><td>0</td><td>0</td></tr>
<tr><td>RTD</td><td>0</td><td>0</td></tr>
</table></td><td>Blake & Nied’s model 1 (three-stage budgeting) provides the best match for model selection tests based on Sargan's likelihood criterion. However the necessary conditions for multi-stage budgeting are not met (and therefore the one-stage model 3 may be more appropriate). Both models are considered in this analysis.

The authors present separate estimates for beer and cider. These have been combined for use in the Sheffield model by weighting the relative effect sizes according to off-trade and on-trade Nielsen sales data for the year to May 2008.</td></tr>
<tr><td>Gruenewald *et al* (1993)[33]

Based on US data for the period 1975 to 1984.</td><td><table>
<tr><td>Beverage</td><td>Off-trade</td><td>On-trade</td></tr>
<tr><td>Beer</td><td>0.345</td><td>0.345</td></tr>
<tr><td>Wine</td><td>0.378</td><td>0.378</td></tr>
<tr><td>Spirit</td><td>0.411</td><td>0.411</td></tr>
<tr><td>RTD</td><td>0.411</td><td>0.411</td></tr>
</table></td><td>Gruenewald *et al* consider different model structures in their analysis. The wine elasticity used here is taken from the preferred random effects model (REM); the spirit elasticity is taken from the preferred least squares dummy variables (LSDV) model. Beer is not considered in the study, but is assumed in the Sheffield model to be the least elastic beverage (since it is the most popular in the UK). An elasticity estimate has been calculated assuming that wine represents a mid-point elasticity between beer and spirit. RTD</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>behaviour is assumed to be similar to spirit.

Outlet density is measured in terms of active licenses for the sale of alcohol (assumed here to include both off-trade and on-trade outlets).</td>
</tr>
<tr>
<td>Hoadley et al (1984)[34]

Based on US data for the period 1955 to 1980.</td>
<td>
<table>
<tr><th>Beverage</th><th>Off-trade</th><th>On-trade</th></tr>
<tr><td>Beer</td><td>0.027</td><td>0.027</td></tr>
<tr><td>Wine</td><td>0.027</td><td>0.027</td></tr>
<tr><td>Spirit</td><td>0.027</td><td>0.027</td></tr>
<tr><td>RTD</td><td>0.027</td><td>0.027</td></tr>
</table>
</td>
<td>Hoadley et al's analysis is restricted to spirit only: the result for the authors' model 4 (pooled model with dummy variables for regional and time differences) is used here, since it is reported to offer the best statistical fit and is considered to be the least vulnerable to violations of key methodological assumptions. The spirit elasticity is assumed to apply to other beverage types here.

Outlet density measured in terms of number of licenses per 1000 population (assumed here to include both off-trade and on-trade outlets).</td>
</tr>
<tr>
<td>Schonlau et al (2008)[35]

Based on US data (LA County and Louisiana only) for the period 2004 to 2005.</td>
<td>
<table>
<tr><th>Beverage</th><th>Off-trade</th><th>On-trade</th></tr>
<tr><td>Beer</td><td>0.1</td><td>0.1</td></tr>
<tr><td>Wine</td><td>0.1</td><td>0.1</td></tr>
<tr><td>Spirit</td><td>0.1</td><td>0.1</td></tr>
<tr><td>RTD</td><td>0.1</td><td>0.1</td></tr>
</table>
</td>
<td>Schonlau et al found that a 10% increase in the number of off-trade outlets was associated with a 1% increase in alcohol consumption ($p<0.001$ for a 1 mile radius from home, Louisiana only).

Given the low quality of the evidence, the simple assumption is made that the elasticity is applicable to an increase in all outlets.</td>
</tr>
<tr>
<td>Xie et al (2000)[36]

Based on Canadian data for the period 1968 to 1986.</td>
<td>
<table>
<tr><th>Beverage</th><th>Off-trade</th><th>On-trade</th></tr>
<tr><td>Beer</td><td>0.19</td><td>0.19</td></tr>
<tr><td>Wine</td><td>0.19</td><td>0.19</td></tr>
<tr><td>Spirit</td><td>0.19</td><td>0.19</td></tr>
<tr><td>RTD</td><td>0.19</td><td>0.19</td></tr>
</table>
</td>
<td>An elasticity for alcohol of 0.19 was found via application of an LSDV model.

Outlet density measured in terms of outlets per 1000 population (assumed here to include both off-trade and on-trade).</td>
</tr>
</table>

2.7.2.2 Licensing hours elasticities

Three key studies have been selected to provide evidence on licensing hours elasticities.

<table>
<tr><th>Source</th><th>Derived elasticity estimate (effect size)</th><th>Comments</th></tr>
<tr>
<td>Carpenter & Eisenberg (2009)[37]

Based on Canadian data for the period 1994 to 1999.</td>
<td>
<table>
<tr><td>Beverage</td><td>Off-trade</td><td>On-trade</td></tr>
<tr><td>Beer</td><td>0.119</td><td>0.119</td></tr>
<tr><td>Wine</td><td>0.119</td><td>0.119</td></tr>
<tr><td>Spirit</td><td>0.119</td><td>0.119</td></tr>
<tr><td>RTD</td><td>0.19</td><td>0.19</td></tr>
</table>
</td>
<td>Carpenter & Eisenberg considered both a cross-sectional analysis of Candian provinces and a quasi-experimental analysis based on Ontario (which permitted Sunday opening of state liquor stores in 1997).

The study identified mean increases in consumption of 0.102 and 0.028 standard drinks respectively (from a baseline of 3.06 standard drinks per week). Extraction of current opening hours (29 June 2009) for all 604 Ontario stores shows that, overall, an additional 7.7% of hours arise through Sunday opening. The implied elasticity is therefore 0.119.

Note that neither consumption increase was statistically significant at conventional levels (standard errors were 0.146 and 0.60 respectively) – therefore the smaller effect size is used here.

The study also considered a day-by-day analysis of consumption changes, finding a decrease in Saturday consumption with $p<0.1$, possibly indicating that liberalisation can reduce binging behaviour.</td>
</tr>
<tr>
<td>Hoadley et al (1984)[34]

Based on US data for the period 1955 to 1980.</td>
<td>
<table>
<tr><td>Beverage</td><td>Off-trade</td><td>On-trade</td></tr>
<tr><td>Beer</td><td>0</td><td>-0.065</td></tr>
<tr><td>Wine</td><td>0</td><td>-0.065</td></tr>
<tr><td>Spirit</td><td>0</td><td>-0.065</td></tr>
<tr><td>RTD</td><td>0</td><td>-0.065</td></tr>
</table>
</td>
<td>Hoadley et al’s analysis is restricted to spirit only: the result for the authors’ model 4 (pooled model with dummy variables for regional and time differences) is used here, since it is reported to offer the best statistical fit and is considered to be the least vulnerable to violations of key methodological assumptions. The spirit elasticity is assumed to apply to other on-trade beverage types here.

Licensing hours measured by (a) the weekday closing time for on-premise sale of spirits; (b) Sunday on-premise opening. Only weekday closing</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td>approached statistical significance; no effect was found for Sunday opening.

Off-trade elasticities are considered zero here since the potential on-trade rationale (customers rushing drinks orders at closing time) cannot readily be applied to the off-trade.</td></tr>
<tr><td>Norstrom & Skog (2003)[38]</td><td><table>
<tr><th>Beverage</th><th>Off-trade</th><th>On-trade</th></tr>
<tr><td>Beer</td><td>0.5712</td><td>0.5712</td></tr>
<tr><td>Wine</td><td>0.168</td><td>0.168</td></tr>
<tr><td>Spirit</td><td>0.252</td><td>0.252</td></tr>
<tr><td>RTD</td><td>0.252</td><td>0.252</td></tr>
</table></td><td>The study was designed to evaluate liberalising Saturday opening, and featured experimental regions (with a range of characteristics) and control regions with buffers. A consistent decrease in sales in buffer regions was observed across beverages, but this was not statistically significant.

Note that the impact on on-trade sales does not seem to be accounted for, so observed consumption effects may be over-estimated.

According to Holder et al (2009), licensing hours increased from 42 to 47 per week. This figure is used to convert the observed consumption effects to elasticities. It is assumed that a reduction in off-trade licensing hours would lead to similar effects. Impact on RTD is assumed similar to spirit.

The authors also evaluated the total relaxation of Saturday opening hours in Sweden in 2005, finding a similar overall increase in off-trade sales.

When opening on Saturdays ceased in the 1970s, no decrease in sales was observed (although this may be due to a lack of power in the tests used).</td></tr>
</table>

2.7.2.3 Advertising elasticities

Four key studies have been selected to provide evidence on advertising elasticities.

Source	**Elasticity estimate (effect size)**	**Comments**
Gallet (2007)[27] Price, income and advertising elasticities of demand meta-analysis (includes 132 studies from the international literature from 1962 to 2003).	Baseline: 0.029 Sensitivities (see Table 2 in Gallet): Lower = 0.007 (for wine) Higher = 0.13 (linear functional form)	The baseline elasticity is the median of 322 separate observations. The sensitivity analyses are chosen around higher and lower estimates from Gallet. Duffy (2003) reports elasticities specifically for the UK, which depending on the model used, vary between 0.018 and 0.025. The results are very similar to Gallet and therefore a separate analysis is not undertaken.
Nelson & Young (2001)	+0.049	Nelson & Young argue that advertising bans have little benefit, and can cause harm, because in the absence of advertising suppliers instead compete for market share on the basis of price (and consumption will increase as prices fall).
Saffer & Dave (2002)[39] Based on US data for the period 1996 to 1998. Effects relate to youth (age 13 to 17) drinking.	Effects relate to youth (age 13 to 17) drinking. Baseline: 0.065 Sensitivities: 0.0341 and 0.2161	Saffer & Dave used a longitudinal sample of approximately 10,000 youths and four econometric methods to estimate advertising and price elasticities based on a consumer demand model. The study focused on participation (the decision to drink) rather than consumption level. This is not an ideal fit to the conceptual framework of the Sheffield model. 'Past month binge participation' is chosen for the baseline analysis since this is closer to a volume-based metric than 'past month alcohol participation'. The most conservative of the four model estimates is chosen. As a sensitivity analysis the largest estimate (based on an individual fixed effects model controlling for individual heterogeneity) is also applied in the model. Note that this value (0.2161) represents the largest advertising elasticity identified in the econometric literature.
Saffer & Dave (2006)[40]	Based on number of partial bans (by media channel and beverage	Study attempted to control for endogeneity between

Based on data from 20 countries (including the UK) for the period 1970 to 1995.	type): -0.0486 Based on number of total bans (by media channel): -0.0898 Media channel = television, radio, print; beverage type = beer/wine combined, spirit.	consumption and bans.

Scenarios examined

The first set of scenarios examined considers a 10% reduction in outlet density, for which six separate evidence sources are used for sensitivity analysis (OUT1 to OUT 6).

The second set of scenarios examined considers a 10% reduction in licensing hours, for which three different evidence sources are used (HRS1 to HRS3).

The third set of scenarios examined considers three different kinds of policy on advertising. The first considers a policy of requiring one sixth of all alcohol advertising to contain positive public health messages. Little evidence exists on the effect of counter-advertising on consumption outcomes. Therefore it is assumed in the model that counter-advertising has no direct impact on consumption but that the impact of such a policy is assumed to relate to a one sixth reduction in pro-alcohol advertising exposure. The second considers a policy to eliminate exposure of under 18 year olds to television advertising of alcohol. Finally, the third considers a policy to completely ban advertising.

3 RESULTS

3.1 Results for screening and brief intervention

Results for all SBI scenarios are shown in Table 3.1, covering a variety of settings, staffing options, SBI configurations and BI effectiveness assumptions. All scenarios assume a 10 year screening programme. Costs are shown net of savings to healthcare services from reduced prevalence of alcohol-related conditions due to reduced consumption. Savings arising from crime and workplace sectors are excluded from the calculation. QALY gains relate to health conditions only. The incremental cost-effectiveness ratio (ICER) compares the intervention to a ‘do nothing’ scenario of no intervention in any setting. The net benefit calculation assumes a NICE threshold of £20,000 per QALY. The cost and QALY figures are based on a 30 year time horizon (sufficient to measure the outcomes of a 10 year programme) with a discount rate of 3.5% for both. Results for males only and females only are shown in Table 3.2 and Table 3.3 respectively. Note that using SBI simultaneously in multiple settings is not considered here.

Three baseline scenarios are considered for next GP registration:

- (SBI1) screening using the full AUDIT, followed by a 25 minute intervention
- (SBI2) screening using AUDIT-C, followed by a 5 minute intervention (this is similar to the DES configuration)
- (SBI3) screening using FAST, followed by a 5 minute intervention.

Three baseline scenarios are also considered for next GP appointment:

- (SBI4) screening using the full AUDIT, followed by a 25 minute intervention
- (SBI5) screening using AUDIT-C, followed by a 5 minute intervention (this is similar to the DES configuration)
- (SBI6) screening using FAST, followed by a 5 minute intervention.

A single baseline scenario is considered for the A&E setting:

- (SBI14) a pre-screen similar to that used in the PAT, screening with FAST, followed by a 50 minute intervention (inclusive of staff administrative time).

3.1.1 Baseline scenarios

3.1.1.1 Next GP registration

The baseline scenarios in a registration setting (SBI1-3) assume that a Practice Nurse undertakes both the screening and, where appropriate, brief intervention. In all three cases (using the Cochrane mean estimate of effectiveness), the estimated costs of delivering SBI are outweighed by the financial savings due to the subsequent reduced burden of illness. QALY gains also accrue and therefore the baseline interventions are estimated to dominate ‘doing nothing’. Screening on next registration is estimated to be applied to 39% of the population of England over the 10 year period assumed, with one third of England’s hazardous and harmful drinkers being screened, detected and given a brief intervention.

3.1.1.2 Next GP consultation

The baseline scenarios in a consultation setting (SBI4-6) assume that a General Practitioner undertakes both the screening and, where indicated, brief intervention. If a 25 minute intervention time is assumed then the estimated costs of implementation outweigh the healthcare costs avoided and there is a net cost overall, producing an ICER of £6,700 per QALY gained, which would still be considered cost-effective under the NICE technology assessment framework. If a 5 minute interventions is assumed, then intervention costs are assumed correspondingly lower and cost-effectiveness ratios improve.

The outcome is different to the next GP registration setting for three main reasons. First, the GP staff costs are higher than those of a Practice Nurse, Second, males, who incur the majority of alcohol-related health harm tend to consult less frequently than females (eg. approximately 10% of 25-44 year old males would not have consulted within the ten year screening programme compared to 1% of females). Third, and most important of all, patients consult their GP much more frequently than they change their GP, and thus the percentage of the population screened is estimated at 96% over the 10 years (cf. 39% for next GP registration) with between 70% and 79% of hazardous and harmful drinkers receiving a brief intervention within the ten years (cf. 33% to 36% for next GP registration). The result is an estimated gain of over 100,000 QALYs over a ten year screening programme (cf. around 30,000 QALYs for a programme based on next GP registration).

Scenario	Setting[1]	Screening tool and M/F threshold	Screening staff[2]	BI tool (duration; effect; rebound)	BI staff[2]	Net NHS/PSS cost (£m)	QALY gain ('000s)	ICER v do nothing[3]	Netben £m[4]	Screened[5]	Coverage[6]	Sensitivity[7]	Specificity[7]	PPV[7]	NPV[7]
SBI1	GP reg	AUDIT 8	P nurse	25m;12%;7y	P nurse	-45.5	30.9	Dom	664	39%	36%	88%	85%	68%	95%
SBI2	GP reg	AUDIT-C 3	P nurse	5m; 12%; 7y	P nurse	-112.2	30.8	Dom	728	39%	36%	88%	86%	68%	95%
SBI3	GP reg	FAST 3	P nurse	5m; 12%; 7y	P nurse	-112.8	29.1	Dom	695	39%	33%	81%	88%	71%	93%
SBI4	GP con	AUDIT 8	GP	25m; 12%; 7y	GP	742.1	110.5	£6,716	1,468	96%	79%	84%	88%	70%	95%
SBI5	GP con	AUDIT-C 3	GP	5m; 12%; 7y	GP	4.2	110.8	£38	2,212	96%	79%	84%	88%	69%	95%
SBI6	GP con	FAST 3	GP	5m; 12%; 7y	GP	-121.5	102.7	Dom	2,176	96%	71%	76%	91%	74%	92%
SBI7	GP reg	AUDIT-C 3	P nurse	5m; 6%; 7y	P nurse	-7.3	15.4	Dom	315	39%	36%	88%	86%	68%	95%
SBI8	GP reg	FAST 3	P nurse	5m; 6%; 7y	P nurse	-16	14.6	Dom	308	39%	33%	81%	88%	71%	93%
SBI9	GP con	AUDIT 8	GP	25m; 12%; 3y	GP	1135.3	49.2	£23,075	-151	96%	79%	84%	88%	70%	95%
SBI10	GP reg	AUDIT-C 3	P nurse	5m; 6%; 3y	P nurse	50.7	7	£7,243	89	39%	36%	88%	86%	68%	95%
SBI11	GP con	AUDIT-C 3	GP	5m; 6%; 3y	GP	553.3	24.8	£22,310	-57	96%	79%	84%	88%	69%	95%
SBI12	GP reg	AUDIT 8/6	P nurse	25m; 12%; 7y	P nurse	-38	32.5	Dom	688	39%	39%	95%	78%	60%	98%
SBI13	GP reg	AUDIT-C 4/3	P nurse	5m; 12%; 7y	P nurse	-112.7	30.7	Dom	727	39%	36%	87%	85%	67%	95%
SBI14	A&E	FAST 3	S nurse	50m; 19%; 2y	ANS	134.3	12.9	£10,411	124	78%	18%	78%	87%	72%	91%
SBI15	A&E	FAST 3	S nurse	25m; 12%; 7yr	ANS	-32.7	26.8	Dom	569	78%	18%	78%	87%	72%	91%

Table 3.1: Screening and brief intervention results: overall population

Notes: (1) reg = registration, con = consultation; (2) P/S = practice/staff nurse, ANS = alcohol nurse specialist; (3) Dom = dominates; (4) λ=£20,000; (5) % of total population screened; (6) % of hazardous and harmful drinkers given BI; (7) Ability of screening strategy to detect hazardous and harmful drinkers.

Scenario	Setting[1]	Screening tool and M/F threshold	Screening staff[2]	BI tool (duration; effect; rebound)	BI staff[2]	Net NHS/PSS cost (£m)	QALY gain ('000s)	ICER v do nothing[3]	Netben £m[4]	Screened[5]	Coverage[6]	Sensitivity[7]	Specificity[7]	PPV[7]	NPV[7]
SBI1	GP reg	AUDIT 8	P nurse	25m;12%;7y	P nurse	-54.5	22.7	Dom	509	39%	39%	95%	77%	64%	97%
SBI2	GP reg	AUDIT-C 3	P nurse	5m; 12%; 7y	P nurse	-98	22.7	Dom	552	39%	39%	93%	79%	66%	96%
SBI3	GP reg	FAST 3	P nurse	5m; 12%; 7y	P nurse	-95.2	21.6	Dom	527	39%	36%	87%	82%	68%	94%
SBI4	GP con	AUDIT 8	GP	25m; 12%; 7y	GP	319.6	82.1	£3,893	1,322	93%	86%	93%	82%	68%	97%
SBI5	GP con	AUDIT-C 3	GP	5m; 12%; 7y	GP	-133.1	82.4	Dom	1,781	93%	86%	93%	82%	67%	97%
SBI6	GP con	FAST 3	GP	5m; 12%; 7y	GP	-179.6	77.4	Dom	1,728	93%	79%	85%	86%	71%	93%
SBI7	GP reg	AUDIT-C 3	P nurse	5m; 6%; 7y	P nurse	-19.7	11.3	Dom	246	39%	39%	93%	79%	66%	96%
SBI8	GP reg	FAST 3	P nurse	5m; 6%; 7y	P nurse	-22.4	10.8	Dom	238	39%	36%	87%	82%	68%	94%
SBI9	GP con	AUDIT 8	GP	25m; 12%; 3y	GP	616.1	36.5	£16,879	114	93%	86%	93%	82%	68%	97%
SBI10	GP reg	AUDIT-C 3	P nurse	5m; 6%; 3y	P nurse	23.8	5.2	£4,577	80	39%	39%	93%	79%	66%	96%
SBI11	GP con	AUDIT-C 3	GP	5m; 6%; 3y	GP	279.8	18.4	£15,207	88	93%	86%	93%	82%	67%	97%
SBI12	GP reg	AUDIT 8	P nurse	25m; 12%; 7y	P nurse	-54.5	22.7	Dom	509	39%	39%	95%	77%	64%	97%
SBI13	GP reg	AUDIT-C 4	P nurse	5m; 12%; 7y	P nurse	-98.5	22.6	Dom	551	39%	38%	93%	78%	64%	96%
SBI14	A&E	FAST 3	S nurse	50m; 19%; 2y	ANS	73.6	10.4	£7,077	134	78%	21%	87%	80%	70%	92%
SBI15	A&E	FAST 3	S nurse	25m; 12%; 7yr	ANS	-54.4	21.8	Dom	490	78%	21%	87%	80%	70%	92%

Table 3.2: Screening and brief intervention results: males

Notes: (1) reg = registration, con = consultation; (2) P/S = practice/staff nurse, ANS = alcohol nurse specialist; (3) Dom = dominates; (4) λ=£20,000; (5) % of total population screened; (6) % of hazardous and harmful drinkers given BI; (7) Ability of screening strategy to detect hazardous and harmful drinkers.

Scenario	Setting[1]	Screening tool and M/F threshold	Screening staff[2]	BI tool (duration; effect; rebound)	BI staff[2]	Net NHS/PSS cost (£m)	QALY gain ('000s)	ICER v do nothing[3]	Netben £m[4]	Screened[5]	Coverage[6]	Sensitivity[7]	Specificity[7]	PPV[7]	NPV[7]
SBI1	GP reg	AUDIT 8	P nurse	25m;12%;7y	P nurse	9	8.1	£1,111	153	39%	33%	80%	92%	73%	94%
SBI2	GP reg	AUDIT-C 3	P nurse	5m; 12%; 7y	P nurse	-14.2	8.1	Dom	176	39%	34%	81%	91%	72%	94%
SBI3	GP reg	FAST 3	P nurse	5m; 12%; 7y	P nurse	-17.5	7.6	Dom	170	39%	31%	73%	94%	76%	93%
SBI4	GP con	AUDIT 8	GP	25m; 12%; 7y	GP	422.4	28.4	£14,873	146	98%	73%	74%	93%	73%	93%
SBI5	GP con	AUDIT-C 3	GP	5m; 12%; 7y	GP	137.3	28.4	£4,835	431	98%	72%	74%	93%	73%	93%
SBI6	GP con	FAST 3	GP	5m; 12%; 7y	GP	58.2	25.3	£2,300	448	98%	65%	66%	96%	79%	92%
SBI7	GP reg	AUDIT-C 3	P nurse	5m; 6%; 7y	P nurse	12.5	4.1	£3,049	70	39%	34%	81%	91%	72%	94%
SBI8	GP reg	FAST 3	P nurse	5m; 6%; 7y	P nurse	6.4	3.8	£1,684	70	39%	31%	73%	94%	76%	93%
SBI9	GP con	AUDIT 8	GP	25m; 12%; 3y	GP	519.2	12.7	£40,882	-265	98%	73%	74%	93%	73%	93%
SBI10	GP reg	AUDIT-C 3	P nurse	5m; 6%; 3y	P nurse	26.9	1.8	£14,944	9	39%	34%	81%	91%	72%	94%
SBI11	GP con	AUDIT-C 3	GP	5m; 6%; 3y	GP	273.5	6.4	£42,734	-146	98%	72%	74%	93%	73%	93%
SBI12	GP reg	AUDIT 6	P nurse	25m; 12%; 7y	P nurse	16.5	9.7	£1,701	178	39%	40%	95%	79%	56%	98%
SBI13	GP reg	AUDIT-C 3	P nurse	5m; 12%; 7y	P nurse	-14.2	8.1	Dom	176	39%	34%	81%	91%	72%	94%
SBI14	A&E	FAST 3	S nurse	50m; 19%; 2y	ANS	60.7	2.5	£24,280	-11	78%	15%	68%	93%	75%	90%
SBI15	A&E	FAST 3	S nurse	25m; 12%; 7yr	ANS	21.7	5	£4,340	78	78%	15%	68%	93%	75%	90%

Table 3.3: Screening and brief intervention results: females

Notes: (1) reg = registration, con = consultation; (2) P/S = practice/staff nurse, ANS = alcohol nurse specialist; (3) Dom = dominates; (4) λ=£20,000; (5) % of total population screened; (6) % of hazardous and harmful drinkers given BI; (7) Ability of screening strategy to detect hazardous and harmful drinkers.

3.1.1.3 A&E consultation

The estimated ICER for the baseline scenario (SBI14) is approximately £10,400 per QALY, which is also within the standard NICE guidelines. Despite a ten year programme in A&E departments involving the screening of over three quarters of the adult population (post pre-screen), only 18% of hazardous and harmful drinkers are estimated to receive the BI. This is principally due to the assumed low take-up rate of 30% in individuals screened positive. Note that, whilst a greater proportion of hazardous and harmful drinkers are assumed to attend A&E every year than moderate drinkers, over a ten year programme of first attendances these differences tend to be attenuated. If booster scenarios were modelled, or the programme duration were reduced, then the differential attendance rates may provide an improved ICER.

The baseline ICER for females is estimated to lie within the NICE range of £20,000 to £30,000 per QALY. The reduced cost-effectiveness compared to males is likely due to the reduced sensitivity of FAST (with threshold 3) and the lower prevalence of hazardous and harmful drinking.

3.1.2 Sensitivity analysis scenarios

Given that the above scenarios all indicate that SBI is likely to be cost-effective for the baseline assumption set, a number of sensitivity analyses have been conducted focusing on a more pessimistic set of assumptions. This provides an indication of, for example, how far effectiveness would have to be reduced or resource costs increased for SBI to no longer appear an attractive (ie. cost-effective) option. Note that PSA analysis is outside the scope of the current study.

3.1.2.1 Reduced effectiveness of the brief intervention (SB7-11)

As mentioned in Section 2.5.2.5, the evidence for an association between intervention duration and effectiveness is equivocal. Therefore, two scenarios have been considered – SBI7 and SBI8 – in which the effectiveness of the 5 minute interventions described under the DES is reduced to 5.9% based on evidence from the Cochrane meta-regression.[23] The results in Table 3.1 indicate that the SBI programmes might still be cost saving and therefore still dominate the ‘do nothing’ option.

The evidence for the duration of effectiveness is also subject to considerable uncertainty. Therefore further scenarios have been considered in which consumption levels are assumed to rebound to baseline in 3 years (as opposed to the 7 year baseline assumption). The comparatively expensive option (SBI9) of full AUDIT screening and a 25 minute intervention – both conducted by a GP – is estimated at £23,100 per QALY, which is above a possible threshold of £20,000 per QALY. For females, the ICER now lies well above the NICE threshold range at £40,900 per QALY. It should be recalled though that the perspective used excludes any harm reductions from crime and workplace sectors.

Two further scenarios have been considered that simultaneously consider reduced effectiveness and reduced long-term duration of effectiveness based around AUDIT-C screening and a 5 minute intervention. SBI10 assumes delivery of SBI by a Practice Nurse in a registration setting and produces an estimate of £7,200 per QALY. SBI11 assumes that delivery is by a GP in a next consultation setting, which gives an estimate of £22,300 per QALY.

3.1.2.2 Alternative screening thresholds (SBI12-13)

Expert opinion has suggested that, for simplicity, the same screening threshold is likely to be used in practice for males and females (with choice of threshold purely dependent on instrument). However there is some evidence in the literature to suggest that differential thresholds may offer the most appropriate diagnostic properties (Jackson *et al.*, 2009).

Two scenarios have been considered: in SBI12 the AUDIT threshold for females is reduced from 8 to 6; in SBI13 the AUDIT-C threshold for males is increased from 3 to 4. It is important to note that these results are based on regression models fitted to evidence from the 2000 Psychiatric Morbidity Survey rather than diagnostic properties reported in the literature. The AUDIT threshold for women appears to offer some control over the trade-off between sensitivity and specificity: for the overall population sensitivity is 95% and specificity is 78% (compared to 88% and 85% in the original SBI1). The result is an estimated additional 16,000 QALYs for a £7.5m increase in cost. Incrementing the AUDIT-C threshold for males by one (from 3 to 4) appears to make only a small difference to the overall diagnostic properties but does lead to an estimated £5m cost savings for a loss of only 100 QALYs and so may present an opportunity cost saving option (at the expense of greater protocol complexity).

3.1.2.3 Alternative brief intervention following A&E screening (SBI15)

The baseline A&E scenario uses evidence of BI effectiveness a single study by Crawford *et al.* (2004). Therefore the results of the Cochrane meta-analysis (shorter intervention, reduced magnitude but increased duration of effectiveness) are also applied as a sensitivity analysis in SBI15. With this alternative assumption set, A&E in SBI dominates ‘doing nothing’.

3.2 Pricing and price-based promotions

The results include both a revision to the results presented in Brennan *et al.* (2008) and completely new results from an enhanced set of sensitivity analyses.

3.2.1 Revisions to v1 (DH) baseline scenarios (text adapted from Brennan et al)

All 33 policy options – covering general price increases, minimum price policies and off-trade discounting restrictions – have been re-appraised using the new baseline assumptions. Scenarios P1-9 examine general price increases, scenarios P10-26 examine minimum price policies, and scenarios P27-33 focus on off-trade discounting. The reader is first taken through an example policy analysis (a minimum price of 40p) to illustrate the model outputs presented in the tables and their interpretation. The rest of the sub-section focuses on comparing results across all of the price-based policies.

3.2.1.1 Example policy analysis: 40p minimum price (scenario P15)

Table 3.4 shows the results for consumption changes, consumer spending and sales.

Overall weekly consumption changes -2.4%. Consumption is estimated to reduce by on average 20 units per person per year.

Consumption changes are greatest for harmful drinkers (-3.08 units per week).

Groups are impacted differentially: 11 to 18s reduce by 1.8%, 18 to 24 year old hazardous drinkers reduce by 0.7% and all-age hazardous drinkers reduce by 1.4%.

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

Table 3.5 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 approximately 160 within the first year of implementation and a full effect after 10 years of around 1,100. Deaths are differentially distributed across the groups, with negligible savings in year 1 for 11 to 18s and 18 to 24 year old hazardous drinkers, but approximately 40 for hazardous, 90 for harmful and 20 for moderate drinkers. Illness also decreases with an estimated reduction of 4,000 acute and 1,600 chronic in year 1.

Hospital admissions are estimated to reduce by 7,500 in year 1, and a full effect after 10 years of 38,900 avoided admissions per annum.

Healthcare service costs are estimated to reduce by £31m in year 1, with a QALY gain valued at £32m.

Crime is estimated to fall by 9,000 offences overall. The distribution of effect here across the groups is very different to that for health. For 11 to 18s, a reduction of 4,200, 18 to 24 year old hazardous 400, moderate 1,000, hazardous 2,400 and harmful 4,700 are estimated.

The new estimate for crime represents a substantial reduction compared to the original analysis, primarily due to efforts to increase the robustness of the price distributions for under 18 year olds used in the model.

The harm avoided in terms of victim quality of life is valued at £3m, using £20,000 per QALY (rather than £81,000 in the original analysis).

Direct costs of crime are estimated to reduce by £11m.

Workplace harms are reduced by 11,000 fewer unemployed people and 91,000 fewer sick days per year.

The societal value of these harm reductions is £3.8bn 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 (£31m), value of QALYs saved (£32m), crime costs saved (£11m), value of crime QALYs saved (£3m) and employment related harms avoided (£279m).

The societal value of harm reductions is again distributed differentially across the groups, with hazardous drinkers accounting for £0.4bn of the total value, harmful drinkers £3bn and moderate drinkers £0.3bn.

Returning to Table 3.4, the spending and sales results are as follows:

Absolute reductions in consumption are estimated to be largest in off-trade beer and off-trade spirit. There is a large absolute increase in consumption of on-trade beer.

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

- Overall: £26 per drinker per annum
- Harmful drinkers: £132 per drinker per annum
- Moderate drinkers: £7 per drinker per annum.

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

- Overall: £23 per drinker per annum
- Harmful drinkers: £139 per drinker per annum
- Moderate drinkers: £6 per drinker per annum.

An overall increased spend by consumers is estimated of £750m per annum, split roughly 60:40 between off-trade and on-trade sectors.

Overall revenue to the Treasury (from duty and VAT receipts) changes by approximately +£20m.

Males and Females			Population Subgroups				Scenario	P15
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	27.10	4.67	27.35	69.82
n people			36,781,777	4,264,561	708,913	23,796,767	6,630,929	2,299,162
Mean consumption per drinker per week			15.79	12.50	27.10	5.75	27.35	69.82
n drinkers			29,431,779	1,393,062	708,913	19,318,268	6,630,929	2,299,162
% binge (>8 males, >6 females)			17.4%	8.5%	57.6%	8.2%	40.4%	68.1%
Mean scale of binge if binge occurs (units)			13.7	14.2	14.7	12.0	13.9	16.2
Volume sales (units per drinker per year)	**Off-trade**	**Beer**	126.6	55.9	156.7	31.3	196.7	767.0
		Wine	301.4	51.2	188.1	101.7	574.4	1,324.3
		Spirit	79.8	35.2	144.9	29.6	134.3	370.2
		RTD	8.8	7.3	16.6	3.1	9.0	58.6
	On-trade	**Beer**	227.1	266.4	547.5	88.7	381.6	951.5
		Wine	35.9	42.5	50.8	24.7	60.6	60.1
		Spirit	23.6	73.5	156.3	14.7	37.9	39.5
		RTD	20.2	119.8	152.3	6.0	31.5	69.5
	Total		823.3	651.8	1,413.2	299.9	1,425.9	3,640.7
Value sales (£ per drinker per year)	**Off-trade**	**Beer**	£ 45	£ 20	£ 56	£ 13	£ 71	£ 252
		Wine	£ 143	£ 23	£ 88	£ 49	£ 272	£ 620
		Spirit	£ 31	£ 14	£ 59	£ 13	£ 51	£ 133
		RTD	£ 7	£ 7	£ 13	£ 3	£ 7	£ 45
	On-trade	**Beer**	£ 254	£ 275	£ 641	£ 104	£ 424	£ 1,041
		Wine	£ 68	£ 78	£ 90	£ 48	£ 111	£ 108
		Spirit	£ 51	£ 138	£ 315	£ 34	£ 78	£ 78
		RTD	£ 36	£ 196	£ 275	£ 11	£ 55	£ 123
	Total		£ 634	£ 751	£ 1,539	£ 276	£ 1,070	£ 2,400
Absolute change								
Mean consumption per person per week			-0.30	-0.07	-0.18	-0.06	-0.38	-3.08
Mean consumption per drinker per week			-0.38	-0.22	-0.18	-0.07	-0.38	-3.08
% change in mean consumption			-2.4%	-1.8%	-0.7%	-1.2%	-1.4%	-4.4%
Change in volume of consumption (units per drinker per year)	**Off-trade**	**Beer**	-20.48	-10.24	-22.84	-2.12	-28.60	-158.39
		Wine	-1.57	0.37	-4.02	-2.27	2.79	-9.27
		Spirit	-9.75	-5.07	-13.37	-2.17	-16.10	-57.17
		RTD	0.01	0.00	0.05	0.01	0.02	0.01
	On-trade	**Beer**	11.59	3.15	27.88	2.73	21.26	62.95
		Wine	0.10	0.08	0.28	0.00	0.34	0.32
		Spirit	0.22	0.11	1.87	0.13	0.34	0.64
		RTD	0.09	0.08	0.77	0.04	0.12	0.43
	Total		-19.79	-11.52	-9.39	-3.65	-19.84	-160.48
Change in £ value of purchases (sales) (£ per drinker per year)	**Off-trade**	**Beer**	£1.75	£0.42	£1.80	£0.79	£2.64	£7.93
		Wine	£8.91	£0.37	£6.02	£1.91	£18.65	£43.99
		Spirit	£0.97	-£0.16	£2.04	£0.51	£1.57	£3.75
		RTD	£0.03	£0.00	£0.04	£0.02	£0.02	£0.24
	On-trade	**Beer**	£13.67	£3.58	£34.62	£3.35	£25.10	£73.17
		Wine	£0.21	£0.15	£0.55	-£0.01	£0.70	£0.70
		Spirit	£0.41	£0.17	£3.17	£0.28	£0.62	£1.02
		RTD	£0.17	£0.13	£1.47	£0.07	£0.23	£0.79
	Total		£26.14	£4.67	£49.71	£6.94	£49.52	£131.60
Effect of policy on "pocket" if drinkers did not change consumption (£ per drinker per year)	**Off-trade**	**Beer**	£10.04	£4.59	£11.11	£1.66	£14.22	£71.92
		Wine	£8.03	£0.17	£6.49	£2.64	£14.14	£39.73
		Spirit	£5.01	£1.89	£7.75	£1.43	£8.26	£27.25
		RTD	£0.02	£0.00	£0.00	£0.01	£0.01	£0.17
	On-trade	**Beer**	£0.00	£0.00	£0.00	£0.00	£0.02	£0.01
		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		£23.11	£6.65	£25.35	£5.73	£36.64	£139.09
Total change in retailer received £m (after VAT+Duty)	**Off-trade**		£m 432.8	£m 3.9	£m 10.3	£m 73.1	£m 171.6	£m 185.1
	On-trade		£m 316.2	£m 4.2	£m 21.1	£m 53.4	£m 131.3	£m 128.9
	Total		£m 749.0	£m 8.0	£m 31.4	£m 126.5	£m 302.9	£m 314.0
Total Change in VAT & Duty Received	**Off-trade**		-£m 89.2	-£m 3.0	-£m 3.3	-£m 10.6	-£m 19.9	-£m 56.5
	On-trade		£m 109.5	£m 1.5	£m 7.1	£m 18.1	£m 45.4	£m 45.1
	Total		£m 20.2	-£m 1.5	£m 3.8	£m 7.5	£m 25.4	-£m 11.4
% 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		+4.1%	+0.6%	+3.2%	+2.5%	+4.6%	+5.5%
Total Change Pop'n Spend (Sales)	**Off-trade**		£m 343.6	£m 0.9	£m 7.0	£m 62.6	£m 151.7	£m 128.6
	On-trade		£m 425.7	£m 5.6	£m 28.2	£m 71.5	£m 176.7	£m 174.0
	Total		£m 769.2	£m 6.5	£m 35.2	£m 134.0	£m 328.3	£m 302.6

Table 3.4: Results table for 40p minimum price (consumption effects)

Males and Females Harm Reductions							Scenario	P15
Absolute change				Population Subgroups				
			England Total	11-18s	Hazardous 18-24	Moderate All ages	Hazardous All ages	Harmful All ages
Health Changes in Year 1	Deaths	Chronic	-102	0	0	-3	-27	-72
		Acute	-54	-1	0	-16	-17	-21
		Total	-156	-1	0	-19	-44	-92
	Sick	Chronic	-1,553	-4	-2	-196	-300	-1,056
		Acute	-3,956	-89	-42	-1,309	-1,441	-1,187
		Total	-5,509	-93	-43	-1,505	-1,741	-2,243
	Admissions	Chronic	-3,182	-7	-3	-360	-579	-2,242
		Acute	-4,299	-109	-53	-1,403	-1,557	-1,315
		Total	-7,481	-116	-56	-1,763	-2,135	-3,557
	QALYs per annum		-1,590	-38	-20	-450	-527	-605
	Value of 'saved' QALYs		-31,803,295	-756,152	-409,766	-8,995,898	-10,536,929	-12,108,280
	Cost (£)	Chronic	-8,536,894	-26,405	-14,384	-1,280,239	-1,787,977	-5,464,578
		Acute	-22,461,277	-505,726	-208,083	-7,432,703	-8,176,716	-6,739,433
		Total (£)	-30,998,171	-532,131	-222,467	-8,712,942	-9,964,694	-12,204,011
Health Changes per annum in Year 10	Deaths p.a.	Chronic	-1,091	0	0	-15	-300	-776
		Acute	-58	-1	0	-18	-20	-20
		Total	-1,149	-1	0	-33	-320	-796
	Illnesses p.a.	Chronic	-16,522	-13	-22	-1,967	-3,299	-11,255
		Acute	-4,563	-84	-39	-1,487	-1,848	-1,209
		Total	-21,084	-96	-60	-3,453	-5,147	-12,464
	Admissions p.a.	Chronic	-33,925	-23	-37	-3,599	-6,360	-23,963
		Acute	-4,931	-102	-49	-1,590	-1,979	-1,339
		Total	-38,855	-125	-86	-5,189	-8,339	-25,302
	QALYs per annum		-8,561	-40	-27	-1,655	-2,306	-4,592
	Cost (£)	Chronic	-90,404,199	-89,301	-164,645	-12,882,304	-19,629,960	-57,878,804
		Acute	-26,056,565	-473,572	-192,413	-8,478,916	-10,564,556	-6,908,244
		Total (£)	-116,460,764	-562,873	-357,058	-21,361,220	-30,194,515	-64,787,048
Cumulative Health Change over 10 yrs	Discounted QALYs		-36,188	-325	-198	-7,360	-10,183	-18,575
	Discounted Costs		-603,149,954	-4,614,420	-2,399,336	-123,694,839	-164,886,323	-313,586,668
	Valye of Discounted QALYs		-723,753,786	-6,508,511	-3,951,188	-147,193,081	-203,661,096	-371,493,713
	Total Value of Health Changes		-1,326,903,740	-11,122,931	-6,350,524	-270,887,920	-368,547,418	-685,080,381
Crime Changes per annum	Volume	Violent	-2,096	-530	-148	-341	-484	-1,168
		Damage	-2,220	-1,420	250	-247	-198	-1,510
		Theft/Oth	-4,606	-2,263	-516	-440	-1,691	-2,062
		Total	-8,923	-4,213	-414	-1,029	-2,372	-4,740
	Cost (£)	Violent	-6,597,633	-1,443,017	-578,128	-1,076,850	-1,613,778	-3,629,134
		Damage	-877,062	-560,963	98,882	-97,688	-78,044	-596,398
		Theft/Oth	-3,474,195	-1,351,420	-501,968	-377,384	-1,243,468	-1,632,438
		Total (£)	-10,948,890	-3,355,399	-981,215	-1,551,922	-2,935,289	-5,857,970
	QALYs	Violent	-116	-26	-7	-19	-24	-68
		Damage	-13	-8	1	-1	-1	-9
		Theft/Oth	-37	-20	-2	-3	-12	-18
	Total	Total	-166	-54	-8	-23	-38	-95
	Value of 'saved' QALYs		-3,321,781	-1,084,545	-152,221	-457,658	-752,858	-1,890,820
Employment Changes per annum	Volume	Absence days	-91,058	-4,026	-6,306	-19,515	-26,443	-44,306
		Unempl people	-10,952	-165	0	0	0	-10,953
	Cost (£)	Absence	-8,836,413	-127,320	-355,461	-1,901,631	-2,306,566	-4,602,916
		Unempl	-270,194,849	-700,638	0	0	12,201	-270,207,051
		Total (£)	-279,031,262	-827,958	-355,461	-1,901,631	-2,294,364	-274,809,966
Summary Financial Value Harm Reduction Year 1	Health Costs (£)		-30,998,171	-532,131	-222,467	-8,712,942	-9,964,694	-12,204,011
	Crime Costs (£)		-10,948,890	-3,355,399	-981,215	-1,551,922	-2,935,289	-5,857,970
	Employment Costs (£)		-279,031,262	-827,958	-355,461	-1,901,631	-2,294,364	-274,809,966
	Total Direct Costs (£)		-320,978,322	-4,715,488	-1,559,142	-12,166,495	-15,194,347	-292,871,948
	Health QALYs (£)		-31,803,295	-756,152	-409,766	-8,995,898	-10,536,929	-12,108,280
	Crime QALYs (£)		-3,321,781	-1,084,545	-152,221	-457,658	-752,858	-1,890,820
	Total Societal Value (£)		-356,103,398	-6,556,186	-2,121,129	-21,620,051	-26,484,134	-306,871,048
Cumul 10 year Summary Financial Value Harm Reduction	Health Costs (£)		-603,149,954	-4,614,420	-2,399,336	-123,694,839	-164,886,323	-313,586,668
	Crime Costs (£)		-91,057,594	-27,905,532	-8,160,377	-12,906,725	-24,411,641	-48,718,428
	Employment Costs (£)		-2,320,592,874	-6,885,801	-2,956,225	-15,815,113	-19,081,323	-2,285,486,028
	Total Direct Costs (£)		-3,014,800,423	-39,405,753	-13,515,937	-152,416,678	-208,379,287	-2,647,791,123
	Health QALYs (£)		-723,753,786	-6,508,511	-3,951,188	-147,193,081	-203,661,096	-371,493,713
	Crime QALYs (£)		-27,625,944	-9,019,734	-1,265,966	-3,806,159	-6,261,226	-15,725,205
	Total Societal Value (£)		-3,766,180,152	-54,933,998	-18,733,091	-303,415,918	-418,301,609	-3,035,010,041

Table 3.5: Results table for 40p minimum price (harm effects)

3.2.1.2 Consumption, spending and sales effects across all policies

Table 3.6 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 sub-groups (under 18s, 11 to 18 year old hazardous drinkers, moderate drinkers, hazardous drinkers and harmful drinkers) are shown in the tables in Section 3.2.1.6.

Changes in consumption

Greater general price increases lead to larger consumption reductions: as general prices are increased further, estimated reductions in consumption become larger (eg. 1%, 10% and 25% price rises give -0.4%, -4.4% and -10.9% estimated consumption changes respectively, as shown in the results for scenarios P1 to P3).

Targeted price changes applied only to low-priced products are less effective than across-the-board price changes: as they affect only part of the market and therefore produce smaller consumption changes than similar price changes applied more broadly (eg. 10% price rise in lower-priced products gives an estimated consumption change of -0.3% in the off-trade and -0.2% in the on-trade, as shown in scenarios P4 and P6).

Targeting low priced products causes some switching: if only low-priced off-trade products see price increases then the reductions in consumption are estimated to occur mostly in wine and spirit, with an increase in overall beer consumption; if only low-price on-trade products are affected then the decreases are found in beer and spirit, with wine showing an overall increase in consumption.

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 threshold increases in 5p increments, larger and larger reductions in consumption are estimated (eg. 25p gives -0.1% and 30p gives -0.4% – a difference of -0.3% from scenario P12 to P13, whereas 35p gives -1.1% and 40p gives -2.4% – a difference of -1.3% from scenario P14 to P15).

Higher minimum prices reduce switching effects: The substitution effects towards wine estimated for lower minimum prices (eg. a 25p minimum implies a 1.8 units per drinker per annum increase in wine consumption) are reversed as the threshold is increased and price rises in wine itself are estimated to reduce consumption).

Differential minimum pricing can lead to increased reductions in consumption: a minimum price of 40p leads to an estimated 2.4% reduction in consumption, but a minimum price of 40p off-trade and £1.00 on-trade gives an estimated consumption reduction of 2.8% (compare scenarios P15 and P22). Note that the v1 Sheffield model showed much greater effects from including a differential on-trade minimum price threshold, but the v2 model includes on-trade pricing data from CGA Strategy which suggests that the prevalence of on-trade alcohol retailing at prices substantially below £1 per unit was overestimated in the 2008 analysis of the raw EFS data. This is the largest difference, in terms of policy impact, between the v1 and v2 model results. Higher differential on-trade thresholds would produce a greater overall effect.

At lower thresholds, minimum prices targeted at particular beverages are not effective: a minimum price of 30p applied to beer or wine would have about half the effect of an overall 30p policy; minimum prices targeting spirit or RTD are estimated to have almost zero effect.

Ban of off-trade 'buy-one-get-one-free' offers has small effects: changes in consumption are estimated to be negligible if only very substantial discounts from list price are restricted. Banning discounts of greater than 50% affects only a small proportion of products.

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 (eg. restricting of discounts to a maximum of 30%, 20% and 10% from list price give estimated consumption changes of -0.3%, -0.8% and -1.5% respectively).

Tighter restrictions on off-trade discounting affect wine consumption: increasingly tight restrictions on discounting affect wine more than beer and spirit (eg. banning discounts over 10% gives an estimated consumption change of -0.8 units per drinker per annum for beer but -11.3 units for wine, as shown in scenario P31).

A total ban on discounting in the off-trade reduces consumption by 22 units per year: this would give an estimated change in consumption of -2.7%, which is slightly more than a 40p minimum price policy (compare scenarios P15 and P32).

Bans on discounts only for lower-priced alcohol are not effective in reducing consumption: a targeted ban on discounting only focused on products with a list price below 30p per unit has negligible effects because so few of those products are discounted (scenario P33).

Changes in consumer spending

Price increases are not matched by consumption reductions and spending is estimated to increase: since the magnitudes of the elasticities are less than unity, consumption decreases do not keep pace with prices increases and therefore overall spending rises. For example, with a 1% general price increase, consumption is estimated to change by -0.4% and overall spending changes by +0.6% (scenario P1).

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 (the final column in Table 3.6). For example, a 10% price increase leads to increased spending of £36 per drinker per annum if consumption is reduced an expected, but if drinkers were to maintain current consumption the increase would be £63. This is not the case for every policy because switching effects – particularly between off-trade and on-trade in the lower minimum price scenarios (eg. 30p scenarioP13) – 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 annual off-trade receipts by £150m (compared to £430m for a 40p minimum price option). Similar increases are observed in the on-trade (eg. £130m for 30p versus £320m for 40p).

Effects on tax and duty are estimated to be relatively small: since the minimum price policies affect mostly off-trade sales, the duty and tax receipts from this sector are estimated to decrease (eg. -£90m tax and duty from the off-trade for a 40p minimum price) but this can partly or, in some cases, totally compensated for by increased duty and VAT from the on-trade sector as some switching is estimated to occur (eg. +£110m tax and duty from the on-trade for a 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).

	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.
P1	General Price +1%	-0.4%	-1.4	-1.3	-0.6	-0.1	-3.4	+43.1	+68.7	-4.0	+6.0	+113.8	+0.6%	+3.87	+6.34
P2	General Price +10%	-4.2%	-14.6	-13.0	-6.0	-1.1	-34.7	+406.2	+645.5	-46.9	+51.5	+1056.2	+5.7%	+35.89	+63.38
P3	General Price +25%	-10.9%	-37.9	-34.0	-15.1	-2.8	-89.9	+906.0	+1431.4	-146.5	+92.0	+2282.8	+12.2%	+77.56	+158.44
P4	Low Priced Off Trade Products +10%	-0.3%	+0.3	-2.2	-0.9	-0.1	-2.9	+79.8	+40.8	-9.5	+14.2	+125.3	+0.7%	+4.26	+3.23
P5	Low Priced Off Trade Products +25%	-0.9%	+0.7	-5.5	-2.3	-0.2	-7.2	+182.8	+102.1	-27.0	+35.4	+293.3	+1.6%	+9.97	+8.07
P6	Low Priced On Trade Products +10%	-0.2%	-1.7	+1.3	-1.2	-0.3	-1.9	+16.2	+102.1	+13.4	-3.4	+128.3	+0.7%	+4.36	+7.30
P7	Low Priced On Trade Products +25%	-0.6%	-4.3	+3.2	-2.8	-0.7	-4.6	+40.5	+208.8	+33.6	-16.3	+266.6	+1.4%	+9.06	+18.26
P8	All Low Priced Products +10%	-0.6%	-1.4	-0.9	-2.1	-0.3	-4.7	+96.1	+143.1	+3.9	+10.7	+253.7	+1.4%	+8.62	+10.53
P9	All Low Priced Products +25%	-1.4%	-3.6	-2.3	-5.2	-0.8	-11.9	+223.8	+311.6	+6.4	+18.9	+560.6	+3.0%	+19.05	+26.33
P10	Minimum Price 15p (Off and On Trade)	+0.0%	+0.0	+0.2	-0.2	+0.0	+0.0	+10.5	+11.0	-0.2	+3.8	+25.0	+0.1%	+0.85	+0.31
P11	Minimum Price 20p " "	-0.0%	-0.5	+0.7	-0.4	+0.0	-0.2	+31.8	+29.1	-0.6	+10.0	+70.3	+0.4%	+2.39	+0.98
P12	Minimum Price 25p	-0.1%	-1.9	+1.8	-0.8	+0.0	-0.8	+73.4	+63.7	-2.2	+22.0	+156.9	+0.8%	+5.33	+2.44
P13	Minimum Price 30p	-0.4%	-3.8	+3.1	-2.3	+0.0	-3.0	+152.4	+126.5	-11.5	+43.7	+311.2	+1.7%	+10.57	+5.85
P14	Minimum Price 35p	-1.1%	-6.0	+2.1	-5.3	+0.1	-9.2	+277.1	+212.7	-39.4	+73.5	+523.9	+2.8%	+17.80	+12.62
P15	Minimum Price 40p	-2.4%	-8.9	-1.5	-9.5	+0.1	-19.8	+432.8	+316.2	-89.2	+109.5	+769.2	+4.1%	+26.14	+23.11
P16	Minimum Price 45p	-4.3%	-12.9	-7.9	-14.5	+0.1	-35.2	+609.5	+430.4	-162.1	+149.0	+1026.8	+5.5%	+34.89	+37.64
P17	Minimum Price 50p	-6.7%	-17.5	-17.4	-20.0	+0.1	-54.8	+784.3	+553.1	-258.3	+191.4	+1270.5	+6.8%	+43.17	+55.57
P18	Minimum Price 60p	-11.9%	-22.7	-44.0	-31.5	+0.1	-98.1	+1090.1	+816.8	-486.4	+282.1	+1702.6	+9.1%	+57.85	+98.61
P19	Minimum Price 70p " "	-17.5%	-26.2	-76.3	-41.9	-0.0	-144.4	+1198.6	+1096.7	-764.7	+377.0	+1907.6	+10.2%	+64.81	+146.09
P20	Minimum Price 20p Off and 60p On Trade	-0.0%	-0.6	+0.7	-0.4	+0.0	-0.2	+32.0	+32.1	-0.4	+10.2	+74.0	+0.4%	+2.52	+1.13
P21	Minimum Price 30p Off and 80p On Trade	-0.4%	-4.6	+3.4	-2.3	+0.1	-3.5	+155.8	+161.0	-8.7	+45.8	+354.0	+1.9%	+12.03	+7.61
P22	Minimum Price 40p Off and 100p On Trade	-2.8%	-14.7	+0.6	-9.4	+0.1	-23.4	+457.6	+516.5	-69.8	+114.9	+1019.2	+5.5%	+34.63	+35.92
P23	30p Minimum Price Beers Only	-0.2%	-6.3	+4.4	+0.3	+0.0	-1.6	+92.0	+76.5	-0.4	+26.4	+194.5	+1.0%	+6.61	+3.51
P24	30p Minimum Price Wines Only	-0.2%	+1.0	-2.4	+0.1	+0.0	-1.3	+25.7	+20.8	-6.3	+7.2	+47.5	+0.3%	+1.61	+1.27
P25	30p Minimum Price Spirits Only	-0.0%	+1.5	+1.1	-2.7	+0.0	-0.0	+34.4	+29.3	-4.7	+10.1	+69.0	+0.4%	+2.34	+1.07
P26	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	+0.1	+0.0%	+0.00	+0.00
P27	Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.0	-0.0	-0.0	-0.0	+0.7	+0.3	-0.1	+0.1	+1.0	+0.0%	+0.03	+0.03
P28	Ban Off Trade Discounting if > 40%	-0.1%	-0.0	-1.0	+0.0	+0.0	-1.0	+15.4	+3.2	-2.9	+1.1	+16.9	+0.1%	+0.57	+0.92
P29	Ban Off Trade Discounting if > 30%	-0.3%	-0.1	-2.5	+0.0	-0.0	-2.6	+40.4	+8.7	-7.4	+3.0	+44.7	+0.2%	+1.52	+2.40
P30	Ban Off Trade Discounting if > 20%	-0.8%	-0.3	-5.8	-0.1	-0.0	-6.2	+95.9	+20.4	-18.2	+7.1	+105.3	+0.6%	+3.58	+5.85
P31	Ban Off Trade Discounting if > 10%	-1.5%	-0.8	-11.3	-0.5	-0.0	-12.6	+191.5	+41.9	-38.5	+14.5	+209.4	+1.1%	+7.11	+12.00
P32	Total Ban Off Trade Discounting	-2.7%	-2.1	-18.5	-1.7	-0.1	-22.4	+333.4	+78.4	-70.9	+27.2	+368.1	+2.0%	+12.51	+21.48
P33	Ban Off Trade Discount if Reg Price <30p	-0.0%	-0.5	+0.2	-0.0	+0.0	-0.2	+11.5	+7.4	-0.2	+2.5	+21.3	+0.1%	+0.72	+0.38

Table 3.6: Summary of estimated effects of price policies on consumption, spending and sales – England population

	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)
P1	General Price +1%	-34	-0.2	-2.2	-2.7	-0.7	-157	-2.0	-2.7	-7.0	-10.0	-2.2	-3.8	-2.6	-8.6	-0.2	-44.1	-1.2
P2	General Price +10%	-233	-1.8	-7.1	-11.7	-2.8	-1455	-20.2	-7.7	-49.6	-53.1	-15.1	-27.6	-21.5	-64.2	-1.2	-294.3	-11.8
P3	General Price +25%	-570	-4.5	-15.6	-26.8	-6.4	-3623	-50.5	-16.5	-120.5	-126.0	-37.8	-68.9	-53.8	-160.5	-3.0	-732.0	-29.6
P4	Low Priced Off Trade Products +10%	-37	-0.3	-1.9	-2.6	-0.7	-211	-2.7	-2.5	-8.0	-10.1	-0.7	-0.9	-0.9	-2.5	-0.1	-24.5	-1.3
P5	Low Priced Off Trade Products +25%	-75	-0.7	-2.5	-4.1	-0.9	-508	-6.6	-3.1	-16.8	-18.0	-0.7	-0.4	-1.5	-2.5	-0.0	-36.1	-3.2
P6	Low Priced On Trade Products +10%	-20	-0.1	-1.9	-2.3	-0.6	-61	-0.9	-2.4	-4.4	-7.4	-3.1	-6.6	-7.2	-16.9	-0.3	-41.9	-0.3
P7	Low Priced On Trade Products +25%	-34	-0.2	-2.4	-3.2	-0.9	-135	-2.3	-2.9	-7.8	-11.1	-6.7	-14.4	-17.2	-38.3	-0.6	-78.7	-0.7
P8	All Low Priced Products +10%	-47	-0.4	-2.4	-3.4	-0.9	-262	-3.6	-2.9	-10.5	-13.0	-3.1	-6.3	-7.6	-17.0	-0.3	-49.8	-1.6
P9	All Low Priced Products +25%	-101	-0.9	-3.6	-5.8	-1.4	-639	-9.0	-4.2	-22.8	-24.8	-6.7	-13.8	-18.2	-38.6	-0.6	-99.3	-4.0
P10	Minimum Price 15p (Off and On Trade)	-7	-0.0	-0.3	-0.4	-0.1	-8	-0.1	-0.2	-0.4	-1.1	-0.5	-0.8	-0.5	-1.8	-0.0	-15.1	-0.0
P11	Minimum Price 20p " "	-8	-0.0	-1.1	-1.2	-0.3	-21	-0.4	-1.5	-2.4	-3.8	-0.3	-0.3	-0.5	-1.1	-0.0	-13.4	-0.3
P12	Minimum Price 25p	-10	-0.1	-1.1	-1.3	-0.3	-55	-1.1	-1.4	-3.9	-4.6	-0.1	+0.2	-0.6	-0.5	-0.0	-12.6	-1.2
P13	Minimum Price 30p	-24	-0.3	-1.4	-2.1	-0.5	-177	-3.1	-1.9	-8.6	-8.4	-0.0	+0.4	-1.1	-0.8	-0.0	-17.9	-2.9
P14	Minimum Price 35p	-74	-0.8	-2.4	-4.2	-0.9	-543	-8.2	-3.0	-20.3	-19.1	-0.7	-0.4	-2.4	-3.5	-0.1	-42.7	-6.2
P15	Minimum Price 40p	-156	-1.6	-4.0	-7.5	-1.6	-1149	-16.5	-4.6	-38.9	-36.2	-2.1	-2.2	-4.6	-8.9	-0.2	-91.1	-11.0
P16	Minimum Price 45p	-267	-2.6	-6.2	-12.1	-2.6	-1963	-27.6	-6.9	-64.0	-59.9	-4.5	-5.7	-7.9	-18.0	-0.4	-167.2	-17.3
P17	Minimum Price 50p	-402	-3.8	-9.0	-17.6	-3.7	-2941	-41.0	-9.9	-94.2	-88.6	-7.7	-10.3	-12.1	-30.1	-0.6	-268.0	-24.7
P18	Minimum Price 60p	-691	-6.4	-15.4	-29.8	-6.4	-4958	-68.8	-16.7	-157.2	-150.4	-14.8	-20.3	-21.5	-56.6	-1.1	-499.4	-37.5
P19	Minimum Price 70p " "	-984	-9.0	-22.0	-42.3	-9.2	-6967	-97.4	-23.7	-221.1	-213.5	-22.1	-30.0	-31.0	-83.2	-1.7	-749.0	-48.2
P20	Minimum Price 20p Off and 60p On Trade	-8	-0.0	-1.1	-1.2	-0.3	-22	-0.4	-1.5	-2.4	-3.8	-0.4	-0.4	-0.5	-1.3	-0.0	-14.0	-0.4
P21	Minimum Price 30p Off and 80p On Trade	-26	-0.3	-1.5	-2.2	-0.5	-186	-3.3	-1.9	-9.0	-8.9	-0.7	-1.2	-2.7	-4.6	-0.1	-23.5	-3.2
P22	Minimum Price 40p Off and 100p On Trade	-183	-1.8	-4.7	-8.9	-1.9	-1313	-19.0	-5.4	-45.0	-42.3	-5.3	-9.6	-11.6	-26.5	-0.4	-124.8	-12.1
P23	30p Minimum Price Beers Only	-7	-0.1	-0.1	-0.4	-0.1	-57	-1.5	+0.1	-3.2	-1.8	-0.5	-0.9	-0.7	-2.1	-0.0	-18.2	-2.8
P24	30p Minimum Price Wines Only	-25	-0.1	-1.9	-2.2	-0.6	-108	-1.2	-2.4	-5.0	-7.9	-0.4	-0.2	-0.5	-1.1	-0.0	-20.4	-0.1
P25	30p Minimum Price Spirits Only	-11	-0.1	-1.4	-1.6	-0.4	-34	-0.4	-1.9	-2.8	-4.9	-0.6	-1.0	-1.0	-2.6	-0.0	-12.6	-0.1
P26	30p Minimum Price Alcopops (RTDs) Only	-11	+0.0	-1.6	-1.7	-0.5	-11	+0.0	-2.1	-2.2	-5.1	-0.7	-1.2	-0.5	-2.5	-0.1	-16.9	+0.0
P27	Ban Off Trade Discounting if > 50%	-12	-0.0	-1.6	-1.7	-0.5	-14	-0.0	-2.1	-2.3	-5.3	-0.7	-1.2	-0.5	-2.5	-0.1	-17.1	-0.0
P28	Ban Off Trade Discounting if > 40%	-19	-0.1	-1.8	-2.1	-0.6	-65	-0.7	-2.3	-3.8	-6.8	-0.9	-1.4	-0.7	-2.9	-0.1	-22.1	-0.3
P29	Ban Off Trade Discounting if > 30%	-30	-0.2	-2.0	-2.5	-0.7	-145	-1.8	-2.6	-6.3	-9.2	-1.1	-1.6	-1.0	-3.7	-0.1	-30.5	-0.9
P30	Ban Off Trade Discounting if > 20%	-57	-0.4	-2.6	-3.6	-0.9	-329	-4.2	-3.2	-11.9	-14.8	-1.6	-2.3	-1.7	-5.6	-0.1	-50.6	-2.1
P31	Ban Off Trade Discounting if > 10%	-102	-0.8	-3.6	-5.5	-1.3	-648	-8.6	-4.2	-21.8	-24.4	-2.7	-3.8	-3.0	-9.4	-0.2	-87.1	-4.3
P32	Total Ban Off Trade Discounting	-169	-1.4	-5.0	-8.3	-2.0	-1122	-15.0	-5.7	-36.6	-38.7	-4.4	-6.2	-5.1	-15.7	-0.3	-143.8	-7.7
P33	Ban Off Trade Discount if Reg Price <30p	-9	-0.0	-1.2	-1.3	-0.4	-19	-0.2	-1.7	-2.2	-4.1	-0.7	-1.2	-0.6	-2.5	-0.1	-17.5	-0.3

Table 3.7: Summary of estimated effects of policies on health, crime and employment alcohol related harms – England population

	SUMMARY - CHANGE IN 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. 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)
	Baseline alcohol attributable harm (estimated by modelling zero consumption)	+3361	+28	+149	+226	+60	+10472	+330	+153	+805	+878	+484	+864	+585	+1932	+37	+8977	+102
P1	General Price +1%	-1.0%	-0.7%	-1.5%	-1.2%	-1.3%	-1.5%	-0.6%	-1.8%	-0.9%	-1.1%	-0.4%	-0.4%	-0.4%	-0.4%	-0.5%	-0.5%	-1.2%
P2	General Price +10%	-6.9%	-6.5%	-4.8%	-5.2%	-4.7%	-13.9%	-6.1%	-5.1%	-6.2%	-6.0%	-3.1%	-3.2%	-3.7%	-3.3%	-3.2%	-3.3%	-11.6%
P3	General Price +25%	-17.0%	-16.0%	-10.5%	-11.9%	-10.6%	-34.6%	-15.3%	-10.8%	-15.0%	-14.3%	-7.8%	-8.0%	-9.2%	-8.3%	-8.0%	-8.2%	-29.1%
P4	Low Priced Off Trade Products +10%	-1.1%	-0.9%	-1.3%	-1.2%	-1.1%	-2.0%	-0.8%	-1.6%	-1.0%	-1.2%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.3%	-1.3%
P5	Low Priced Off Trade Products +25%	-2.2%	-2.3%	-1.7%	-1.8%	-1.6%	-4.9%	-2.0%	-2.0%	-2.1%	-2.0%	-0.1%	-0.0%	-0.2%	-0.1%	-0.1%	-0.4%	-3.2%
P6	Low Priced On Trade Products +10%	-0.6%	-0.3%	-1.3%	-1.0%	-1.1%	-0.6%	-0.3%	-1.5%	-0.6%	-0.8%	-0.6%	-0.8%	-1.2%	-0.9%	-0.7%	-0.5%	-0.3%
P7	Low Priced On Trade Products +25%	-1.0%	-0.8%	-1.6%	-1.4%	-1.5%	-1.3%	-0.7%	-1.9%	-1.0%	-1.3%	-1.4%	-1.7%	-2.9%	-2.0%	-1.5%	-0.9%	-0.7%
P8	All Low Priced Products +10%	-1.4%	-1.3%	-1.6%	-1.5%	-1.4%	-2.5%	-1.1%	-1.9%	-1.3%	-1.5%	-0.6%	-0.7%	-1.3%	-0.9%	-0.7%	-0.6%	-1.6%
P9	All Low Priced Products +25%	-3.0%	-3.2%	-2.4%	-2.6%	-2.3%	-6.1%	-2.7%	-2.7%	-2.8%	-2.8%	-1.4%	-1.6%	-3.1%	-2.0%	-1.5%	-1.1%	-4.0%
P10	Minimum Price 15p (Off and On Trade)	-0.2%	-0.0%	-0.2%	-0.2%	-0.2%	-0.1%	-0.0%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.0%
P11	Minimum Price 20p " "	-0.2%	-0.1%	-0.7%	-0.5%	-0.6%	-0.2%	-0.1%	-1.0%	-0.3%	-0.4%	-0.1%	-0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.3%
P12	Minimum Price 25p	-0.3%	-0.3%	-0.7%	-0.6%	-0.6%	-0.5%	-0.3%	-0.9%	-0.5%	-0.5%	-0.0%	+0.0%	-0.1%	-0.0%	-0.0%	-0.1%	-1.2%
P13	Minimum Price 30p	-0.7%	-1.0%	-1.0%	-0.9%	-0.8%	-1.7%	-1.0%	-1.2%	-1.1%	-1.0%	-0.0%	+0.0%	-0.2%	-0.0%	-0.0%	-0.2%	-2.9%
P14	Minimum Price 35p	-2.2%	-2.7%	-1.6%	-1.9%	-1.6%	-5.2%	-2.5%	-1.9%	-2.5%	-2.2%	-0.1%	-0.0%	-0.4%	-0.2%	-0.2%	-0.5%	-6.1%
P15	Minimum Price 40p	-4.6%	-5.5%	-2.7%	-3.3%	-2.7%	-11.0%	-5.0%	-3.0%	-4.8%	-4.1%	-0.4%	-0.3%	-0.8%	-0.5%	-0.4%	-1.0%	-10.8%
P16	Minimum Price 45p	-8.0%	-9.1%	-4.2%	-5.3%	-4.3%	-18.7%	-8.4%	-4.5%	-8.0%	-6.8%	-0.9%	-0.7%	-1.3%	-0.9%	-1.0%	-1.9%	-17.0%
P17	Minimum Price 50p	-12.0%	-13.5%	-6.0%	-7.8%	-6.3%	-28.1%	-12.4%	-6.5%	-11.7%	-10.1%	-1.6%	-1.2%	-2.1%	-1.6%	-1.6%	-3.0%	-24.3%
P18	Minimum Price 60p	-20.6%	-22.5%	-10.3%	-13.2%	-10.8%	-47.3%	-20.9%	-10.9%	-19.5%	-17.1%	-3.1%	-2.4%	-3.7%	-2.9%	-3.1%	-5.6%	-36.9%
P19	Minimum Price 70p " "	-29.3%	-31.7%	-14.8%	-18.7%	-15.5%	-66.5%	-29.5%	-15.5%	-27.5%	-24.3%	-4.6%	-3.5%	-5.3%	-4.3%	-4.6%	-8.3%	-47.5%
P20	Minimum Price 20p Off and 60p On Trade	-0.2%	-0.1%	-0.7%	-0.5%	-0.6%	-0.2%	-0.1%	-1.0%	-0.3%	-0.4%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.4%
P21	Minimum Price 30p Off and 80p On Trade	-0.8%	-1.1%	-1.0%	-1.0%	-0.9%	-1.8%	-1.0%	-1.3%	-1.1%	-1.0%	-0.1%	-0.1%	-0.5%	-0.2%	-0.2%	-0.3%	-3.1%
P22	Minimum Price 40p Off and 100p On Trade	-5.4%	-6.3%	-3.2%	-3.9%	-3.2%	-12.5%	-5.8%	-3.5%	-5.6%	-4.8%	-1.1%	-1.1%	-2.0%	-1.4%	-1.2%	-1.4%	-12.0%
P23	30p Minimum Price Beers Only	-0.2%	-0.4%	-0.1%	-0.2%	-0.1%	-0.5%	-0.5%	+0.1%	-0.4%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-2.7%
P24	30p Minimum Price Wines Only	-0.7%	-0.4%	-1.3%	-1.0%	-1.0%	-1.0%	-0.4%	-1.6%	-0.6%	-0.9%	-0.1%	-0.0%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%
P25	30p Minimum Price Spirits Only	-0.3%	-0.2%	-0.9%	-0.7%	-0.7%	-0.3%	-0.1%	-1.2%	-0.4%	-0.6%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%
P26	30p Minimum Price Alcopops (RTDs) Only	-0.3%	+0.0%	-1.1%	-0.8%	-0.8%	-0.1%	+0.0%	-1.4%	-0.3%	-0.6%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	+0.0%
P27	Ban Off Trade Discounting if > 50%	-0.4%	-0.0%	-1.1%	-0.8%	-0.9%	-0.1%	-0.0%	-1.4%	-0.3%	-0.6%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.0%
P28	Ban Off Trade Discounting if > 40%	-0.6%	-0.2%	-1.2%	-0.9%	-1.0%	-0.6%	-0.2%	-1.5%	-0.5%	-0.8%	-0.2%	-0.2%	-0.1%	-0.2%	-0.2%	-0.2%	-0.3%
P29	Ban Off Trade Discounting if > 30%	-0.9%	-0.6%	-1.4%	-1.1%	-1.2%	-1.4%	-0.5%	-1.7%	-0.8%	-1.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.3%	-0.9%
P30	Ban Off Trade Discounting if > 20%	-1.7%	-1.4%	-1.8%	-1.6%	-1.6%	-3.1%	-1.3%	-2.1%	-1.5%	-1.7%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.6%	-2.1%
P31	Ban Off Trade Discounting if > 10%	-3.0%	-2.8%	-2.4%	-2.4%	-2.2%	-6.2%	-2.6%	-2.7%	-2.7%	-2.8%	-0.6%	-0.4%	-0.5%	-0.5%	-0.6%	-1.0%	-4.3%
P32	Total Ban Off Trade Discounting	-5.0%	-4.9%	-3.4%	-3.7%	-3.3%	-10.7%	-4.6%	-3.7%	-4.6%	-4.4%	-0.9%	-0.7%	-0.9%	-0.8%	-0.9%	-1.6%	-7.6%
P33	Ban Off Trade Discounting if Regular Price <3	-0.3%	-0.1%	-0.8%	-0.6%	-0.6%	-0.2%	-0.1%	-1.1%	-0.3%	-0.5%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.3%

Table 3.8: Summary of estimated percentage change in alcohol-attributable health, crime and employment harms – England population

	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
P1	General Price +1%	-13.7	-9.5	-4.2	-27.7	-55.1	-15.0	-3.4	-73.5	-168	-79	-35	-230	-512	-201	-28	-741
P2	General Price +10%	-51.0	-68.5	-27.5	-277.7	-424.6	-56.2	-23.7	-504.5	-851	-569	-229	-2,309	-3,958	-1,062	-197	-5,218
P3	General Price +25%	-115.0	-170.7	-68.4	-699.8	-1,053.9	-127.2	-59.2	-1,240.3	-2,009	-1,420	-569	-5,820	-9,818	-2,521	-492	-12,830
P4	Low Priced Off Trade Products +10%	-12.7	-3.2	-2.3	-28.5	-46.6	-13.2	-1.0	-60.8	-173	-27	-19	-237	-455	-203	-8	-666
P5	Low Priced Off Trade Products +25%	-18.2	-3.5	-3.3	-71.1	-96.1	-18.6	-1.0	-115.7	-302	-29	-28	-591	-950	-359	-8	-1,317
P6	Low Priced On Trade Products +10%	-11.6	-16.3	-3.2	-3.4	-34.4	-12.9	-5.2	-52.6	-128	-135	-26	-28	-317	-148	-44	-509
P7	Low Priced On Trade Products +25%	-15.5	-35.8	-5.4	-7.9	-64.6	-17.6	-11.2	-93.5	-189	-297	-45	-66	-597	-222	-93	-913
P8	All Low Priced Products +10%	-15.9	-16.5	-3.9	-32.2	-68.5	-17.2	-5.2	-90.9	-220	-138	-32	-267	-657	-260	-43	-961
P9	All Low Priced Products +25%	-25.6	-36.6	-7.2	-80.8	-150.2	-27.7	-11.2	-189.1	-415	-304	-60	-672	-1,451	-496	-93	-2,040
P10	Minimum Price 15p (Off and On Trade)	-2.0	-2.2	-1.5	-1.5	-7.2	-2.3	-.7	-10.2	-16	-18	-13	-13	-59	-22	-6	-87
P11	Minimum Price 20p " "	-6.4	-1.4	-1.4	-11.1	-20.3	-6.6	-.4	-27.4	-69	-12	-12	-92	-185	-75	-3	-264
P12	Minimum Price 25p	-6.7	-.7	-1.4	-34.5	-43.3	-6.9	-.1	-50.4	-85	-6	-11	-287	-390	-93	-1	-483
P13	Minimum Price 30p	-9.8	-1.1	-1.8	-79.0	-91.7	-9.9	-.1	-101.7	-151	-9	-15	-657	-832	-169	-1	-1,002
P14	Minimum Price 35p	-18.2	-4.4	-4.2	-156.5	-183.3	-18.7	-1.2	-203.1	-326	-36	-35	-1,302	-1,699	-383	-10	-2,092
P15	Minimum Price 40p	-31.0	-10.9	-8.8	-270.2	-321.0	-31.8	-3.3	-356.1	-603	-91	-73	-2,247	-3,015	-724	-28	-3,766
P16	Minimum Price 45p	-49.4	-21.9	-16.3	-420.1	-507.7	-51.1	-7.1	-565.9	-986	-182	-136	-3,494	-4,798	-1,197	-59	-6,054
P17	Minimum Price 50p	-72.0	-36.3	-26.3	-596.0	-730.6	-74.9	-12.0	-817.4	-1,452	-302	-219	-4,957	-6,929	-1,772	-100	-8,800
P18	Minimum Price 60p	-122.8	-68.5	-49.1	-893.2	-1,133.6	-128.7	-22.9	-1,285.2	-2,464	-570	-408	-7,429	-10,870	-3,007	-191	-14,068
P19	Minimum Price 70p " "	-175.4	-101.3	-73.8	-1,146.7	-1,497.1	-184.8	-34.0	-1,715.9	-3,511	-842	-614	-9,536	-14,503	-4,270	-283	-19,055
P20	Minimum Price 20p Off and 60p On Trade	-6.4	-1.7	-1.4	-11.9	-21.5	-6.7	-.5	-28.6	-70	-14	-12	-99	-195	-76	-4	-275
P21	Minimum Price 30p Off and 80p On Trade	-10.3	-4.3	-2.2	-82.4	-99.2	-10.6	-1.3	-111.0	-159	-36	-18	-685	-898	-178	-11	-1,087
P22	Minimum Price 40p Off and 100p On Trade	-36.9	-26.5	-11.4	-296.7	-371.5	-38.3	-8.8	-418.7	-704	-221	-95	-2,467	-3,487	-846	-74	-4,407
P23	30p Minimum Price Beers Only	-1.0	-2.3	-2.1	-77.2	-82.7	-1.2	-.8	-84.7	-29	-19	-18	-642	-707	-35	-7	-750
P24	30p Minimum Price Wines Only	-11.6	-1.8	-2.1	-3.9	-19.3	-12.4	-.6	-32.3	-134	-15	-17	-32	-199	-158	-5	-361
P25	30p Minimum Price Spirits Only	-8.4	-3.0	-.9	+2.4	-9.9	-8.7	-.9	-19.5	-90	-25	-7	+20	-103	-99	-7	-209
P26	30p Minimum Price Alcopops (RTDs) Only	-9.4	-3.1	-1.7	+.0	-14.1	-10.1	-1.2	-25.4	-89.8	-25.4	-13.8	+.1	-128.8	-102.4	-9.7	-240.9
P27	Ban Off Trade Discounting if > 50%	-9.6	-3.0	-1.7	-.3	-14.6	-10.4	-1.1	-26.0	-92	-25	-14	-3	-134	-105	-9	-248
P28	Ban Off Trade Discounting if > 40%	-10.8	-3.6	-2.2	-7.4	-24.0	-11.7	-1.3	-37.1	-116	-30	-18	-61	-226	-136	-11	-373
P29	Ban Off Trade Discounting if > 30%	-12.8	-4.6	-3.0	-19.7	-40.1	-13.8	-1.7	-55.6	-155	-38	-25	-164	-382	-184	-14	-580
P30	Ban Off Trade Discounting if > 20%	-17.3	-7.1	-5.1	-48.2	-77.6	-18.6	-2.5	-98.7	-243	-59	-42	-401	-745	-296	-21	-1,061
P31	Ban Off Trade Discounting if > 10%	-25.0	-11.8	-8.7	-99.2	-144.7	-26.8	-4.1	-175.7	-396	-98	-73	-825	-1,392	-488	-34	-1,915
P32	Total Ban Off Trade Discounting	-36.3	-19.5	-14.4	-178.4	-248.7	-39.0	-6.8	-294.5	-624	-163	-120	-1,483	-2,390	-774	-56	-3,220
P33	Ban Off Trade Discount if Reg Price <30p	-7.3	-3.0	-1.7	-6.9	-18.9	-7.6	-1.0	-27.5	-75	-25	-14	-57	-171	-83	-9	-263

Table 3.9: Summary of financial valuation of pricing policies on health, crime and employment alcohol related harms – England population

3.2.1.3 Health, crime and employment harm effects across all policies

Table 3.7 shows the results of each pricing scenario in terms of estimated changes in health, crime and employment alcohol-related harm. Equivalent tables for each priority group are included in Section 3.2.1.7.

As prices increase, the modelling estimates that more deaths are avoided: for example, a move from a 30p to a 40p threshold for a minimum price policy changes the estimated year 1 deaths avoided from 24 to 156. 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 almost 8 times greater than in year 1. The changes in deaths for each policy are broadly in proportion to the changes in overall consumption (shown in Figure 3.1).

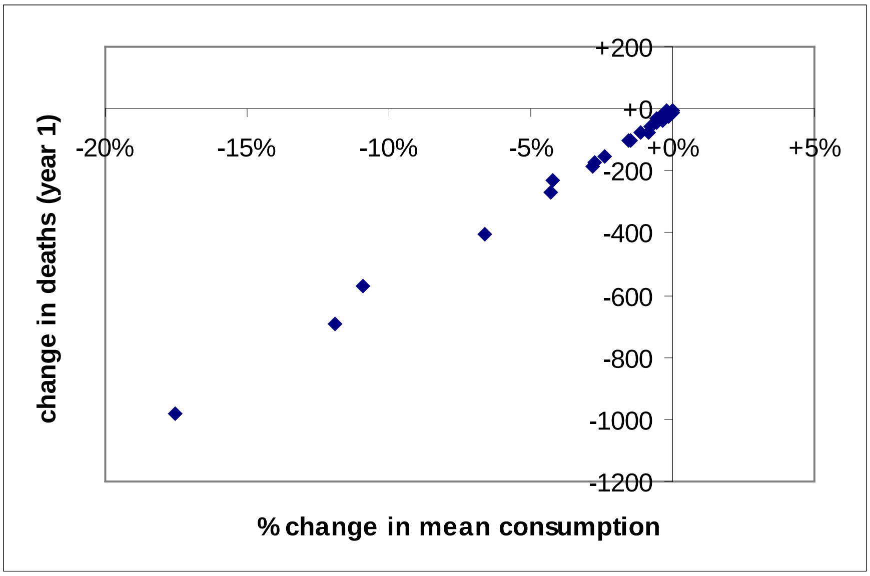

Figure 3.1: Relationship of estimated change in deaths (year 1) to estimated change in consumption across different policies

As prices increase, alcohol-attributable hospital admissions are estimated to reduce: targeting only very cheap alcohol (eg. a 15p per unit minimum price) is estimated to have negligible effects on hospital admissions, with a reduction of around 400 per year at full effect (Table 3.7, scenario P10). Increasing the prices of cheap off-trade alcohol by 10%, increasing prices of cheap on-trade alcohol by 10% or 25%, introducing a minimum price at a threshold of less than 30p or banning off-trade discounts at the 30% level all have small effects. Policy options leading to greater price rises do begin to have larger effects. For example, a 40p minimum price gives an estimated reduction of around 40,000 admissions per annum at full effect (a reduction of almost 5% in the volume of alcohol-attributable admissions).

Crime harms are estimated to reduce as prices are increased: a minimum price of 30p is estimated to reduce total crimes by around 800 whereas for a 40p threshold the reduction is estimated at almost 9,000. For the latter scenario, violent crimes are estimated to fall by 2,100 (0.4% of alcohol-attributable crimes of this type), criminal damage by 2,200 (0.3%) and thefts, robberies and other crimes by 4,600 (0.8%).

Crime-related harms are estimated to reduce proportionately less than health-related harms overall: for example, for the 40p minimum price, alcohol-attributable deaths at full effect are estimated to reduce by 11% whilst alcohol-attributable crimes reduce by 0.5%. This effect is related to the assumption that peak consumption levels under 4/3 units (males/females) do not incur excess risk of crime, and that (via the model relating mean consumption to peak consumption) peak consumption is less responsive to price changes than 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 18,000 per annum whereas for 40p the reduction is estimated at over 90,000.

Unemployment due to alcohol problems is estimated to reduce as prices increase: in the model, unemployment is a risk factor only for harmful drinkers. For a 30p minimum price threshold, 2,900 avoided cases of unemployment are estimated; for 40p the figure is 11,000.

Unemployment harm reduces proportionately more than health, crime or absence harms: for example, for a 40p minimum price, alcohol-attributable unemployment is estimated to reduce by 10.8%, whilst hospital admissions reduce by 4.8%, heath-related QALY gains increase by 4.1%, total crimes reduce by 0.5% and total days absent reduce by 1.0%. This effect arises because only harmful drinkers are assumed to be at risk from alcohol-attributable unemployment, and it is these drinkers who are most affected by the 40p policy in both relative and absolute terms.

3.2.1.4 Financial valuation of harm reductions for price changes

The financial value of health 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 QALY)
- A financial value for the crime impacts on quality of life (per QALY for 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 3.9 shows the results summary for the England population.

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 -£1bn. The savings increases with the threshold, for example the 40p policy is estimated to reduce harms by £3.8bn – almost quadruple the valuation for 30p.

The largest financially valued component of harm reduction is in the estimated impact on unemployment. for example, almost two thirds of the total £1bn harm reduction in the 30p minimum pricing scenario is from unemployment-related reductions (£660m). Unemployment is the largest component for most policies because they disproportionately affect harmful drinkers, who are at substantially increased risk of unemployment.

Healthcare costs are reduced as prices are increased: for example, NHS and PSS costs avoided due to reduced illness and admissions are estimated to be £150m for the 30p minimum price and £600m for a 40p threshold.

The financial value of mortality and morbidity avoided using the QALY measure also improves as prices are increased: for example the value of QALY loss avoided changes from £170m for the 30p minimum price to £720m for a 40p threshold.

Crime costs are also estimated to reduce as prices increase: for example costs of crime for the 30p minimum price reduce by approximately £10m compared with £90m over 10 years for a 40p threshold. Similarly the value of the loss of victim quality of life changes from £1m to approximately £30m.

Figure 3.2 shows the total ten year financial savings 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 per unit price via 35p to 40p corresponds to almost a quadrupling of the saving (from £1bn to £2.1bn to £3.8bn over the ten year period).

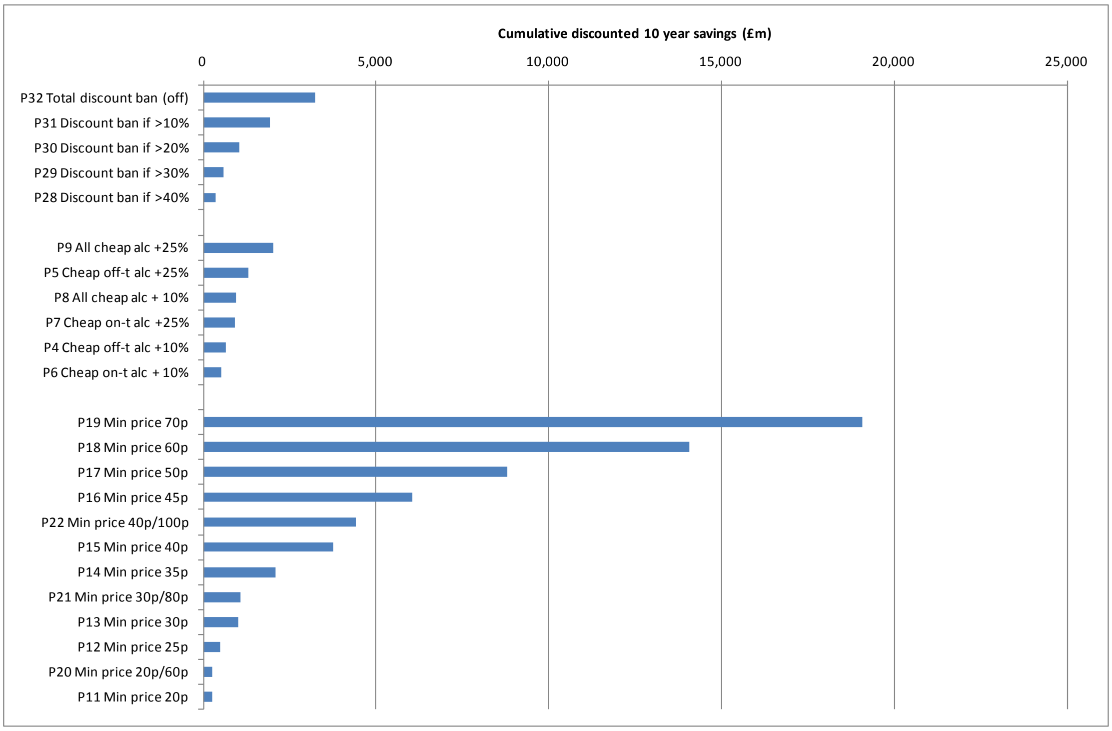

Figure 3.2: Comparison of financial harm saved across selected policies

Introducing minimum unit prices in the on-trade as well as the off-trade is estimated to make policies more effective: this is because such policies would target lower-priced alcohol in the on-trade in addition to the off-trade, mitigating some substitution effects between the two sectors. Adding a £1 on-trade minimum unit price to a 30p off-trade threshold increases the estimated savings from £3.8bn to £4.4bn.

Policies targeting cheap alcohol and leading to a price increase of 10% in low priced alcohol, for example scenario P8, only have a relatively small effect, similar in scale to a 25p-30p minimum price. 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 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 over 50% and over 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 a 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 in terms of overall harm reduction.

3.2.1.5 Differential effects of different policies on moderate, hazardous and harmful drinkers

This section presents 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? Which groups are most affected in terms of their consumer expenditure?

Figure 3.3 shows the reductions in annual hospital admissions saved (at 10 years, ie. after the full policy effect has been achieved) for the moderate, hazardous and harmful groups 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.

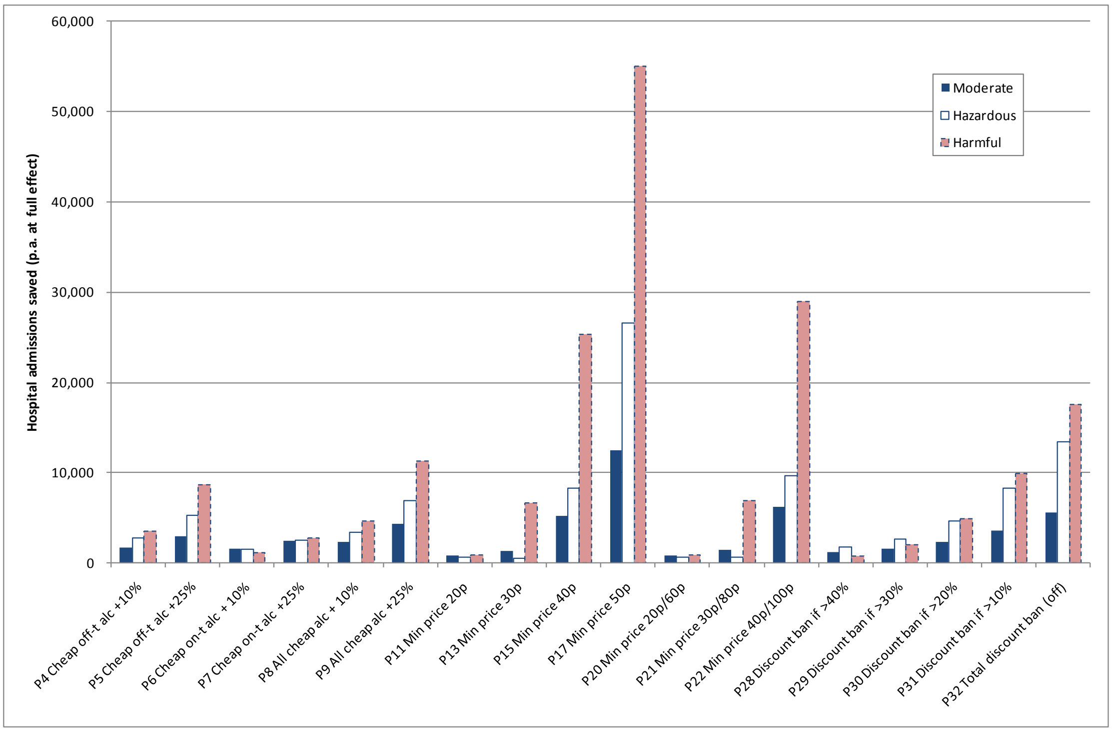

Figure 3.3: Hospital admissions saved per year for moderate, hazardous and harmful drinkers

Figure 3.4 shows a similar pattern across the consumption groups for how much extra per year each would spend on alcohol per drinker. Most of the extra spending is accounted for by harmful drinkers. The extra spending for moderate drinkers varies from approximately 20p to £13 per year depending on the policy option, with most policies in the range of £2 to £7. Note that this estimate 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 range between 30p and £15. 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 £67 (£62 if they had not changed consumption, without the switching to on-trade beverages) and harmful drinkers £201 (or £312 without consumption change).

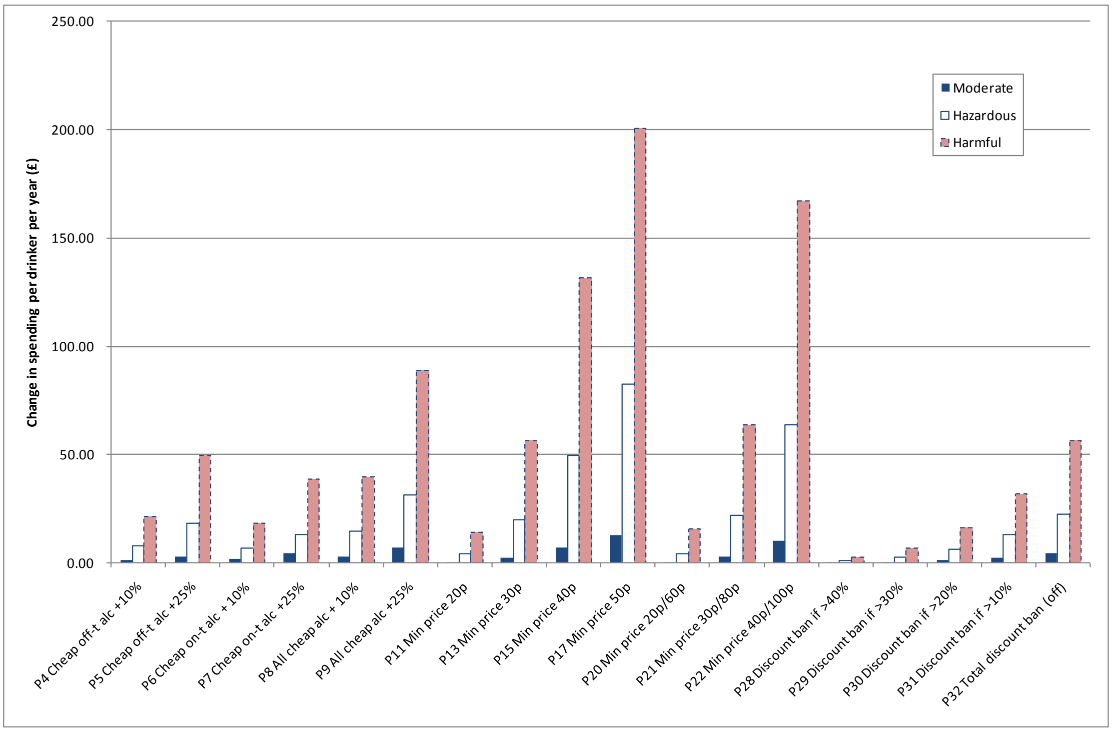

Figure 3.4: Extra spending on alcohol, per drinker per year, after policy change

Other differential effects of note include:

- Mortality – harmful drinkers have both a higher mortality risk and respond to price changes with larger absolute consumption changes than other groups. Of the 1,455 deaths estimated to be avoided at full effect from a 10% general price increase, 765 (53%) are from the harmful drinker group (despite harmful drinkers comprising only 7% of the population).

- Crime – reductions occur particularly amongst 11 to 18 year olds because they are disproportionately involved in alcohol-related crime and are affected more than the population average by prices rises targeted at cheaper products. Of the 17,000 crimes estimated to be avoided by a 10% rise in the price of the cheapest 25% of products, 9,000 (52%) are from the 11 to 18 year old group.

- Financial value of harm reduction – the majority of the value comes from the reduction in harms associated with harmful drinkers. Of the £3.8b harm reduction estimated for a 40p minimum price, just over £3b is from harmful drinkers.

3.2.1.6 Summary tables for consumption analysis of pricing policies by priority group

	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.
P1	General Price +1%	-0.5%	-1.5	-0.3	-1.0	-0.5	-3.3	+0.5	+4.7	-0.1	+0.1	+5.3	+0.5%	+3.80	+7.51
P2	General Price +10%	-5.1%	-15.3	-3.3	-9.7	-5.0	-33.4	+5.1	+43.2	-0.9	+0.6	+48.0	+4.6%	+34.49	+75.07
P3	General Price +25%	-12.9%	-39.1	-8.4	-24.1	-12.6	-84.2	+11.3	+92.4	-2.5	-1.3	+99.8	+9.5%	+71.64	+187.67
P4	Low Priced Off Trade Products +10%	-0.2%	-0.8	+0.1	-0.5	+0.0	-1.2	+0.6	+0.4	-0.3	+0.1	+0.9	+0.1%	+0.64	+0.58
P5	Low Priced Off Trade Products +25%	-0.4%	-1.9	+0.1	-1.2	+0.0	-2.9	+1.4	+1.0	-0.7	+0.4	+2.1	+0.2%	+1.48	+1.45
P6	Low Priced On Trade Products +10%	-2.2%	-5.1	+0.2	-7.1	-2.5	-14.5	+0.2	+7.6	+0.1	-2.9	+5.1	+0.5%	+3.64	+21.57
P7	Low Priced On Trade Products +25%	-5.5%	-12.8	+0.5	-17.4	-6.3	-35.9	+0.4	+11.8	+0.3	-8.4	+4.2	+0.4%	+3.00	+53.94
P8	All Low Priced Products +10%	-2.4%	-5.9	+0.3	-7.6	-2.5	-15.7	+0.8	+8.1	-0.1	-2.7	+6.0	+0.6%	+4.28	+22.15
P9	All Low Priced Products +25%	-6.0%	-14.7	+0.7	-18.6	-6.3	-38.9	+1.8	+12.8	-0.3	-8.0	+6.2	+0.6%	+4.48	+55.39
P10	Minimum Price 15p (Off and On Trade)	-0.0%	-0.0	+0.0	-0.2	+0.0	-0.2	+0.1	+0.0	-0.1	+0.0	+0.1	+0.0%	+0.09	+0.09
P11	Minimum Price 20p " "	-0.1%	-0.2	+0.1	-0.6	+0.0	-0.8	+0.4	+0.2	-0.2	+0.1	+0.6	+0.1%	+0.39	+0.38
P12	Minimum Price 25p	-0.3%	-1.0	+0.1	-1.2	+0.0	-2.0	+1.0	+0.6	-0.5	+0.2	+1.4	+0.1%	+1.01	+0.99
P13	Minimum Price 30p	-0.7%	-2.7	+0.3	-2.3	+0.0	-4.7	+2.0	+1.6	-1.2	+0.6	+2.9	+0.3%	+2.11	+2.30
P14	Minimum Price 35p	-1.2%	-4.7	+0.4	-3.5	+0.0	-7.7	+2.8	+2.7	-2.0	+1.0	+4.5	+0.4%	+3.25	+4.06
P15	Minimum Price 40p	-1.8%	-7.1	+0.5	-5.0	+0.1	-11.5	+3.9	+4.2	-3.0	+1.5	+6.5	+0.6%	+4.67	+6.65
P16	Minimum Price 45p	-2.6%	-9.5	+0.0	-7.3	+0.1	-16.6	+5.3	+6.1	-4.4	+2.2	+9.1	+0.9%	+6.54	+10.54
P17	Minimum Price 50p	-3.5%	-12.2	-1.3	-9.6	+0.2	-22.9	+6.8	+8.3	-6.2	+2.9	+11.8	+1.1%	+8.45	+15.56
P18	Minimum Price 60p	-5.4%	-17.7	-4.8	-13.2	+0.3	-35.4	+8.5	+13.3	-9.9	+4.7	+16.5	+1.6%	+11.87	+27.32
P19	Minimum Price 70p " "	-6.8%	-19.5	-8.8	-16.3	+0.4	-44.1	+10.5	+19.7	-12.5	+6.5	+24.1	+2.3%	+17.32	+41.43
P20	Minimum Price 20p Off and 60p On Trade	-0.1%	-0.3	+0.1	-0.6	+0.0	-0.9	+0.4	+0.3	-0.2	+0.1	+0.6	+0.1%	+0.47	+0.50
P21	Minimum Price 30p Off and 80p On Trade	-1.4%	-7.1	+0.4	-2.2	+0.1	-8.9	+2.0	+6.7	-1.1	+0.5	+8.2	+0.8%	+5.87	+9.16
P22	Minimum Price 40p Off and 100p On Trade	-4.3%	-24.5	+0.9	-4.9	+0.2	-28.2	+4.2	+20.3	-2.7	+0.6	+22.4	+2.1%	+16.08	+34.26
P23	30p Minimum Price Beers Only	-0.4%	-3.0	+0.0	+0.1	+0.0	-2.9	+1.1	+1.2	-0.6	+0.4	+2.2	+0.2%	+1.57	+1.52
P24	30p Minimum Price Wines 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
P25	30p Minimum Price Spirits Only	-0.3%	+0.3	+0.2	-2.3	+0.0	-1.8	+0.8	+0.3	-0.5	+0.1	+0.8	+0.1%	+0.54	+0.78
P26	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
P27	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%	+0.00	+0.00
P28	Ban Off Trade Discounting if > 40%	-0.0%	-0.0	-0.2	+0.0	+0.0	-0.2	+0.1	+0.1	-0.0	+0.0	+0.2	+0.0%	+0.13	+0.18
P29	Ban Off Trade Discounting if > 30%	-0.1%	-0.2	-0.4	-0.0	+0.0	-0.6	+0.4	+0.1	-0.1	+0.1	+0.5	+0.0%	+0.35	+0.50
P30	Ban Off Trade Discounting if > 20%	-0.2%	-0.4	-0.9	-0.0	+0.0	-1.3	+0.9	+0.4	-0.2	+0.1	+1.1	+0.1%	+0.82	+1.18
P31	Ban Off Trade Discounting if > 10%	-0.4%	-0.8	-1.9	-0.2	+0.0	-2.9	+1.9	+0.8	-0.5	+0.3	+2.5	+0.2%	+1.79	+2.59
P32	Total Ban Off Trade Discounting	-0.8%	-1.5	-3.2	-0.7	-0.0	-5.4	+3.7	+1.7	-1.0	+0.6	+5.0	+0.5%	+3.59	+5.18
P33	Ban Off Trade Discount if Reg Price <30p	-0.1%	-0.3	+0.0	-0.0	+0.0	-0.4	+0.2	+0.1	-0.1	+0.1	+0.3	+0.0%	+0.22	+0.19

Table 3.10: Summary of estimated effects of price policies on consumption, spending and sales – 11 to 18 year old 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.
P1	General Price +1%	-0.5%	-3.1	-0.9	-2.2	-0.7	-6.9	+1.0	+4.7	-0.1	+0.2	+5.8	+0.5%	+8.19	+15.39
P2	General Price +10%	-5.0%	-31.5	-9.3	-22.4	-7.0	-70.2	+9.2	+43.5	-1.6	+1.5	+52.6	+4.8%	+74.25	+153.86
P3	General Price +25%	-12.8%	-82.4	-24.5	-55.9	-17.6	-180.3	+20.3	+92.2	-4.7	+0.5	+108.4	+9.9%	+152.85	+384.65
P4	Low Priced Off Trade Products +10%	-0.0%	+2.5	-1.8	-1.1	-0.0	-0.4	+1.6	+2.6	-0.3	+0.9	+4.8	+0.4%	+6.72	+2.67
P5	Low Priced Off Trade Products +25%	-0.1%	+6.3	-4.6	-2.6	-0.1	-1.0	+3.7	+6.4	-0.7	+2.2	+11.5	+1.1%	+16.21	+6.69
P6	Low Priced On Trade Products +10%	-1.1%	-3.6	+0.8	-11.5	-1.8	-16.1	+0.4	+3.3	+0.3	-2.1	+1.8	+0.2%	+2.60	+23.00
P7	Low Priced On Trade Products +25%	-2.8%	-9.0	+1.9	-28.2	-4.4	-39.7	+0.9	+3.2	+0.8	-6.1	-1.2	-0.1%	-1.76	+57.49
P8	All Low Priced Products +10%	-1.2%	-1.1	-1.1	-12.6	-1.8	-16.6	+2.0	+5.9	+0.1	-1.3	+6.6	+0.6%	+9.32	+25.67
P9	All Low Priced Products +25%	-2.9%	-2.8	-2.7	-30.9	-4.5	-40.9	+4.6	+9.6	+0.1	-4.0	+10.2	+0.9%	+14.44	+64.18
P10	Minimum Price 15p (Off and On Trade)	+0.0%	+0.2	+0.3	+0.1	+0.0	+0.6	+0.3	+0.8	+0.0	+0.3	+1.3	+0.1%	+1.82	+0.34
P11	Minimum Price 20p " "	+0.1%	+0.7	+0.5	+0.4	+0.1	+1.7	+0.8	+2.3	-0.0	+0.8	+3.9	+0.4%	+5.50	+1.09
P12	Minimum Price 25p	+0.2%	+1.3	+1.2	+0.4	+0.2	+3.1	+1.7	+4.8	-0.1	+1.6	+8.0	+0.7%	+11.33	+2.53
P13	Minimum Price 30p	+0.2%	+2.4	+1.2	-1.4	+0.3	+2.5	+3.6	+8.7	-0.6	+2.9	+14.7	+1.3%	+20.69	+6.26
P14	Minimum Price 35p	-0.1%	+3.8	-0.6	-5.3	+0.6	-1.6	+6.6	+14.2	-1.6	+4.8	+24.0	+2.2%	+33.83	+13.83
P15	Minimum Price 40p	-0.7%	+5.0	-3.7	-11.5	+0.8	-9.4	+10.3	+21.1	-3.3	+7.1	+35.2	+3.2%	+49.71	+25.35
P16	Minimum Price 45p	-1.5%	+5.2	-8.8	-19.2	+1.1	-21.7	+14.3	+28.8	-5.7	+9.7	+47.2	+4.3%	+66.51	+40.78
P17	Minimum Price 50p	-2.6%	+5.4	-15.9	-27.6	+1.4	-36.7	+17.9	+37.0	-8.6	+12.5	+58.9	+5.4%	+83.09	+58.99
P18	Minimum Price 60p	-4.7%	+12.1	-34.4	-46.6	+1.9	-67.0	+23.5	+54.8	-15.0	+18.5	+81.7	+7.5%	+115.30	+101.18
P19	Minimum Price 70p " "	-7.2%	+17.2	-57.1	-64.3	+2.3	-101.9	+23.1	+73.8	-23.2	+24.8	+98.6	+9.0%	+139.04	+148.14
P20	Minimum Price 20p Off and 60p On Trade	+0.1%	+0.6	+0.6	+0.4	+0.1	+1.7	+0.8	+2.4	-0.0	+0.8	+3.9	+0.4%	+5.56	+1.16
P21	Minimum Price 30p Off and 80p On Trade	+0.0%	-0.3	+1.6	-1.2	+0.4	+0.5	+3.7	+11.5	-0.4	+3.1	+18.0	+1.6%	+25.35	+11.91
P22	Minimum Price 40p Off and 100p On Trade	-1.6%	-9.3	-2.1	-11.6	+1.0	-21.9	+11.0	+32.7	-2.8	+7.4	+48.3	+4.4%	+68.15	+55.21
P23	30p Minimum Price Beers Only	+0.4%	+0.5	+3.8	+1.3	+0.3	+5.9	+2.1	+7.6	-0.1	+2.6	+12.2	+1.1%	+17.17	+3.51
P24	30p Minimum Price Wines Only	-0.1%	+1.5	-3.0	+0.2	+0.0	-1.3	+0.7	+0.9	-0.2	+0.3	+1.7	+0.2%	+2.46	+1.50
P25	30p Minimum Price Spirits Only	-0.1%	+0.5	+0.4	-3.0	+0.0	-2.1	+0.7	+0.2	-0.3	+0.1	+0.7	+0.1%	+1.06	+1.26
P26	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
P27	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%	+0.05	+0.03
P28	Ban Off Trade Discounting if > 40%	-0.0%	+0.2	-0.6	+0.0	+0.0	-0.4	+0.2	+0.3	-0.0	+0.1	+0.5	+0.0%	+0.75	+0.59
P29	Ban Off Trade Discounting if > 30%	-0.1%	+0.5	-1.6	+0.1	+0.0	-1.0	+0.6	+0.7	-0.1	+0.2	+1.4	+0.1%	+2.01	+1.59
P30	Ban Off Trade Discounting if > 20%	-0.2%	+1.1	-3.7	+0.0	+0.0	-2.6	+1.6	+1.6	-0.3	+0.5	+3.4	+0.3%	+4.78	+3.99
P31	Ban Off Trade Discounting if > 10%	-0.4%	+1.7	-7.1	-0.7	+0.0	-6.0	+3.3	+3.2	-0.7	+1.1	+6.9	+0.6%	+9.78	+8.65
P32	Total Ban Off Trade Discounting	-0.9%	+2.3	-11.6	-2.8	-0.1	-12.3	+6.3	+6.0	-1.5	+2.0	+12.9	+1.2%	+18.14	+16.82
P33	Ban Off Trade Discount if Reg Price <30p	+0.0%	+0.1	+0.1	+0.0	+0.0	+0.2	+0.2	+0.5	-0.0	+0.2	+0.9	+0.1%	+1.32	+0.34

Table 3.11: Summary of estimated effects of price policies on consumption, spending and sales – 18 to 24 year old hazardous 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.
P1	General Price +1%	-0.3%	-0.3	-0.5	-0.2	-0.0	-1.0	+9.6	+25.1	-0.7	+3.2	+37.2	+0.7%	+1.93	+2.76
P2	General Price +10%	-3.5%	-3.5	-4.7	-1.8	-0.3	-10.4	+91.4	+242.1	-7.5	+30.4	+356.4	+6.7%	+18.45	+27.57
P3	General Price +25%	-8.8%	-9.1	-12.0	-4.6	-0.7	-26.3	+208.1	+568.1	-23.0	+68.8	+821.9	+15.4%	+42.55	+68.91
P4	Low Priced Off Trade Products +10%	-0.2%	+0.4	-0.8	-0.2	-0.0	-0.6	+13.8	+7.8	-1.4	+2.6	+22.7	+0.4%	+1.18	+0.90
P5	Low Priced Off Trade Products +25%	-0.5%	+0.9	-2.0	-0.5	-0.0	-1.6	+32.0	+19.5	-4.0	+6.6	+54.0	+1.0%	+2.80	+2.24
P6	Low Priced On Trade Products +10%	-0.2%	-0.4	-0.0	-0.2	-0.0	-0.7	+1.1	+32.6	+0.9	+2.5	+37.1	+0.7%	+1.92	+2.73
P7	Low Priced On Trade Products +25%	-0.6%	-1.1	-0.0	-0.6	-0.1	-1.8	+2.7	+74.0	+2.2	+4.9	+83.8	+1.6%	+4.34	+6.82
P8	All Low Priced Products +10%	-0.5%	-0.1	-0.8	-0.4	-0.1	-1.4	+14.8	+40.5	-0.5	+5.1	+59.9	+1.1%	+3.10	+3.63
P9	All Low Priced Products +25%	-1.1%	-0.2	-2.0	-1.1	-0.1	-3.4	+34.7	+93.7	-1.8	+11.5	+138.2	+2.6%	+7.15	+9.06
P10	Minimum Price 15p (Off and On Trade)	-0.0%	-0.0	+0.0	-0.0	+0.0	-0.0	+1.4	+1.3	-0.0	+0.4	+3.1	+0.1%	+0.16	+0.07
P11	Minimum Price 20p " "	+0.0%	+0.0	+0.0	-0.0	+0.0	+0.0	+3.7	+4.4	-0.0	+1.5	+9.5	+0.2%	+0.49	+0.19
P12	Minimum Price 25p	+0.0%	+0.1	+0.1	-0.1	+0.0	+0.1	+8.2	+10.0	-0.1	+3.4	+21.6	+0.4%	+1.12	+0.44
P13	Minimum Price 30p	-0.1%	+0.2	-0.0	-0.4	+0.0	-0.2	+20.5	+21.3	-1.1	+7.2	+47.9	+0.9%	+2.48	+1.24
P14	Minimum Price 35p	-0.5%	+0.5	-0.8	-1.1	+0.0	-1.4	+42.9	+36.1	-4.6	+12.2	+86.6	+1.6%	+4.48	+2.98
P15	Minimum Price 40p	-1.2%	+0.6	-2.3	-2.0	+0.0	-3.6	+73.1	+53.4	-10.6	+18.1	+134.0	+2.5%	+6.94	+5.73
P16	Minimum Price 45p	-2.3%	+0.6	-4.4	-3.2	+0.1	-7.0	+112.5	+72.6	-19.1	+24.5	+190.5	+3.6%	+9.86	+9.75
P17	Minimum Price 50p	-3.8%	+0.4	-7.2	-4.6	+0.1	-11.3	+157.8	+93.3	-30.4	+31.5	+252.3	+4.7%	+13.06	+14.91
P18	Minimum Price 60p	-7.4%	-0.0	-14.7	-7.6	+0.1	-22.3	+250.4	+139.0	-61.7	+46.9	+374.6	+7.0%	+19.39	+28.03
P19	Minimum Price 70p " "	-11.5%	-0.4	-23.4	-10.9	+0.1	-34.6	+315.6	+188.6	-102.7	+63.4	+464.8	+8.7%	+24.06	+42.87
P20	Minimum Price 20p Off and 60p On Trade	+0.0%	+0.0	+0.0	-0.0	+0.0	+0.0	+3.7	+4.5	-0.0	+1.5	+9.7	+0.2%	+0.50	+0.20
P21	Minimum Price 30p Off and 80p On Trade	-0.1%	+0.2	-0.0	-0.4	+0.0	-0.3	+20.7	+27.0	-1.0	+7.9	+54.5	+1.0%	+2.82	+1.62
P22	Minimum Price 40p Off and 100p On Trade	-1.6%	-0.6	-2.2	-2.0	+0.1	-4.7	+74.6	+108.0	-9.4	+23.8	+197.0	+3.7%	+10.20	+9.95
P23	30p Minimum Price Beers Only	+0.1%	-0.3	+0.4	+0.1	+0.0	+0.2	+8.8	+13.8	+0.4	+4.7	+27.7	+0.5%	+1.43	+0.52
P24	30p Minimum Price Wines Only	-0.2%	+0.1	-0.6	+0.0	+0.0	-0.5	+6.0	+1.8	-1.0	+0.6	+7.4	+0.1%	+0.38	+0.45
P25	30p Minimum Price Spirits Only	+0.0%	+0.4	+0.2	-0.5	+0.0	+0.1	+5.6	+5.7	-0.5	+2.0	+12.8	+0.2%	+0.66	+0.27
P26	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
P27	Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.0	+0.0	-0.0	-0.0	+0.1	+0.0	-0.0	+0.0	+0.2	+0.0%	+0.01	+0.01
P28	Ban Off Trade Discounting if > 40%	-0.1%	+0.0	-0.3	+0.0	+0.0	-0.2	+3.4	+0.5	-0.3	+0.2	+3.8	+0.1%	+0.19	+0.29
P29	Ban Off Trade Discounting if > 30%	-0.2%	+0.0	-0.7	+0.0	-0.0	-0.6	+9.0	+1.4	-0.8	+0.5	+10.0	+0.2%	+0.52	+0.77
P30	Ban Off Trade Discounting if > 20%	-0.5%	+0.0	-1.6	-0.0	-0.0	-1.6	+21.7	+3.2	-2.0	+1.1	+24.0	+0.5%	+1.24	+1.87
P31	Ban Off Trade Discounting if > 10%	-1.1%	+0.0	-3.1	-0.1	-0.0	-3.2	+43.8	+6.7	-4.3	+2.3	+48.5	+0.9%	+2.51	+3.87
P32	Total Ban Off Trade Discounting	-1.9%	-0.0	-5.1	-0.5	-0.0	-5.7	+77.7	+13.2	-8.2	+4.4	+87.2	+1.6%	+4.52	+7.01
P33	Ban Off Trade Discount if Reg Price <30p	-0.0%	-0.0	-0.0	-0.0	+0.0	-0.0	+1.3	+1.3	-0.0	+0.4	+3.1	+0.1%	+0.16	+0.07

Table 3.12: Summary of estimated effects of price policies on consumption, spending and sales – moderate 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.
P1	General Price +1%	-0.4%	-2.5	-2.4	-1.1	-0.2	-6.2	+17.3	+23.5	-1.6	+1.5	+40.7	+0.6%	+6.14	+10.70
P2	General Price +10%	-4.5%	-25.8	-24.7	-11.3	-1.7	-63.5	+162.7	+216.6	-19.0	+11.4	+371.7	+5.2%	+56.06	+107.04
P3	General Price +25%	-11.6%	-67.5	-65.3	-28.3	-4.2	-165.3	+360.4	+463.0	-60.6	+12.6	+775.4	+10.9%	+116.94	+267.59
P4	Low Priced Off Trade Products +10%	-0.3%	+1.3	-3.5	-1.5	-0.1	-3.7	+31.6	+17.4	-2.5	+6.0	+52.5	+0.7%	+7.91	+5.42
P5	Low Priced Off Trade Products +25%	-0.7%	+3.2	-8.7	-3.7	-0.2	-9.4	+72.3	+43.5	-7.5	+15.1	+123.3	+1.7%	+18.60	+13.54
P6	Low Priced On Trade Products +10%	-0.2%	-3.2	+3.1	-2.6	-0.4	-3.2	+8.2	+32.9	+6.7	-3.9	+43.9	+0.6%	+6.62	+12.40
P7	Low Priced On Trade Products +25%	-0.6%	-8.1	+7.7	-6.5	-1.1	-7.9	+20.4	+61.8	+16.7	-13.0	+85.8	+1.2%	+12.94	+31.01
P8	All Low Priced Products +10%	-0.5%	-2.0	-0.4	-4.1	-0.5	-7.0	+39.8	+50.4	+4.1	+2.1	+96.4	+1.4%	+14.54	+17.82
P9	All Low Priced Products +25%	-1.2%	-5.0	-1.1	-10.2	-1.3	-17.5	+92.9	+105.4	+9.1	+1.9	+209.3	+2.9%	+31.56	+44.55
P10	Minimum Price 15p (Off and On Trade)	+0.0%	-0.1	+0.6	-0.2	+0.0	+0.3	+3.9	+3.7	+0.4	+1.3	+9.3	+0.1%	+1.40	+0.45
P11	Minimum Price 20p " "	+0.1%	-0.7	+2.1	-0.4	+0.0	+0.9	+11.8	+10.6	+1.3	+3.6	+27.4	+0.4%	+4.13	+1.37
P12	Minimum Price 25p	+0.1%	-2.0	+5.1	-1.0	+0.0	+2.1	+28.0	+25.2	+3.0	+8.6	+64.8	+0.9%	+9.78	+3.45
P13	Minimum Price 30p	+0.1%	-3.4	+8.8	-3.5	+0.1	+1.9	+59.1	+51.3	+3.1	+17.6	+131.1	+1.8%	+19.78	+8.51
P14	Minimum Price 35p	-0.3%	-4.9	+8.4	-8.4	+0.1	-4.8	+108.5	+87.2	-3.7	+30.1	+222.1	+3.1%	+33.49	+19.22
P15	Minimum Price 40p	-1.4%	-7.3	+3.1	-15.8	+0.1	-19.8	+171.6	+131.3	-19.9	+45.4	+328.3	+4.6%	+49.52	+36.64
P16	Minimum Price 45p	-3.1%	-11.5	-8.4	-24.8	+0.2	-44.5	+245.1	+180.1	-46.5	+62.3	+441.0	+6.2%	+66.51	+61.71
P17	Minimum Price 50p	-5.4%	-16.7	-26.6	-34.5	+0.2	-77.6	+319.6	+232.6	-83.4	+80.4	+549.2	+7.7%	+82.82	+93.27
P18	Minimum Price 60p	-10.9%	-20.8	-79.6	-55.2	+0.2	-155.5	+449.0	+344.8	-176.5	+119.2	+736.6	+10.4%	+111.08	+170.20
P19	Minimum Price 70p " "	-17.0%	-24.2	-144.8	-73.4	+0.1	-242.2	+486.3	+463.6	-295.6	+159.6	+813.9	+11.5%	+122.75	+254.99
P20	Minimum Price 20p Off and 60p On Trade	+0.1%	-0.8	+2.1	-0.5	+0.0	+0.9	+11.9	+11.2	+1.4	+3.7	+28.1	+0.4%	+4.24	+1.49
P21	Minimum Price 30p Off and 80p On Trade	+0.1%	-4.7	+9.5	-3.5	+0.1	+1.4	+60.8	+63.3	+4.5	+18.3	+146.9	+2.1%	+22.16	+11.29
P22	Minimum Price 40p Off and 100p On Trade	-1.8%	-18.0	+8.2	-15.6	+0.2	-25.2	+184.3	+202.5	-10.0	+45.6	+422.4	+6.0%	+63.69	+58.09
P23	30p Minimum Price Beers Only	+0.3%	-6.9	+10.2	+0.6	+0.0	+4.0	+36.4	+36.0	+6.1	+12.4	+91.0	+1.3%	+13.72	+4.81
P24	30p Minimum Price Wines Only	-0.2%	+0.8	-3.8	+0.1	+0.0	-2.9	+9.2	+3.7	-2.4	+1.3	+11.7	+0.2%	+1.77	+2.06
P25	30p Minimum Price Spirits Only	+0.1%	+2.7	+2.4	-4.2	+0.0	+0.9	+13.4	+11.6	-0.5	+4.0	+28.4	+0.4%	+4.28	+1.65
P26	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
P27	Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.1	+0.0	+0.0	-0.1	+0.3	+0.1	-0.1	+0.0	+0.4	+0.0%	+0.05	+0.06
P28	Ban Off Trade Discounting if > 40%	-0.1%	+0.1	-2.0	+0.0	+0.0	-2.0	+6.5	+1.4	-1.4	+0.5	+7.0	+0.1%	+1.06	+1.77
P29	Ban Off Trade Discounting if > 30%	-0.4%	+0.1	-5.1	+0.0	-0.0	-5.0	+16.9	+3.9	-3.5	+1.4	+18.6	+0.3%	+2.81	+4.61
P30	Ban Off Trade Discounting if > 20%	-0.8%	+0.0	-12.0	-0.1	-0.0	-12.0	+39.7	+9.1	-8.5	+3.2	+43.5	+0.6%	+6.56	+11.12
P31	Ban Off Trade Discounting if > 10%	-1.7%	-0.4	-23.2	-0.9	-0.0	-24.5	+78.5	+18.7	-17.9	+6.5	+85.7	+1.2%	+12.93	+22.67
P32	Total Ban Off Trade Discounting	-3.0%	-1.8	-37.7	-3.0	-0.1	-42.7	+134.1	+34.6	-32.5	+12.0	+148.2	+2.1%	+22.35	+39.90
P33	Ban Off Trade Discount if Reg Price <30p	+0.0%	-0.5	+0.7	-0.0	+0.0	+0.2	+4.4	+3.2	+0.5	+1.1	+9.1	+0.1%	+1.38	+0.54

Table 3.13: Summary of estimated effects of price policies on consumption, spending and sales – hazardous 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.
P1	General Price +1%	-0.4%	-7.5	-5.2	-2.6	-0.5	-15.8	+15.8	+16.7	-1.7	+1.1	+31.9	+0.6%	+13.88	+24.00
P2	General Price +10%	-4.5%	-76.6	-54.4	-25.7	-5.3	-162.1	+148.6	+154.5	-19.9	+8.2	+291.4	+5.3%	+126.72	+240.04
P3	General Price +25%	-11.6%	-199.6	-144.0	-64.8	-13.4	-421.8	+329.7	+329.1	-61.4	+8.6	+606.0	+11.0%	+263.58	+600.10
P4	Low Priced Off Trade Products +10%	-0.6%	-2.8	-11.2	-5.6	-0.5	-20.1	+34.0	+15.4	-5.4	+5.4	+49.5	+0.9%	+21.52	+17.93
P5	Low Priced Off Trade Products +25%	-1.4%	-7.1	-28.3	-14.0	-1.2	-50.5	+77.5	+38.6	-15.0	+13.6	+114.7	+2.1%	+49.88	+44.83
P6	Low Priced On Trade Products +10%	-0.1%	-6.9	+7.4	-3.0	-0.9	-3.3	+6.9	+30.3	+5.8	-0.8	+42.2	+0.8%	+18.36	+26.56
P7	Low Priced On Trade Products +25%	-0.2%	-17.2	+18.6	-7.2	-2.2	-8.0	+17.2	+61.7	+14.5	-4.2	+89.2	+1.6%	+38.80	+66.39
P8	All Low Priced Products +10%	-0.6%	-9.8	-3.8	-8.5	-1.4	-23.5	+40.9	+45.8	+0.4	+4.7	+91.7	+1.7%	+39.90	+44.49
P9	All Low Priced Products +25%	-1.6%	-24.7	-9.9	-21.2	-3.4	-59.3	+94.9	+100.6	-0.6	+9.2	+204.1	+3.7%	+88.77	+111.22
P10	Minimum Price 15p (Off and On Trade)	-0.0%	+0.3	+0.3	-1.3	+0.0	-0.7	+5.1	+5.9	-0.6	+2.0	+12.5	+0.2%	+5.46	+2.04
P11	Minimum Price 20p " "	-0.1%	-5.1	+2.5	-2.5	+0.1	-5.0	+15.9	+13.9	-1.7	+4.8	+33.0	+0.6%	+14.36	+6.82
P12	Minimum Price 25p	-0.4%	-19.0	+7.8	-5.3	+0.1	-16.3	+36.4	+28.1	-4.7	+9.8	+69.6	+1.3%	+30.26	+17.18
P13	Minimum Price 30p	-1.1%	-40.3	+14.4	-14.6	+0.3	-40.3	+71.3	+53.0	-12.6	+18.5	+130.3	+2.4%	+56.65	+38.91
P14	Minimum Price 35p	-2.4%	-64.7	+9.2	-32.7	+0.4	-87.8	+123.5	+87.7	-29.6	+30.7	+212.3	+3.8%	+92.34	+79.26
P15	Minimum Price 40p	-4.4%	-95.4	-9.0	-56.5	+0.4	-160.5	+185.1	+128.9	-56.5	+45.1	+302.6	+5.5%	+131.60	+139.09
P16	Minimum Price 45p	-7.1%	-133.3	-40.2	-83.8	+0.4	-256.9	+248.0	+173.9	-93.4	+60.8	+389.3	+7.1%	+169.33	+217.53
P17	Minimum Price 50p	-10.3%	-175.6	-85.5	-112.6	+0.3	-373.4	+302.0	+222.0	-140.2	+77.5	+461.3	+8.4%	+200.64	+310.64
P18	Minimum Price 60p	-16.6%	-223.7	-208.5	-173.7	-0.2	-606.2	+384.3	+324.3	-241.7	+113.0	+579.9	+10.5%	+252.22	+524.80
P19	Minimum Price 70p " "	-23.1%	-255.6	-359.0	-226.3	-1.3	-842.2	+388.6	+431.7	-358.3	+149.7	+611.7	+11.1%	+266.04	+757.72
P20	Minimum Price 20p Off and 60p On Trade	-0.2%	-5.8	+2.6	-2.5	+0.1	-5.5	+16.0	+16.3	-1.6	+5.0	+35.8	+0.6%	+15.55	+8.23
P21	Minimum Price 30p Off and 80p On Trade	-1.2%	-44.0	+15.9	-14.5	+0.3	-42.4	+72.8	+66.4	-11.3	+19.2	+147.0	+2.7%	+63.95	+47.63
P22	Minimum Price 40p Off and 100p On Trade	-4.8%	-122.9	+2.1	-56.2	+0.5	-176.4	+195.6	+191.7	-48.3	+44.8	+383.9	+7.0%	+166.98	+194.66
P23	30p Minimum Price Beers Only	-0.9%	-58.0	+23.3	+1.4	+0.1	-33.3	+46.2	+26.0	-6.6	+9.1	+74.8	+1.4%	+32.53	+26.13
P24	30p Minimum Price Wines Only	-0.1%	+9.4	-14.0	+0.5	+0.1	-4.0	+10.4	+15.4	-2.8	+5.3	+28.4	+0.5%	+12.33	+6.62
P25	30p Minimum Price Spirits Only	-0.1%	+8.5	+5.1	-16.5	+0.0	-2.8	+14.5	+11.6	-3.2	+4.0	+27.0	+0.5%	+11.75	+6.16
P26	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%	+0.01	+0.00
P27	Ban Off Trade Discounting if > 50%	-0.0%	+0.0	-0.2	-0.0	-0.0	-0.2	+0.3	+0.1	-0.1	+0.1	+0.4	+0.0%	+0.18	+0.18
P28	Ban Off Trade Discounting if > 40%	-0.1%	-0.4	-4.5	+0.0	-0.0	-4.8	+5.4	+1.3	-1.2	+0.5	+6.0	+0.1%	+2.59	+4.11
P29	Ban Off Trade Discounting if > 30%	-0.3%	-1.5	-11.1	+0.0	-0.0	-12.6	+14.3	+3.4	-3.1	+1.2	+15.7	+0.3%	+6.84	+10.84
P30	Ban Off Trade Discounting if > 20%	-0.8%	-4.0	-26.4	-0.4	-0.1	-30.8	+34.0	+7.8	-7.6	+2.8	+37.0	+0.7%	+16.11	+26.59
P31	Ban Off Trade Discounting if > 10%	-1.7%	-9.6	-50.9	-2.6	-0.2	-63.2	+67.9	+15.9	-16.0	+5.6	+73.4	+1.3%	+31.93	+54.70
P32	Total Ban Off Trade Discounting	-3.1%	-20.8	-83.6	-8.2	-0.9	-113.5	+119.1	+29.5	-29.7	+10.3	+129.3	+2.3%	+56.23	+98.85
P33	Ban Off Trade Discount if Reg Price <30p	-0.1%	-4.4	+1.3	-0.2	+0.0	-3.2	+5.8	+2.8	-0.6	+1.0	+8.9	+0.2%	+3.89	+2.63

Table 3.14: Summary of estimated effects of price policies on consumption, spending and sales – harmful drinkers

3.2.1.7 Summary tables for health, crime and employment harms by priority group

	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)
P1	General Price +1%	-0	-0.0	-0.0	-0.1	-0.0	-0	-0.0	-0.0	-0.1	-0.2	-0.2	-0.5	-1.2	-1.9	-0.0	-1.4	-0.0
P2	General Price +10%	-3	-0.0	-0.4	-0.5	-0.2	-3	-0.1	-0.3	-0.6	-1.4	-1.8	-5.5	-12.1	-19.4	-0.2	-14.2	-0.3
P3	General Price +25%	-7	-0.1	-0.9	-1.2	-0.4	-8	-0.2	-0.9	-1.4	-3.6	-4.6	-13.8	-30.6	-48.9	-0.5	-35.8	-0.6
P4	Low Priced Off Trade Products +10%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.4	-0.0	-0.4	-0.0
P5	Low Priced Off Trade Products +25%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.3	-0.5	-0.9	-0.0	-1.0	-0.0
P6	Low Priced On Trade Products +10%	-1	-0.0	-0.2	-0.2	-0.1	-1	-0.0	-0.2	-0.2	-0.6	-0.7	-2.2	-5.6	-8.5	-0.1	-5.8	-0.1
P7	Low Priced On Trade Products +25%	-3	-0.0	-0.4	-0.5	-0.2	-3	-0.1	-0.4	-0.6	-1.6	-1.8	-5.6	-13.9	-21.2	-0.2	-14.4	-0.3
P8	All Low Priced Products +10%	-1	-0.0	-0.2	-0.2	-0.1	-1	-0.0	-0.2	-0.3	-0.7	-0.8	-2.4	-5.8	-8.9	-0.1	-6.2	-0.1
P9	All Low Priced Products +25%	-3	-0.0	-0.4	-0.6	-0.2	-3	-0.1	-0.4	-0.6	-1.7	-1.9	-6.0	-14.3	-22.2	-0.2	-15.4	-0.3
P10	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	-0.1	-0.0
P11	Minimum Price 20p " "	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.2	-0.0	-0.3	-0.0
P12	Minimum Price 25p	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.4	-0.6	-0.0	-0.7	-0.0
P13	Minimum Price 30p	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.1	-0.1	-0.2	-0.5	-0.8	-1.5	-0.0	-1.6	-0.1
P14	Minimum Price 35p	-0	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.1	-0.2	-0.3	-0.9	-1.4	-2.7	-0.0	-2.6	-0.1
P15	Minimum Price 40p	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.1	-0.3	-0.5	-1.4	-2.3	-4.2	-0.1	-4.0	-0.2
P16	Minimum Price 45p	-1	-0.0	-0.1	-0.2	-0.1	-1	-0.0	-0.1	-0.2	-0.5	-0.8	-2.1	-3.5	-6.4	-0.1	-6.0	-0.2
P17	Minimum Price 50p	-2	-0.0	-0.2	-0.2	-0.1	-2	-0.0	-0.2	-0.3	-0.7	-1.1	-3.0	-5.1	-9.2	-0.1	-8.4	-0.3
P18	Minimum Price 60p	-3	-0.0	-0.3	-0.4	-0.1	-3	-0.1	-0.3	-0.4	-1.1	-1.8	-4.8	-8.4	-15.0	-0.2	-13.6	-0.4
P19	Minimum Price 70p " "	-4	-0.0	-0.4	-0.5	-0.2	-4	-0.1	-0.4	-0.6	-1.5	-2.3	-6.2	-11.4	-19.8	-0.2	-17.5	-0.5
P20	Minimum Price 20p Off and 60p On Trade	-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	-0.3	-0.0
P21	Minimum Price 30p Off and 80p On Trade	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.1	-0.3	-0.5	-1.3	-2.1	-3.9	-0.0	-3.5	-0.1
P22	Minimum Price 40p Off and 100p On Trade	-3	-0.0	-0.3	-0.4	-0.1	-3	-0.0	-0.3	-0.4	-1.0	-1.6	-4.6	-8.2	-14.4	-0.2	-11.5	-0.3
P23	30p Minimum Price Beers Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.4	-0.4	-0.9	-0.0	-1.1	-0.0
P24	30p Minimum Price Wines 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
P25	30p Minimum Price Spirits Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.0	-0.1	-0.4	-0.6	-0.0	-0.5	-0.0
P26	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
P27	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
P28	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	-0.0	-0.0	-0.1	-0.0
P29	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	-0.1	-0.2	-0.0	-0.3	-0.0
P30	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	-0.1	-0.3	-0.5	-0.0	-0.6	-0.0
P31	Ban Off Trade Discounting if > 10%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.3	-0.7	-1.1	-0.0	-1.2	-0.0
P32	Total Ban Off Trade Discounting	-0	-0.0	-0.1	-0.1	-0.0	-0	-0.0	-0.1	-0.1	-0.2	-0.3	-0.6	-1.4	-2.3	-0.0	-2.3	-0.1
P33	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	-0.1	-0.1	-0.0	-0.2	-0.0

Table 3.15: Summary of estimated effects of price policies on health, crime and employment alcohol related harm – 11 to 18 year olds

	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. 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)
P1	General Price +1%	-1	-0.0	-0.0	-0.1	-0.0	-1	-0.0	-0.0	-0.1	-0.2	-0.5	-0.9	-0.4	-1.9	-0.0	-6.6	+0.0
P2	General Price +10%	-4	-0.0	-0.3	-0.4	-0.1	-5	-0.1	-0.3	-0.5	-1.2	-3.8	-7.0	-2.6	-13.4	-0.3	-41.6	+0.0
P3	General Price +25%	-11	-0.0	-0.7	-1.0	-0.3	-13	-0.2	-0.7	-1.3	-2.9	-9.6	-17.5	-6.5	-33.6	-0.7	-102.5	+0.0
P4	Low Priced Off Trade Products +10%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.0	-0.2	-0.3	-0.0	-2.7	+0.0
P5	Low Priced Off Trade Products +25%	+0	-0.0	-0.0	-0.0	-0.0	+0	-0.0	-0.0	-0.0	-0.1	+0.0	+0.4	-0.2	+0.2	+0.0	-2.5	+0.0
P6	Low Priced On Trade Products +10%	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.2	-0.3	-1.0	-1.8	-0.8	-3.6	-0.1	-11.7	+0.0
P7	Low Priced On Trade Products +25%	-3	-0.0	-0.2	-0.2	-0.1	-3	-0.1	-0.2	-0.4	-0.8	-2.2	-4.0	-1.6	-7.9	-0.2	-24.7	+0.0
P8	All Low Priced Products +10%	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.2	-0.4	-0.9	-1.6	-0.8	-3.3	-0.1	-11.6	+0.0
P9	All Low Priced Products +25%	-2	-0.0	-0.2	-0.2	-0.1	-3	-0.1	-0.2	-0.4	-0.8	-2.1	-3.5	-1.6	-7.2	-0.1	-24.6	+0.0
P10	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	-0.1	-0.2	-0.2	-0.5	-0.0	-2.5	+0.0
P11	Minimum Price 20p " "	-0	+0.0	-0.0	-0.0	-0.0	-0	+0.0	-0.0	-0.0	-0.0	-0.1	-0.0	-0.1	-0.2	-0.0	-1.8	+0.0
P12	Minimum Price 25p	+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	-0.9	+0.0
P13	Minimum Price 30p	+0	+0.0	-0.0	-0.0	-0.0	+0	-0.0	-0.0	-0.0	-0.0	+0.1	+0.4	-0.1	+0.4	+0.0	-0.9	+0.0
P14	Minimum Price 35p	+0	-0.0	-0.0	-0.0	-0.0	+0	-0.0	-0.0	-0.0	-0.1	+0.1	+0.4	-0.2	+0.3	+0.0	-2.6	+0.0
P15	Minimum Price 40p	+0	-0.0	-0.0	-0.1	-0.0	-0	-0.0	-0.0	-0.1	-0.2	-0.1	+0.3	-0.5	-0.4	-0.0	-6.3	+0.0
P16	Minimum Price 45p	-0	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.2	-0.4	-0.6	-0.3	-0.9	-1.8	-0.0	-12.4	+0.0
P17	Minimum Price 50p	-1	-0.0	-0.1	-0.2	-0.1	-1	-0.1	-0.1	-0.3	-0.6	-1.0	-1.0	-1.5	-3.5	-0.1	-19.9	+0.0
P18	Minimum Price 60p	-2	-0.0	-0.2	-0.3	-0.1	-3	-0.1	-0.2	-0.5	-1.1	-1.9	-2.1	-2.5	-6.5	-0.1	-34.5	+0.0
P19	Minimum Price 70p " "	-3	-0.0	-0.4	-0.5	-0.2	-4	-0.1	-0.3	-0.7	-1.6	-3.1	-3.6	-3.7	-10.4	-0.2	-51.7	+0.0
P20	Minimum Price 20p Off and 60p On Trade	-0	+0.0	-0.0	-0.0	-0.0	-0	+0.0	-0.0	-0.0	-0.0	-0.1	-0.0	-0.1	-0.2	-0.0	-1.8	+0.0
P21	Minimum Price 30p Off and 80p On Trade	+0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.0	+0.1	-0.2	-0.1	-0.0	-2.1	+0.0
P22	Minimum Price 40p Off and 100p On Trade	-1	-0.0	-0.1	-0.1	-0.0	-2	-0.1	-0.1	-0.2	-0.4	-1.0	-1.4	-1.0	-3.4	-0.1	-13.9	+0.0
P23	30p Minimum Price Beers 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	+0.6	+0.0
P24	30p Minimum Price Wines Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.2	-0.2	-0.6	-0.0	-3.3	+0.0
P25	30p Minimum Price Spirits Only	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.3	-0.8	-0.0	-3.8	+0.0
P26	30p Minimum Price Alcopops (RTDs) Only	-0	+0.0	-0.0	-0.0	-0.0	-0	+0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.2	-0.6	-0.0	-2.8	+0.0
P27	Ban Off Trade Discounting if > 50%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.2	-0.2	-0.6	-0.0	-2.8	+0.0
P28	Ban Off Trade Discounting if > 40%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.2	-0.7	-0.0	-3.0	+0.0
P29	Ban Off Trade Discounting if > 30%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.2	-0.7	-0.0	-3.3	+0.0
P30	Ban Off Trade Discounting if > 20%	-0	-0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.3	-0.8	-0.0	-4.0	+0.0
P31	Ban Off Trade Discounting if > 10%	-0	-0.0	-0.0	-0.1	-0.0	-0	-0.0	-0.0	-0.1	-0.2	-0.3	-0.4	-0.4	-1.2	-0.0	-5.7	+0.0
P32	Total Ban Off Trade Discounting	-1	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.1	-0.3	-0.6	-0.7	-0.6	-1.9	-0.0	-8.8	+0.0
P33	Ban Off Trade Discount if Reg Price <30p	-0	+0.0	-0.0	-0.0	-0.0	-0	-0.0	-0.0	-0.0	-0.1	-0.2	-0.2	-0.2	-0.6	-0.0	-2.7	+0.0

Table 3.16: Summary of estimated effects of price policies on health, crime and employment alcohol related harm – 18 to 24 year old hazardous 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)
P1	General Price +1%	-11	-0.0	-1.0	-1.2	-0.3	-14	-0.3	-1.2	-1.8	-3.8	-0.9	-1.6	-0.6	-3.1	-0.1	-20.4	+0.0
P2	General Price +10%	-44	-0.3	-2.6	-3.4	-0.9	-72	-2.9	-2.8	-8.5	-13.6	-4.4	-7.0	-3.3	-14.7	-0.3	-101.5	+0.0
P3	General Price +25%	-101	-0.7	-5.4	-7.2	-2.0	-161	-7.5	-5.6	-20.0	-30.2	-10.3	-16.4	-7.8	-34.5	-0.8	-240.2	+0.0
P4	Low Priced Off Trade Products +10%	-9	-0.0	-0.9	-1.0	-0.3	-11	-0.4	-1.0	-1.7	-3.2	-0.5	-0.8	-0.3	-1.6	-0.0	-12.6	+0.0
P5	Low Priced Off Trade Products +25%	-12	-0.1	-1.0	-1.3	-0.3	-19	-0.9	-1.2	-2.9	-4.6	-0.3	-0.4	-0.4	-1.1	-0.0	-14.2	+0.0
P6	Low Priced On Trade Products +10%	-9	-0.0	-1.0	-1.1	-0.3	-11	-0.2	-1.1	-1.6	-3.4	-1.0	-1.7	-0.7	-3.4	-0.1	-19.1	+0.0
P7	Low Priced On Trade Products +25%	-13	-0.0	-1.1	-1.3	-0.4	-18	-0.6	-1.3	-2.4	-4.4	-1.7	-2.9	-1.2	-5.8	-0.1	-30.6	+0.0
P8	All Low Priced Products +10%	-12	-0.1	-1.1	-1.3	-0.4	-16	-0.6	-1.2	-2.4	-4.2	-0.9	-1.5	-0.7	-3.2	-0.1	-20.3	+0.0
P9	All Low Priced Products +25%	-19	-0.1	-1.4	-1.8	-0.5	-30	-1.5	-1.6	-4.4	-6.6	-1.5	-2.4	-1.3	-5.2	-0.1	-33.6	+0.0
P10	Minimum Price 15p (Off and On Trade)	-5	-0.0	-0.6	-0.7	-0.2	-6	-0.0	-0.8	-0.8	-2.0	-0.5	-0.9	-0.3	-1.8	-0.0	-11.2	+0.0
P11	Minimum Price 20p " "	-5	-0.0	-0.6	-0.7	-0.2	-5	-0.0	-0.8	-0.9	-2.0	-0.4	-0.8	-0.3	-1.5	-0.0	-9.9	+0.0
P12	Minimum Price 25p	-5	-0.0	-0.6	-0.7	-0.2	-5	-0.1	-0.7	-0.9	-2.0	-0.3	-0.5	-0.2	-1.0	-0.0	-7.9	+0.0
P13	Minimum Price 30p	-6	-0.0	-0.7	-0.7	-0.2	-8	-0.3	-0.8	-1.4	-2.5	-0.2	-0.2	-0.1	-0.5	-0.0	-6.4	+0.0
P14	Minimum Price 35p	-11	-0.1	-0.9	-1.2	-0.3	-18	-1.0	-1.1	-2.9	-4.4	-0.2	-0.1	-0.2	-0.5	-0.0	-9.8	+0.0
P15	Minimum Price 40p	-19	-0.2	-1.3	-1.8	-0.4	-33	-2.0	-1.5	-5.2	-7.4	-0.3	-0.2	-0.4	-1.0	-0.0	-19.5	+0.0
P16	Minimum Price 45p	-32	-0.3	-2.0	-2.8	-0.7	-54	-3.4	-2.2	-8.5	-12.0	-0.8	-0.7	-0.9	-2.3	-0.1	-36.3	+0.0
P17	Minimum Price 50p	-47	-0.5	-2.7	-3.9	-1.0	-79	-5.1	-3.0	-12.5	-17.3	-1.4	-1.4	-1.5	-4.3	-0.1	-59.8	+0.0
P18	Minimum Price 60p	-85	-0.9	-4.6	-6.7	-1.7	-136	-9.3	-5.0	-22.4	-30.0	-3.1	-3.5	-3.2	-9.8	-0.2	-124.9	+0.0
P19	Minimum Price 70p " "	-125	-1.3	-6.8	-9.8	-2.5	-185	-13.8	-7.2	-33.2	-43.8	-5.1	-6.0	-5.1	-16.2	-0.4	-199.8	+0.0
P20	Minimum Price 20p Off and 60p On Trade	-5	-0.0	-0.6	-0.7	-0.2	-5	-0.0	-0.8	-0.9	-2.0	-0.4	-0.8	-0.3	-1.5	-0.0	-9.9	+0.0
P21	Minimum Price 30p Off and 80p On Trade	-6	-0.0	-0.7	-0.8	-0.2	-8	-0.3	-0.8	-1.4	-2.6	-0.2	-0.3	-0.1	-0.6	-0.0	-7.1	+0.0
P22	Minimum Price 40p Off and 100p On Trade	-24	-0.2	-1.6	-2.2	-0.6	-40	-2.3	-1.8	-6.2	-9.0	-0.8	-1.1	-0.7	-2.5	-0.1	-27.5	+0.0
P23	30p Minimum Price Beers Only	-3	-0.0	-0.4	-0.5	-0.1	-2	-0.0	-0.5	-0.6	-1.4	-0.2	-0.3	-0.1	-0.5	-0.0	-6.4	+0.0
P24	30p Minimum Price Wines Only	-9	-0.0	-0.9	-1.1	-0.3	-11	-0.2	-1.1	-1.5	-3.3	-0.6	-1.1	-0.4	-2.1	-0.0	-14.6	+0.0
P25	30p Minimum Price Spirits Only	-5	-0.0	-0.7	-0.8	-0.2	-6	-0.1	-0.8	-1.0	-2.2	-0.4	-0.8	-0.3	-1.5	-0.0	-8.3	+0.0
P26	30p Minimum Price Alcopops (RTDs) Only	-7	+0.0	-0.8	-0.9	-0.3	-7	+0.0	-1.0	-1.0	-2.6	-0.5	-1.0	-0.3	-1.8	-0.0	-11.6	+0.0
P27	Ban Off Trade Discounting if > 50%	-7	-0.0	-0.8	-0.9	-0.3	-7	-0.0	-1.0	-1.1	-2.7	-0.5	-1.0	-0.3	-1.8	-0.0	-11.6	+0.0
P28	Ban Off Trade Discounting if > 40%	-8	-0.0	-0.9	-1.0	-0.3	-9	-0.1	-1.0	-1.3	-3.0	-0.6	-1.0	-0.4	-2.0	-0.0	-13.1	+0.0
P29	Ban Off Trade Discounting if > 30%	-9	-0.0	-1.0	-1.1	-0.3	-11	-0.2	-1.1	-1.6	-3.4	-0.6	-1.1	-0.4	-2.2	-0.1	-15.6	+0.0
P30	Ban Off Trade Discounting if > 20%	-13	-0.0	-1.1	-1.3	-0.4	-17	-0.5	-1.3	-2.3	-4.5	-0.8	-1.3	-0.6	-2.6	-0.1	-21.6	+0.0
P31	Ban Off Trade Discounting if > 10%	-19	-0.1	-1.4	-1.7	-0.5	-28	-1.1	-1.6	-3.6	-6.4	-1.1	-1.6	-0.9	-3.5	-0.1	-32.4	+0.0
P32	Total Ban Off Trade Discounting	-27	-0.2	-1.8	-2.3	-0.6	-44	-1.9	-2.0	-5.7	-9.3	-1.5	-2.2	-1.3	-5.0	-0.1	-49.1	+0.0
P33	Ban Off Trade Discount if Reg Price <30p	-5	-0.0	-0.6	-0.7	-0.2	-5	-0.0	-0.8	-0.8	-2.0	-0.5	-0.9	-0.3	-1.7	-0.0	-11.3	+0.0

Table 3.17: Summary of estimated effects of price policies on health, crime and employment alcohol related harm – moderate 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)
P1	General Price +1%	-14	-0.1	-0.9	-1.1	-0.3	-68	-0.6	-1.3	-2.6	-4.2	-0.8	-1.4	-1.1	-3.3	-0.1	-17.7	+0.0
P2	General Price +10%	-96	-0.5	-3.1	-4.5	-1.2	-617	-6.4	-3.5	-16.4	-20.5	-6.9	-12.4	-8.7	-28.0	-0.5	-129.5	+0.0
P3	General Price +25%	-236	-1.4	-6.9	-10.4	-2.7	-1535	-16.6	-7.5	-40.6	-49.0	-17.5	-31.7	-21.8	-71.0	-1.3	-327.3	+0.0
P4	Low Priced Off Trade Products +10%	-13	-0.1	-0.8	-1.0	-0.3	-81	-0.8	-1.2	-2.7	-3.9	-0.1	+0.1	-0.4	-0.4	-0.0	-7.5	+0.0
P5	Low Priced Off Trade Products +25%	-26	-0.2	-1.0	-1.4	-0.4	-190	-2.0	-1.4	-5.3	-6.5	+0.0	+0.5	-0.6	-0.1	+0.0	-10.4	+0.0
P6	Low Priced On Trade Products +10%	-7	-0.0	-0.8	-0.9	-0.3	-23	-0.2	-1.1	-1.6	-2.9	-1.3	-2.7	-3.1	-7.1	-0.1	-16.6	+0.0
P7	Low Priced On Trade Products +25%	-11	-0.1	-1.0	-1.2	-0.3	-51	-0.6	-1.3	-2.5	-4.1	-3.0	-6.3	-7.3	-16.7	-0.2	-32.6	+0.0
P8	All Low Priced Products +10%	-16	-0.1	-1.0	-1.2	-0.3	-98	-1.0	-1.3	-3.4	-4.9	-1.3	-2.4	-3.3	-7.0	-0.1	-18.6	+0.0
P9	All Low Priced Products +25%	-35	-0.2	-1.4	-2.0	-0.5	-236	-2.5	-1.8	-6.9	-8.7	-2.9	-5.8	-7.7	-16.4	-0.2	-38.0	+0.0
P10	Minimum Price 15p (Off and On Trade)	-2	+0.0	+0.3	+0.3	+0.1	-0	+0.0	+0.5	+0.5	+0.9	-0.1	-0.1	-0.2	-0.4	-0.0	-4.7	+0.0
P11	Minimum Price 20p " "	-1	+0.0	-0.4	-0.5	-0.1	+5	+0.1	-0.7	-0.6	-1.4	-0.0	+0.1	-0.2	-0.1	-0.0	-3.4	+0.0
P12	Minimum Price 25p	+1	+0.0	-0.4	-0.4	-0.1	+16	+0.2	-0.7	-0.3	-1.1	+0.1	+0.4	-0.2	+0.3	+0.0	-1.1	+0.0
P13	Minimum Price 30p	-0	+0.0	-0.5	-0.5	-0.1	+8	+0.1	-0.8	-0.5	-1.5	+0.2	+0.6	-0.4	+0.4	+0.0	-0.5	+0.0
P14	Minimum Price 35p	-15	-0.1	-0.8	-1.0	-0.3	-102	-1.0	-1.2	-3.1	-4.5	+0.0	+0.5	-0.8	-0.3	+0.0	-8.1	+0.0
P15	Minimum Price 40p	-44	-0.3	-1.4	-2.1	-0.5	-320	-3.3	-1.8	-8.3	-10.2	-0.5	-0.2	-1.7	-2.4	-0.0	-26.4	+0.0
P16	Minimum Price 45p	-88	-0.6	-2.4	-3.8	-0.9	-642	-6.8	-2.9	-16.3	-18.7	-1.5	-1.7	-3.1	-6.4	-0.1	-58.8	+0.0
P17	Minimum Price 50p	-143	-1.0	-3.6	-5.9	-1.4	-1044	-11.4	-4.3	-26.6	-29.8	-3.0	-3.8	-4.9	-11.7	-0.2	-103.7	+0.0
P18	Minimum Price 60p	-266	-1.9	-6.7	-11.0	-2.6	-1929	-22.1	-7.6	-50.9	-55.3	-6.0	-7.9	-9.1	-23.0	-0.5	-205.3	+0.0
P19	Minimum Price 70p " "	-392	-2.9	-9.6	-16.2	-3.9	-2819	-33.9	-10.8	-76.9	-81.6	-9.4	-12.4	-13.1	-34.9	-0.7	-319.4	+0.0
P20	Minimum Price 20p Off and 60p On Trade	-1	+0.0	-0.4	-0.5	-0.1	+5	+0.1	-0.7	-0.6	-1.4	-0.0	+0.1	-0.2	-0.1	-0.0	-3.4	+0.0
P21	Minimum Price 30p Off and 80p On Trade	-1	+0.0	-0.5	-0.5	-0.1	+6	+0.1	-0.8	-0.6	-1.6	-0.0	-0.0	-0.9	-1.0	-0.0	-2.4	+0.0
P22	Minimum Price 40p Off and 100p On Trade	-53	-0.3	-1.7	-2.5	-0.6	-372	-3.8	-2.1	-9.7	-11.8	-1.8	-3.2	-4.2	-9.2	-0.1	-39.7	+0.0
P23	30p Minimum Price Beers Only	+6	+0.1	+0.5	+0.6	+0.2	+56	+0.6	+0.7	+2.0	+2.3	+0.1	+0.3	-0.3	+0.2	+0.0	+0.2	+0.0
P24	30p Minimum Price Wines Only	-11	-0.0	-0.8	-1.0	-0.3	-55	-0.5	-1.2	-2.2	-3.5	-0.2	-0.1	-0.3	-0.7	-0.0	-8.8	+0.0
P25	30p Minimum Price Spirits Only	-3	-0.0	-0.6	-0.6	-0.2	-5	-0.0	-0.9	-1.0	-2.0	-0.1	+0.1	-0.2	-0.2	-0.0	-2.9	+0.0
P26	30p Minimum Price Alcopops (RTDs) Only	-4	+0.0	-0.7	-0.7	-0.2	-5	+0.0	-1.0	-1.1	-2.3	-0.2	-0.2	-0.2	-0.6	-0.0	-5.7	+0.0
P27	Ban Off Trade Discounting if > 50%	-5	-0.0	-0.7	-0.8	-0.2	-6	-0.0	-1.1	-1.1	-2.4	-0.2	-0.2	-0.2	-0.6	-0.0	-5.7	+0.0
P28	Ban Off Trade Discounting if > 40%	-8	-0.0	-0.8	-0.9	-0.3	-31	-0.3	-1.1	-1.7	-3.0	-0.2	-0.2	-0.3	-0.8	-0.0	-8.0	+0.0
P29	Ban Off Trade Discounting if > 30%	-13	-0.1	-0.9	-1.1	-0.3	-70	-0.7	-1.3	-2.6	-4.1	-0.3	-0.4	-0.4	-1.1	-0.0	-11.9	+0.0
P30	Ban Off Trade Discounting if > 20%	-25	-0.1	-1.2	-1.5	-0.4	-157	-1.6	-1.5	-4.7	-6.3	-0.6	-0.7	-0.7	-2.0	-0.0	-21.3	+0.0
P31	Ban Off Trade Discounting if > 10%	-45	-0.3	-1.6	-2.3	-0.6	-303	-3.1	-2.0	-8.3	-10.3	-1.0	-1.3	-1.3	-3.7	-0.1	-38.3	+0.0
P32	Total Ban Off Trade Discounting	-74	-0.5	-2.3	-3.4	-0.9	-509	-5.4	-2.7	-13.4	-16.0	-1.8	-2.5	-2.3	-6.6	-0.1	-64.3	+0.0
P33	Ban Off Trade Discount if Reg Price <30p	-2	+0.0	-0.5	-0.5	-0.2	-0	+0.0	-0.8	-0.8	-1.6	-0.2	-0.1	-0.2	-0.6	-0.0	-5.4	+0.0

Table 3.18: Summary of estimated effects of price policies on health, crime and employment alcohol related harm – hazardous 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)
P1	General Price +1%	-9	-0.1	-0.2	-0.4	-0.1	-75	-1.1	-0.2	-2.6	-2.0	-0.3	-0.5	-0.3	-1.1	-0.0	-5.0	-1.2
P2	General Price +10%	-91	-1.0	-1.3	-3.6	-0.6	-765	-10.8	-1.3	-24.5	-18.4	-3.1	-5.6	-3.4	-12.1	-0.2	-57.7	-11.8
P3	General Price +25%	-229	-2.5	-3.0	-8.6	-1.5	-1923	-26.3	-3.0	-59.4	-45.2	-8.1	-14.5	-8.8	-31.4	-0.6	-151.1	-29.6
P4	Low Priced Off Trade Products +10%	-15	-0.2	-0.2	-0.6	-0.1	-119	-1.5	-0.3	-3.5	-2.9	-0.1	-0.1	-0.2	-0.4	-0.0	-3.9	-1.3
P5	Low Priced Off Trade Products +25%	-37	-0.4	-0.5	-1.3	-0.2	-299	-3.8	-0.5	-8.6	-6.9	-0.3	-0.3	-0.5	-1.1	-0.0	-11.0	-3.2
P6	Low Priced On Trade Products +10%	-3	-0.1	-0.1	-0.2	-0.0	-26	-0.5	-0.1	-1.1	-0.9	-0.5	-1.1	-1.0	-2.6	-0.0	-3.8	-0.3
P7	Low Priced On Trade Products +25%	-8	-0.1	-0.2	-0.5	-0.1	-65	-1.2	-0.2	-2.7	-2.0	-1.3	-2.8	-2.5	-6.5	-0.1	-10.6	-0.8
P8	All Low Priced Products +10%	-18	-0.2	-0.3	-0.8	-0.1	-147	-2.0	-0.3	-4.6	-3.7	-0.6	-1.3	-1.2	-3.1	-0.0	-8.6	-1.6
P9	All Low Priced Products +25%	-46	-0.5	-0.6	-1.8	-0.3	-371	-5.0	-0.7	-11.4	-8.8	-1.6	-3.2	-3.0	-7.8	-0.1	-22.6	-4.0
P10	Minimum Price 15p (Off and On Trade)	+0	-0.0	+0.0	+0.0	+0.0	-2	-0.1	+0.1	-0.1	+0.1	+0.2	+0.3	+0.1	+0.5	+0.0	+1.2	-0.0
P11	Minimum Price 20p " "	-1	-0.0	+0.0	-0.0	-0.0	-21	-0.4	+0.0	-0.9	-0.4	+0.2	+0.5	-0.0	+0.7	+0.0	+0.3	-0.3
P12	Minimum Price 25p	-6	-0.1	-0.0	-0.3	-0.0	-67	-1.3	-0.0	-2.7	-1.5	+0.2	+0.5	-0.2	+0.4	+0.0	-3.0	-1.2
P13	Minimum Price 30p	-18	-0.3	-0.3	-0.9	-0.2	-177	-3.0	-0.3	-6.7	-4.4	-0.0	+0.1	-0.6	-0.5	-0.0	-10.5	-2.9
P14	Minimum Price 35p	-48	-0.6	-0.7	-2.0	-0.3	-423	-6.3	-0.7	-14.2	-10.2	-0.5	-0.6	-1.2	-2.3	-0.0	-24.2	-6.2
P15	Minimum Price 40p	-92	-1.1	-1.2	-3.6	-0.6	-796	-11.3	-1.2	-25.3	-18.6	-1.2	-1.5	-2.1	-4.7	-0.1	-44.3	-11.0
P16	Minimum Price 45p	-147	-1.6	-1.8	-5.5	-0.9	-1267	-17.5	-1.8	-39.2	-29.1	-2.1	-2.8	-3.1	-8.0	-0.2	-71.0	-17.3
P17	Minimum Price 50p	-212	-2.3	-2.5	-7.8	-1.3	-1818	-24.6	-2.6	-55.0	-41.3	-3.1	-4.4	-4.3	-11.8	-0.2	-102.9	-24.7
P18	Minimum Price 60p	-339	-3.6	-4.0	-12.0	-2.1	-2892	-37.4	-4.0	-83.8	-64.8	-5.3	-7.7	-6.5	-19.5	-0.4	-166.3	-37.5
P19	Minimum Price 70p " "	-466	-4.7	-5.5	-16.1	-2.8	-3961	-49.6	-5.5	-110.9	-87.7	-7.0	-9.7	-8.3	-25.1	-0.5	-225.4	-48.2
P20	Minimum Price 20p Off and 60p On Trade	-2	-0.0	+0.0	-0.1	-0.0	-21	-0.4	+0.0	-0.9	-0.4	+0.2	+0.3	-0.0	+0.5	+0.0	-0.2	-0.4
P21	Minimum Price 30p Off and 80p On Trade	-19	-0.3	-0.3	-0.9	-0.2	-183	-3.1	-0.3	-6.9	-4.6	-0.3	-0.5	-0.9	-1.6	-0.0	-12.8	-3.2
P22	Minimum Price 40p Off and 100p On Trade	-105	-1.2	-1.4	-4.1	-0.7	-900	-12.9	-1.4	-28.9	-21.1	-2.1	-3.6	-3.3	-9.0	-0.2	-53.8	-12.1
P23	30p Minimum Price Beers Only	-10	-0.2	-0.1	-0.5	-0.1	-111	-2.1	-0.1	-4.7	-2.7	-0.4	-0.8	-0.3	-1.5	-0.0	-11.5	-2.8
P24	30p Minimum Price Wines Only	-5	-0.1	-0.1	-0.2	-0.0	-42	-0.5	-0.1	-1.2	-1.1	+0.5	+1.1	+0.3	+1.9	+0.0	+3.6	-0.1
P25	30p Minimum Price Spirits Only	-3	-0.0	-0.1	-0.2	-0.0	-23	-0.3	-0.1	-0.8	-0.7	-0.1	-0.1	-0.5	-0.6	-0.0	-0.9	-0.1
P26	30p Minimum Price Alcopops (RTDs) Only	-0	+0.0	-0.1	-0.1	-0.0	+0	+0.0	-0.1	-0.1	-0.2	+0.0	+0.0	+0.1	+0.1	+0.0	+0.8	+0.0
P27	Ban Off Trade Discounting if > 50%	-0	-0.0	-0.1	-0.1	-0.0	-1	-0.0	-0.1	-0.1	-0.2	+0.0	+0.0	+0.1	+0.1	+0.0	+0.7	-0.0
P28	Ban Off Trade Discounting if > 40%	-3	-0.0	-0.1	-0.2	-0.0	-24	-0.3	-0.1	-0.8	-0.7	+0.0	+0.0	+0.0	+0.0	+0.0	-0.4	-0.3
P29	Ban Off Trade Discounting if > 30%	-8	-0.1	-0.2	-0.4	-0.1	-63	-0.9	-0.2	-2.1	-1.7	-0.0	-0.1	-0.0	-0.2	-0.0	-2.4	-0.9
P30	Ban Off Trade Discounting if > 20%	-19	-0.2	-0.3	-0.8	-0.1	-155	-2.1	-0.4	-4.9	-3.9	-0.2	-0.3	-0.2	-0.6	-0.0	-7.1	-2.1
P31	Ban Off Trade Discounting if > 10%	-38	-0.4	-0.5	-1.5	-0.3	-317	-4.4	-0.6	-9.9	-7.6	-0.5	-0.6	-0.5	-1.5	-0.0	-15.6	-4.3
P32	Total Ban Off Trade Discounting	-68	-0.7	-0.9	-2.5	-0.4	-568	-7.8	-0.9	-17.5	-13.3	-0.9	-1.3	-0.9	-3.1	-0.1	-29.3	-7.7
P33	Ban Off Trade Discount if Reg Price <30p	-1	-0.0	-0.1	-0.1	-0.0	-13	-0.2	-0.1	-0.6	-0.5	-0.0	-0.0	+0.0	-0.0	-0.0	-0.4	-0.3

Table 3.19: Summary of estimated effects of price policies on health, crime and employment alcohol related harm – harmful drinkers

3.2.1.8 Summary tables for financial value of harm reductions by priority group

	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
P1	General Price +1%	-0.2	-1.4	-.0	-.1	-1.9	-.4	-.4	-2.6	-2	-12	-	-1	-16	-3	-3	-22
P2	General Price +10%	-2.2	-14.6	-.4	-1.1	-18.4	-3.2	-4.1	-25.7	-20	-122	-4	-9	-155	-29	-34	-217
P3	General Price +25%	-5.5	-36.8	-1.1	-2.6	-46.0	-8.0	-10.4	-64.5	-51	-306	-9	-22	-388	-72	-87	-546
P4	Low Priced Off Trade Products +10%	-0.1	-.3	-.0	-.1	-.5	-.1	-.1	-.7	-1	-3	-	-1	-4	-1	-1	-6
P5	Low Priced Off Trade Products +25%	-0.1	-.8	-.0	-.2	-1.1	-.2	-.3	-1.6	-1	-6	-	-2	-10	-2	-2	-14
P6	Low Priced On Trade Products +10%	-1.0	-6.5	-.2	-.5	-8.1	-1.5	-1.7	-11.3	-9	-54	-1	-4	-68	-13	-14	-95
P7	Low Priced On Trade Products +25%	-2.4	-16.2	-.4	-1.1	-20.1	-3.5	-4.2	-27.8	-22	-135	-4	-9	-169	-32	-35	-236
P8	All Low Priced Products +10%	-1.0	-6.8	-.2	-.5	-8.6	-1.5	-1.8	-11.9	-9	-57	-2	-4	-72	-13	-15	-101
P9	All Low Priced Products +25%	-2.5	-17.0	-.5	-1.3	-21.2	-3.7	-4.5	-29.4	-23	-141	-4	-11	-179	-33	-37	-249
P10	Minimum Price 15p (Off and On Trade)	-0.0	-.0	-.0	-.0	-.1	-.1	-.0	-.2	-	-	-	-	-1	-1	-	-1
P11	Minimum Price 20p " "	-0.1	-.2	-.0	-.0	-.3	-.1	-.1	-.5	-1	-2	-	-	-3	-1	-1	-4
P12	Minimum Price 25p	-0.1	-.5	-.0	-.1	-.8	-.2	-.2	-1.1	-1	-5	-	-1	-7	-1	-1	-10
P13	Minimum Price 30p	-0.2	-1.3	-.0	-.3	-1.8	-.3	-.4	-2.5	-2	-10	-	-2	-15	-3	-3	-21
P14	Minimum Price 35p	-0.4	-2.2	-.1	-.5	-3.1	-.5	-.7	-4.3	-3	-18	-1	-4	-26	-4	-6	-36
P15	Minimum Price 40p	-0.5	-3.4	-.1	-.7	-4.7	-.8	-1.1	-6.6	-5	-28	-1	-6	-39	-7	-9	-55
P16	Minimum Price 45p	-0.8	-5.0	-.2	-1.0	-7.0	-1.1	-1.6	-9.7	-7	-42	-2	-8	-58	-10	-14	-82
P17	Minimum Price 50p	-1.1	-7.2	-.3	-1.2	-9.8	-1.6	-2.3	-13.7	-10	-60	-2	-10	-82	-14	-19	-115
P18	Minimum Price 60p	-1.8	-11.6	-.4	-1.8	-15.6	-2.6	-3.7	-21.9	-16	-97	-4	-15	-131	-22	-31	-184
P19	Minimum Price 70p " "	-2.4	-15.2	-.5	-2.0	-20.1	-3.4	-4.8	-28.3	-21	-127	-5	-17	-169	-30	-40	-238
P20	Minimum Price 20p Off and 60p On Trade	-0.1	-.2	-.0	-.1	-.4	-.1	-.1	-.5	-1	-2	-	-	-3	-1	-1	-4
P21	Minimum Price 30p Off and 80p On Trade	-0.5	-3.0	-.1	-.5	-4.1	-.7	-1.0	-5.7	-4	-25	-1	-4	-34	-6	-8	-48
P22	Minimum Price 40p Off and 100p On Trade	-1.7	-10.8	-.4	-1.3	-14.1	-2.3	-3.4	-19.8	-15	-90	-3	-11	-118	-20	-29	-167
P23	30p Minimum Price Beers Only	-0.2	-.8	-.0	-.2	-1.2	-.2	-.3	-1.7	-1	-6	-	-2	-10	-2	-2	-14
P24	30p Minimum Price Wines Only	-0.0	+.0	-.0	+.0	-.0	-.1	-.0	-.1	-	+	-	+	-	-	-	-1
P25	30p Minimum Price Spirits Only	-0.1	-.5	-.0	-.1	-.7	-.2	-.1	-1.0	-1	-4	-	-1	-6	-1	-1	-8
P26	30p Minimum Price Alcopops (RTDs) Only	-0.0	+.0	-.0	+.0	-.0	-.1	-.0	-.1	-.2	+.0	-.0	+.0	-.2	-.4	-.0	-.6
P27	Ban Off Trade Discounting if > 50%	-0.0	+.0	-.0	-.0	-.0	-.1	-.0	-.1	-	+	-	-	-	-	-	-1
P28	Ban Off Trade Discounting if > 40%	-0.0	-.1	-.0	-.0	-.1	-.1	-.0	-.2	-	-1	-	-	-1	-1	-	-2
P29	Ban Off Trade Discounting if > 30%	-0.1	-.2	-.0	-.0	-.3	-.1	-.1	-.4	-1	-2	-	-	-2	-1	-	-4
P30	Ban Off Trade Discounting if > 20%	-0.1	-.4	-.0	-.1	-.6	-.2	-.1	-.9	-1	-4	-	-1	-5	-1	-1	-7
P31	Ban Off Trade Discounting if > 10%	-0.2	-1.0	-.0	-.1	-1.3	-.3	-.3	-1.9	-2	-8	-	-1	-11	-2	-2	-16
P32	Total Ban Off Trade Discounting	-0.3	-1.9	-.1	-.2	-2.5	-.5	-.5	-3.5	-3	-15	-1	-2	-21	-4	-4	-29
P33	Ban Off Trade Discount if Reg Price <30p	-0.0	-.1	-.0	-.0	-.2	-.1	-.0	-.3	-	-1	-	-	-1	-1	-	-2

Table 3.20: Summary of estimated financial value of harm reductions – 11 to 18 year olds

	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
P1	General Price +1%	-0.3	-2.2	-.4	+.0	-2.9	-.4	-.8	-4.1	-3	-18	-3	+	-24	-4	-6	-34
P2	General Price +10%	-1.8	-15.2	-2.6	+.0	-19.6	-2.4	-5.4	-27.3	-17	-126	-21	+	-165	-24	-45	-233
P3	General Price +25%	-4.4	-37.8	-6.3	+.0	-48.6	-5.9	-13.4	-67.9	-43	-314	-53	+	-410	-59	-111	-580
P4	Low Priced Off Trade Products +10%	-0.1	-.5	-.2	+.0	-.8	-.2	-.1	-1.0	-1	-4	-1	+	-6	-1	-1	-9
P5	Low Priced Off Trade Products +25%	-0.1	-.1	-.1	+.0	-.3	-.2	+.1	-.4	-1	-1	-1	+	-3	-1	+1	-4
P6	Low Priced On Trade Products +10%	-0.5	-4.1	-.7	+.0	-5.3	-.7	-1.4	-7.5	-5	-34	-6	+	-45	-7	-12	-64
P7	Low Priced On Trade Products +25%	-1.1	-8.9	-1.5	+.0	-11.5	-1.4	-3.1	-16.1	-11	-74	-13	+	-98	-15	-26	-139
P8	All Low Priced Products +10%	-0.5	-3.9	-.7	+.0	-5.1	-.7	-1.3	-7.1	-5	-32	-6	+	-43	-7	-11	-61
P9	All Low Priced Products +25%	-1.0	-8.4	-1.5	+.0	-10.9	-1.5	-2.9	-15.2	-11	-69	-13	+	-93	-15	-24	-132
P10	Minimum Price 15p (Off and On Trade)	-0.1	-.7	-.1	+.0	-.9	-.1	-.2	-1.2	-1	-5	-1	+	-7	-1	-2	-10
P11	Minimum Price 20p " "	-0.0	-.4	-.1	+.0	-.5	-.1	-.1	-.7	-	-3	-1	+	-4	-1	-1	-6
P12	Minimum Price 25p	-0.0	+.0	-.0	+.0	-.0	-.0	+.1	-.0	-	+	-	+	-	-	+1	-
P13	Minimum Price 30p	-0.0	+.2	-.0	+.0	+.2	-.1	+.2	+.3	-	+2	-	+	+2	-1	+1	+2
P14	Minimum Price 35p	-0.1	-.1	-.1	+.0	-.3	-.2	+.1	-.3	-1	-	-1	+	-3	-2	+1	-3
P15	Minimum Price 40p	-0.2	-1.0	-.4	+.0	-1.6	-.4	-.2	-2.1	-2	-8	-3	+	-14	-4	-1	-19
P16	Minimum Price 45p	-0.5	-2.7	-.7	+.0	-3.9	-.8	-.7	-5.4	-5	-23	-6	+	-34	-8	-6	-47
P17	Minimum Price 50p	-0.8	-4.9	-1.2	+.0	-6.9	-1.3	-1.4	-9.5	-8	-41	-10	+	-58	-12	-12	-82
P18	Minimum Price 60p	-1.4	-8.9	-2.0	+.0	-12.3	-2.2	-2.6	-17.1	-14	-74	-17	+	-105	-21	-22	-148
P19	Minimum Price 70p " "	-2.1	-13.7	-3.1	+.0	-18.9	-3.3	-4.1	-26.3	-21	-114	-25	+	-161	-31	-34	-227
P20	Minimum Price 20p Off and 60p On Trade	-0.0	-.4	-.1	+.0	-.5	-.1	-.1	-.7	-	-3	-1	+	-4	-1	-1	-6
P21	Minimum Price 30p Off and 80p On Trade	-0.1	-.3	-.1	+.0	-.4	-.1	-.0	-.6	-1	-2	-1	+	-4	-1	-	-6
P22	Minimum Price 40p Off and 100p On Trade	-0.6	-4.2	-.8	+.0	-5.6	-.9	-1.3	-7.8	-6	-35	-7	+	-48	-9	-11	-68
P23	30p Minimum Price Beers Only	+0.1	+.5	+.0	+.0	+.6	+.1	+.2	+.9	+	+4	+	+	+5	+	+2	+8
P24	30p Minimum Price Wines Only	-0.1	-.8	-.2	+.0	-1.1	-.2	-.2	-1.6	-1	-7	-2	+	-9	-2	-2	-13
P25	30p Minimum Price Spirits Only	-0.2	-1.0	-.2	+.0	-1.4	-.2	-.3	-2.0	-1	-9	-2	+	-12	-2	-3	-17
P26	30p Minimum Price Alcopops (RTDs) Only	-0.1	-.8	-.2	+.0	-1.1	-.2	-.3	-1.5	-1.0	-6.7	-1.4	+.0	-9.1	-1.5	-2.2	-12.8
P27	Ban Off Trade Discounting if > 50%	-0.1	-.8	-.2	+.0	-1.1	-.2	-.2	-1.5	-1	-7	-1	+	-9	-1	-2	-12
P28	Ban Off Trade Discounting if > 40%	-0.1	-.8	-.2	+.0	-1.1	-.2	-.2	-1.5	-1	-7	-1	+	-9	-1	-2	-13
P29	Ban Off Trade Discounting if > 30%	-0.1	-.9	-.2	+.0	-1.2	-.2	-.3	-1.6	-1	-7	-2	+	-10	-2	-2	-14
P30	Ban Off Trade Discounting if > 20%	-0.1	-1.1	-.2	+.0	-1.5	-.2	-.3	-2.0	-1	-9	-2	+	-12	-2	-3	-17
P31	Ban Off Trade Discounting if > 10%	-0.2	-1.5	-.3	+.0	-2.1	-.4	-.5	-2.9	-2	-13	-3	+	-18	-3	-4	-25
P32	Total Ban Off Trade Discounting	-0.4	-2.5	-.5	+.0	-3.3	-.6	-.8	-4.7	-3	-20	-4	+	-28	-5	-6	-40
P33	Ban Off Trade Discount if Reg Price <30p	-0.1	-.7	-.2	+.0	-1.0	-.1	-.2	-1.3	-1	-6	-1	+	-8	-1	-2	-11

Table 3.21: Summary of estimated financial value of harm reductions – 18 to 24 year old hazardous 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	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
P1	General Price +1%	-6.2	-3.7	-2.0	+.0	-11.9	-6.9	-1.4	-20.2	-62	-31	-17	+	-110	-75	-12	-197
P2	General Price +10%	-16.8	-17.9	-10.0	+.0	-44.7	-18.9	-6.5	-70.1	-213	-149	-83	+	-445	-272	-54	-770
P3	General Price +25%	-34.9	-42.3	-23.5	+.0	-100.7	-39.6	-15.2	-155.5	-471	-352	-196	+	-1,018	-605	-126	-1,750
P4	Low Priced Off Trade Products +10%	-5.3	-1.9	-1.3	+.0	-8.4	-5.7	-.7	-14.7	-56	-16	-10	+	-82	-65	-5	-152
P5	Low Priced Off Trade Products +25%	-6.5	-1.5	-1.4	+.0	-9.4	-6.9	-.5	-16.7	-79	-12	-11	+	-103	-92	-4	-199
P6	Low Priced On Trade Products +10%	-5.8	-4.1	-1.8	+.0	-11.7	-6.4	-1.5	-19.6	-57	-34	-15	+	-105	-67	-13	-185
P7	Low Priced On Trade Products +25%	-7.0	-6.9	-2.7	+.0	-16.6	-7.8	-2.5	-26.9	-74	-58	-23	+	-155	-88	-21	-263
P8	All Low Priced Products +10%	-6.5	-3.8	-1.9	+.0	-12.2	-7.1	-1.4	-20.8	-72	-32	-16	+	-119	-84	-11	-215
P9	All Low Priced Products +25%	-9.0	-6.4	-3.0	+.0	-18.3	-9.8	-2.2	-30.3	-113	-53	-25	+	-191	-132	-18	-341
P10	Minimum Price 15p (Off and On Trade)	-3.7	-2.0	-1.1	+.0	-6.9	-3.9	-.7	-11.6	-35	-17	-9	+	-61	-39	-6	-106
P11	Minimum Price 20p " "	-3.7	-1.7	-1.0	+.0	-6.4	-3.9	-.6	-10.8	-35	-14	-8	+	-57	-39	-5	-101
P12	Minimum Price 25p	-3.6	-1.2	-.8	+.0	-5.6	-3.8	-.4	-9.8	-35	-10	-7	+	-52	-40	-3	-95
P13	Minimum Price 30p	-4.0	-.6	-.6	+.0	-5.3	-4.1	-.2	-9.5	-44	-5	-5	+	-54	-50	-2	-106
P14	Minimum Price 35p	-6.0	-.7	-1.0	+.0	-7.6	-6.2	-.2	-14.0	-77	-6	-8	+	-90	-89	-2	-181
P15	Minimum Price 40p	-8.7	-1.6	-1.9	+.0	-12.2	-9.0	-.5	-21.6	-124	-13	-16	+	-152	-147	-4	-303
P16	Minimum Price 45p	-13.5	-3.4	-3.6	+.0	-20.4	-14.2	-1.1	-35.8	-197	-28	-30	+	-255	-240	-9	-504
P17	Minimum Price 50p	-18.6	-6.0	-5.9	+.0	-30.6	-19.7	-2.0	-52.2	-282	-50	-49	+	-381	-345	-17	-743
P18	Minimum Price 60p	-31.8	-13.5	-12.5	+.0	-57.8	-34.0	-4.5	-96.3	-492	-112	-104	+	-708	-599	-38	-1,345
P19	Minimum Price 70p " "	-46.7	-22.2	-20.0	+.0	-89.0	-50.3	-7.5	-146.8	-726	-185	-166	+	-1,077	-875	-63	-2,015
P20	Minimum Price 20p Off and 60p On Trade	-3.7	-1.7	-1.0	+.0	-6.4	-3.9	-.6	-10.9	-35	-14	-8	+	-57	-39	-5	-101
P21	Minimum Price 30p Off and 80p On Trade	-4.1	-.8	-.7	+.0	-5.6	-4.2	-.2	-9.9	-45	-6	-6	+	-57	-51	-2	-111
P22	Minimum Price 40p Off and 100p On Trade	-10.7	-3.3	-2.7	+.0	-16.7	-11.2	-1.2	-29.1	-149	-28	-23	+	-199	-179	-10	-388
P23	30p Minimum Price Beers Only	-2.5	-.6	-.8	+.0	-3.9	-2.5	-.2	-6.6	-24	-5	-6	+	-35	-28	-2	-65
P24	30p Minimum Price Wines Only	-5.6	-2.5	-1.5	+.0	-9.6	-6.2	-1.0	-16.9	-55	-21	-12	+	-89	-66	-8	-162
P25	30p Minimum Price Spirits Only	-4.1	-1.8	-.8	+.0	-6.6	-4.3	-.7	-11.6	-40	-15	-6	+	-61	-44	-5	-110
P26	30p Minimum Price Alcopops (RTDs) Only	-4.9	-2.2	-1.2	+.0	-8.2	-5.4	-.9	-14.4	-43.7	-18.1	-9.8	+.0	-71.6	-51.7	-7.2	-130.4
P27	Ban Off Trade Discounting if > 50%	-5.0	-2.2	-1.2	+.0	-8.3	-5.5	-.8	-14.6	-45	-18	-10	+	-72	-53	-7	-132
P28	Ban Off Trade Discounting if > 40%	-5.3	-2.3	-1.3	+.0	-9.0	-5.9	-.9	-15.7	-49	-19	-11	+	-80	-59	-8	-147
P29	Ban Off Trade Discounting if > 30%	-5.8	-2.6	-1.6	+.0	-9.9	-6.4	-1.0	-17.3	-56	-22	-13	+	-91	-69	-8	-168
P30	Ban Off Trade Discounting if > 20%	-6.8	-3.3	-2.2	+.0	-12.3	-7.6	-1.2	-21.1	-73	-27	-18	+	-118	-90	-10	-219
P31	Ban Off Trade Discounting if > 10%	-8.7	-4.5	-3.3	+.0	-16.5	-9.7	-1.6	-27.9	-102	-37	-27	+	-166	-129	-14	-308
P32	Total Ban Off Trade Discounting	-11.6	-6.4	-5.0	+.0	-23.1	-12.9	-2.3	-38.3	-146	-54	-41	+	-241	-186	-19	-446
P33	Ban Off Trade Discount if Reg Price <30p	-3.8	-2.0	-1.2	+.0	-6.9	-4.0	-.7	-11.6	-35	-17	-10	+	-61	-40	-6	-107

Table 3.22: Summary of estimated financial value of harm reductions – moderate 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
P1	General Price +1%	-5.8	-3.7	-1.6	+.0	-11.2	-6.3	-1.3	-18.8	-70	-31	-14	+	-115	-84	-11	-209
P2	General Price +10%	-20.8	-30.5	-12.0	+.0	-63.3	-23.4	-10.6	-97.3	-322	-254	-100	+	-675	-411	-88	-1,174
P3	General Price +25%	-47.6	-77.3	-30.4	+.0	-155.3	-53.8	-26.9	-236.0	-768	-643	-253	+	-1,663	-981	-224	-2,868
P4	Low Priced Off Trade Products +10%	-5.1	-.6	-.7	+.0	-6.4	-5.3	-.1	-11.9	-68	-5	-5	+	-79	-79	-1	-159
P5	Low Priced Off Trade Products +25%	-7.0	-.4	-.9	+.0	-8.3	-7.2	+.0	-15.4	-110	-4	-7	+	-120	-129	+	-249
P6	Low Priced On Trade Products +10%	-4.5	-7.1	-1.1	+.0	-12.7	-5.0	-2.1	-19.8	-50	-59	-9	+	-118	-58	-18	-194
P7	Low Priced On Trade Products +25%	-5.9	-16.2	-2.0	+.1	-23.9	-6.7	-4.9	-35.5	-69	-134	-17	+1	-219	-83	-41	-343
P8	All Low Priced Products +10%	-6.2	-6.9	-1.3	+.0	-14.4	-6.8	-2.0	-23.3	-83	-58	-11	+	-151	-98	-17	-265
P9	All Low Priced Products +25%	-9.5	-16.0	-2.4	+.0	-27.8	-10.4	-4.7	-42.9	-144	-133	-20	+	-297	-174	-39	-510
P10	Minimum Price 15p (Off and On Trade)	+1.6	-.5	-.4	+.0	+.7	+1.5	-.1	+2.1	+19	-5	-4	+	+11	+17	-1	+27
P11	Minimum Price 20p " "	-2.6	-.2	-.3	+.0	-3.1	-2.7	-.0	-5.8	-27	-2	-3	+	-31	-28	-	-59
P12	Minimum Price 25p	-2.3	+.3	-.1	+.0	-2.0	-2.3	+.2	-4.1	-21	+2	-1	+	-19	-22	+2	-40
P13	Minimum Price 30p	-2.6	+.5	+.0	+.1	-2.1	-2.7	+.3	-4.5	-27	+4	+	+1	-22	-29	+3	-49
P14	Minimum Price 35p	-5.2	-.4	-.6	+.0	-6.2	-5.5	+.1	-11.7	-74	-4	-5	+	-82	-89	+	-171
P15	Minimum Price 40p	-10.0	-2.9	-2.3	+.0	-15.2	-10.5	-.8	-26.5	-165	-24	-19	+	-208	-204	-6	-418
P16	Minimum Price 45p	-17.0	-7.7	-5.4	+.0	-30.1	-18.0	-2.4	-50.5	-301	-64	-45	+	-410	-374	-20	-804
P17	Minimum Price 50p	-26.5	-14.2	-9.8	+.0	-50.5	-28.3	-4.6	-83.5	-482	-118	-81	+	-681	-596	-38	-1,316
P18	Minimum Price 60p	-49.1	-27.9	-19.7	+.0	-96.7	-52.5	-9.3	-158.5	-909	-232	-164	+	-1,305	-1,107	-77	-2,489
P19	Minimum Price 70p " "	-71.9	-42.9	-31.0	+.0	-145.8	-77.1	-14.3	-237.2	-1,360	-357	-258	+	-1,974	-1,631	-119	-3,724
P20	Minimum Price 20p Off and 60p On Trade	-2.6	-.2	-.3	+.0	-3.1	-2.7	-.0	-5.8	-27	-2	-3	+	-31	-28	-	-59
P21	Minimum Price 30p Off and 80p On Trade	-2.8	-.8	-.1	+.1	-3.6	-2.9	-.1	-6.6	-29	-6	-1	+	-36	-32	-1	-68
P22	Minimum Price 40p Off and 100p On Trade	-11.6	-9.3	-3.3	+.0	-24.2	-12.3	-3.0	-39.5	-190	-77	-28	+	-295	-237	-25	-557
P23	30p Minimum Price Beers Only	+3.1	+.3	-.0	+.1	+3.5	+3.0	+.2	+6.7	+45	+3	-	+1	+48	+47	+1	+97
P24	30p Minimum Price Wines Only	-5.0	-1.0	-.8	+.0	-6.9	-5.3	-.3	-12.5	-61	-9	-7	+	-76	-70	-2	-149
P25	30p Minimum Price Spirits Only	-3.5	-.4	-.1	+.0	-4.0	-3.6	-.0	-7.7	-38	-3	-1	+	-42	-40	-	-82
P26	30p Minimum Price Alcopops (RTDs) Only	-4.1	-.8	-.5	+.0	-5.5	-4.4	-.3	-10.1	-42.3	-6.7	-4.4	+.0	-53.4	-46.7	-2.1	-102.2
P27	Ban Off Trade Discounting if > 50%	-4.2	-.8	-.5	+.0	-5.5	-4.5	-.2	-10.3	-43	-7	-4	+	-54	-48	-2	-104
P28	Ban Off Trade Discounting if > 40%	-4.7	-1.1	-.8	+.0	-6.6	-5.1	-.3	-12.0	-53	-9	-6	+	-69	-61	-3	-132
P29	Ban Off Trade Discounting if > 30%	-5.6	-1.5	-1.2	+.0	-8.2	-6.0	-.5	-14.7	-69	-12	-10	+	-91	-81	-4	-176
P30	Ban Off Trade Discounting if > 20%	-7.5	-2.6	-2.1	+.0	-12.2	-8.1	-.8	-21.1	-105	-22	-18	+	-144	-127	-7	-278
P31	Ban Off Trade Discounting if > 10%	-10.9	-4.7	-3.8	+.0	-19.5	-11.8	-1.6	-32.9	-167	-39	-32	+	-238	-206	-13	-458
P32	Total Ban Off Trade Discounting	-15.8	-8.3	-6.5	+.0	-30.6	-17.2	-2.8	-50.6	-257	-69	-54	+	-380	-320	-23	-723
P33	Ban Off Trade Discount if Reg Price <30p	-2.9	-.7	-.5	+.0	-4.1	-3.0	-.2	-7.4	-30	-6	-4	+	-41	-32	-2	-75

Table 3.23: Summary of estimated financial value of harm reductions – hazardous 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	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
P1	General Price +1%	-1.6	-1.2	-.5	-27.7	-30.9	-1.6	-.4	-32.9	-35	-10	-4	-230	-278	-40	-3	-322
P2	General Price +10%	-12.4	-13.5	-5.4	-277.7	-308.9	-12.4	-4.7	-326.0	-307	-112	-45	-2,309	-2,773	-367	-39	-3,180
P3	General Price +25%	-30.0	-35.0	-14.1	-699.8	-778.9	-30.4	-12.3	-821.5	-747	-291	-117	-5,820	-6,975	-904	-102	-7,981
P4	Low Priced Off Trade Products +10%	-2.2	-.4	-.4	-28.5	-31.5	-2.1	-.1	-33.7	-48	-4	-3	-237	-292	-58	-1	-351
P5	Low Priced Off Trade Products +25%	-4.6	-1.3	-1.1	-71.1	-78.2	-4.5	-.4	-83.0	-113	-11	-9	-591	-724	-137	-3	-865
P6	Low Priced On Trade Products +10%	-0.9	-2.5	-.2	-3.4	-6.9	-.9	-.8	-8.6	-17	-20	-1	-28	-67	-18	-7	-91
P7	Low Priced On Trade Products +25%	-1.7	-6.3	-.5	-8.1	-16.6	-1.7	-2.0	-20.3	-37	-53	-4	-67	-161	-39	-17	-217
P8	All Low Priced Products +10%	-2.8	-3.1	-.6	-32.2	-38.6	-2.7	-1.0	-42.3	-62	-26	-5	-267	-360	-73	-8	-442
P9	All Low Priced Products +25%	-6.2	-7.9	-1.7	-80.8	-96.6	-6.1	-2.5	-105.2	-149	-66	-14	-672	-900	-177	-21	-1,098
P10	Minimum Price 15p (Off and On Trade)	+0.2	+.6	+.1	-1.5	-.6	+.2	+.2	-.2	+1	+5	+1	-13	-6	+1	+2	-3
P11	Minimum Price 20p " "	-0.0	+.7	-.1	-11.1	-10.5	-.0	+.3	-10.3	-7	+6	-	-92	-95	-8	+2	-100
P12	Minimum Price 25p	-0.8	+.4	-.4	-34.6	-35.4	-.8	+.2	-35.9	-28	+3	-4	-288	-316	-30	+2	-344
P13	Minimum Price 30p	-3.1	-.7	-1.2	-79.1	-84.0	-3.1	-.1	-87.2	-80	-6	-10	-657	-753	-89	-1	-843
P14	Minimum Price 35p	-6.9	-2.9	-2.6	-156.6	-168.9	-6.9	-.9	-176.7	-175	-24	-21	-1,302	-1,523	-204	-7	-1,734
P15	Minimum Price 40p	-12.2	-5.9	-4.6	-270.2	-292.9	-12.1	-1.9	-306.9	-314	-49	-38	-2,247	-2,648	-371	-16	-3,035
P16	Minimum Price 45p	-18.8	-9.8	-7.3	-420.1	-456.0	-18.7	-3.3	-477.9	-486	-82	-61	-3,494	-4,122	-582	-27	-4,731
P17	Minimum Price 50p	-26.5	-14.5	-10.5	-596.0	-647.6	-26.4	-4.9	-678.9	-686	-121	-88	-4,957	-5,851	-827	-41	-6,718
P18	Minimum Price 60p	-41.4	-24.1	-16.8	-893.2	-975.5	-41.5	-8.2	-1,025.2	-1,058	-200	-140	-7,429	-8,827	-1,295	-68	-10,190
P19	Minimum Price 70p " "	-55.9	-31.5	-22.7	-1,146.7	-1,256.8	-56.3	-10.7	-1,323.8	-1,418	-262	-189	-9,536	-11,405	-1,753	-89	-13,247
P20	Minimum Price 20p Off and 60p On Trade	-0.1	+.5	-.1	-11.9	-11.6	-.1	+.2	-11.5	-8	+4	-1	-99	-104	-8	+2	-110
P21	Minimum Price 30p Off and 80p On Trade	-3.2	-1.8	-1.3	-82.5	-88.9	-3.3	-.6	-92.7	-83	-15	-11	-686	-795	-93	-5	-893
P22	Minimum Price 40p Off and 100p On Trade	-14.0	-10.1	-5.3	-296.7	-326.0	-13.9	-3.4	-343.3	-359	-84	-44	-2,467	-2,954	-422	-28	-3,404
P23	30p Minimum Price Beers Only	-1.5	-1.7	-1.3	-77.4	-81.9	-1.6	-.7	-84.2	-49	-14	-11	-643	-718	-53	-6	-777
P24	30p Minimum Price Wines Only	-0.9	+2.0	+.2	-3.9	-2.5	-.8	+.8	-2.5	-18	+17	+2	-32	-31	-21	+6	-46
P25	30p Minimum Price Spirits Only	-0.7	-.6	+.0	+2.4	+1.1	-.7	-.1	+.3	-13	-5	+	+20	+2	-14	-1	-13
P26	30p Minimum Price Alcopops (RTDs) Only	-0.3	+.2	+.1	+.0	-.1	-.3	+.1	-.3	-3.4	+1.5	+.5	+.1	-1.2	-3.3	+.4	-4.1
P27	Ban Off Trade Discounting if > 50%	-0.3	+.2	+.1	-.3	-.4	-.3	+.1	-.7	-4	+2	+	-3	-4	-4	+	-8
P28	Ban Off Trade Discounting if > 40%	-0.7	+.1	-.1	-7.4	-8.1	-.7	+.0	-8.8	-13	+	-	-61	-74	-15	+	-89
P29	Ban Off Trade Discounting if > 30%	-1.4	-.2	-.3	-19.7	-21.6	-1.3	-.1	-23.0	-29	-2	-2	-164	-196	-34	-1	-231
P30	Ban Off Trade Discounting if > 20%	-2.9	-.8	-.7	-48.2	-52.6	-2.8	-.3	-55.8	-65	-7	-6	-401	-479	-78	-2	-559
P31	Ban Off Trade Discounting if > 10%	-5.2	-2.0	-1.6	-99.2	-108.0	-5.1	-.7	-113.9	-127	-16	-13	-825	-982	-152	-6	-1,139
P32	Total Ban Off Trade Discounting	-8.7	-3.9	-3.0	-178.4	-194.0	-8.6	-1.4	-204.0	-220	-33	-25	-1,483	-1,761	-266	-11	-2,038
P33	Ban Off Trade Discount if Reg Price <30p	-0.5	+.0	-.1	-6.9	-7.5	-.5	-.0	-8.0	-9	+	-1	-57	-67	-10	-	-77

Table 3.24: Summary of estimated financial value of harm reductions – harmful drinkers

3.2.2 Sensitivity analyses

For the analyses of structural uncertainty (cross-price weighting, aggregation, long-run elasticities and differential responsiveness of heavy drinkers), model runs have been completed for all 33 policy options. The detailed results are shown in the Appendix. The probabilistic sensitivity analysis around the elasticity parameters in the v2 baseline are limited to a 10% general price increase and a 40p minimum price due to time constraints.

Sensitivity analysis results around a 40p minimum price are shown in Figure 3.5. The total population reduction in consumption varies between 2% and 2.7% across the scenarios. The largest reduction is found when aggregation error is accounted for. This scenario is based on a re-apportionment of off-trade beer and spirit purchasing from females to males, with the impact that a greater proportion of male beer and spirit consumption is assumed to be in the off-trade (with the converse for females) than in the baseline scenario. Since off-trade beverages tend to be cheaper than those in the on-trade these are affected more by minimum price policies, and so because males drink more than females in absolute terms the overall effect of the re-apportionment is to increase the impact of the policy from the baseline estimate.

The smallest reduction in total consumption is found for the scenario in which hazardous and harmful elasticities are attenuated. These drinkers consume a significant proportion of all alcohol and therefore the overall impact is a relative reduction in policy effectiveness of approximately 17%.

The effect of using long-run elasticity estimates is quite similar to the baseline, since the larger own-price elasticities are compensated by the larger cross-price elasticities (ie. the magnitude of consumer switching behaviour is seen to increase, with total on-trade spending estimated to increase from +£320m for the baseline to +£580m, as shown in Appendix 19 Table 1).

The results of the PSA suggest that parameter uncertainty has a more limited impact than the structural assumptions. The own-price elasticity confidence intervals are quite tight due to the large volume of data used in the regression. The confidence intervals around the parameters used to construct the cross-price elasticities are wider – indeed some of the cross-prices are observed to change sign – but the overall effect is not great.

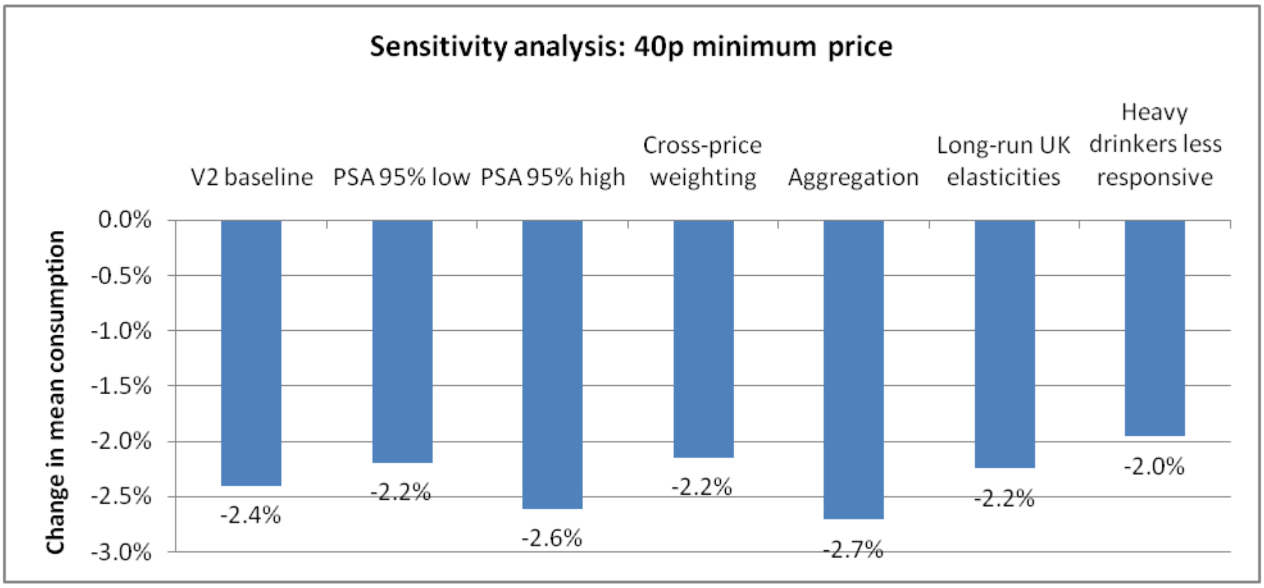

Figure 3.5: Sensitivity analysis results for a 40p minimum price

Sensitivity analysis results around a 10% general price increase are shown in Figure 3.6. The range of effects is observed to be greater than for a minimum price. Cross-elasticities tend to assume less importance for across-the-board price rises and therefore the impact of accounting for the uncertainty in these parameters via PSA is small. The attenuation of hazardous and harmful responsiveness leads to the smallest estimate of consumption change, whilst the long-run scenario shows the greatest impact due to the large own-price elasticities used.

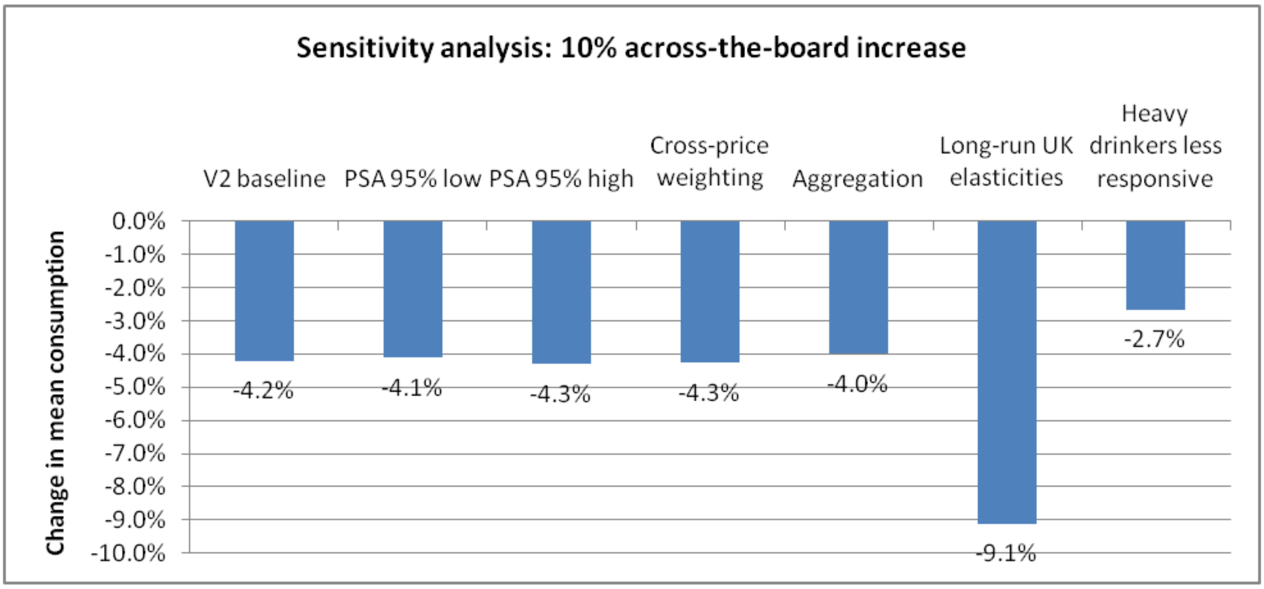

Figure 3.6: Sensitivity analysis for a 10% general price increase

The differential effectiveness of policies in terms of moderate drinkers versus harmful drinkers can also be examined. A plot of relative consumption change for moderate drinkers (on the horizontal axis) against harmful drinkers (on the vertical axis) for 1%, 10% and 25% general price increases is shown in Figure 3.7. A line of equal effect is also plotted: if a policy estimate lies on this line then it has equal effect (in relative terms) on both moderate and harmful consumption. Estimates above and to the left of this line indicate that the policy affects moderate drinkers more than harmful drinkers; estimate below and to the right of the line indicate the opposite effect.

For the scenario where harmful responsiveness is reduced by one third from that of moderate drinkers, the plot of relative effectiveness lies in the upper-left area of the graph as expected. In the scenario using long-run estimates, no differentiation was made between moderate and harmful elasticities and the general price increase is seen to have a broadly equal effect on both groups. The baseline model and the two other sensitivity analyses suggest that harmful drinkers are more responsive than moderates to a general price increase.

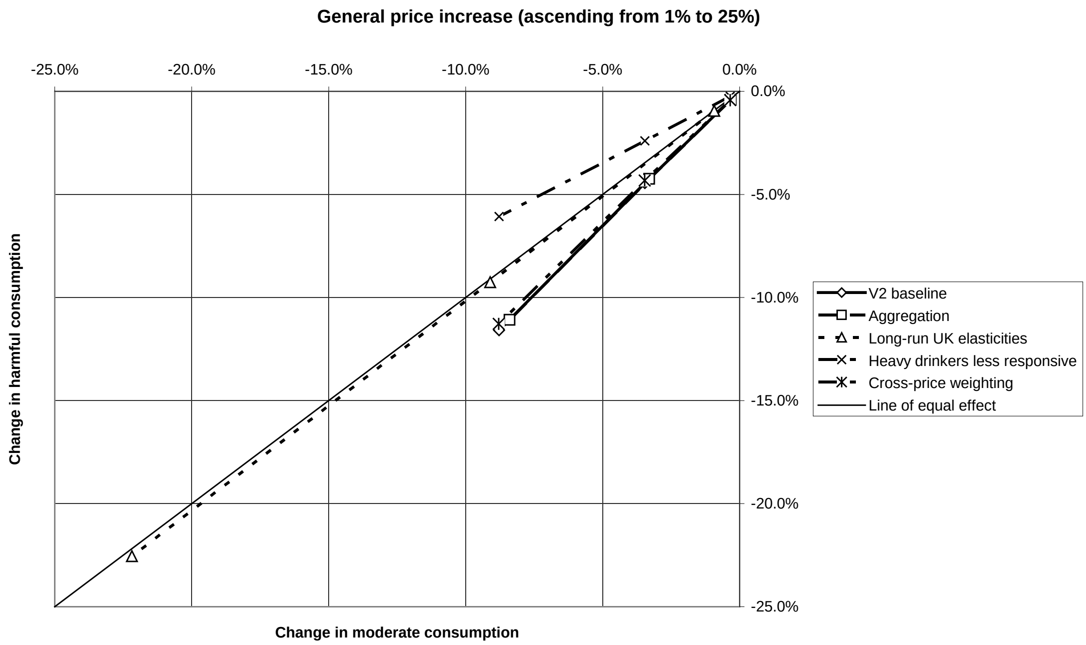

Figure 3.7: Moderate versus heavy drinker effectiveness estimates for general price increases

A plot of relative consumption change for moderate drinkers against harmful drinkers for minimum price policies, with threshold increasing from 15p to 70p per unit, is shown in Figure 3.8. The effectiveness curves for all policies suggest that harmful drinkers are more responsive than moderates for the range of minimum pricing thresholds considered[4]. In

[4] Note that the use of long-run elasticities produces a slight consumption increase for moderate drinkers, which should be regarded as an outlier result and is omitted from the plot for the sake of clarity.

general, the relationship between differential effectiveness and threshold appears to be non-linear, with greater differentials apparent for smaller thresholds. Note that the scenario in which harmful drinkers are one third less responsive to price changes than moderate drinkers still shows harmful drinkers to be more responsive (in contrast to the situation for a general price increase). This effect arises because harmful drinkers are estimated from the EFS data to purchase the types of alcohol that is impacted by minimum price policies.

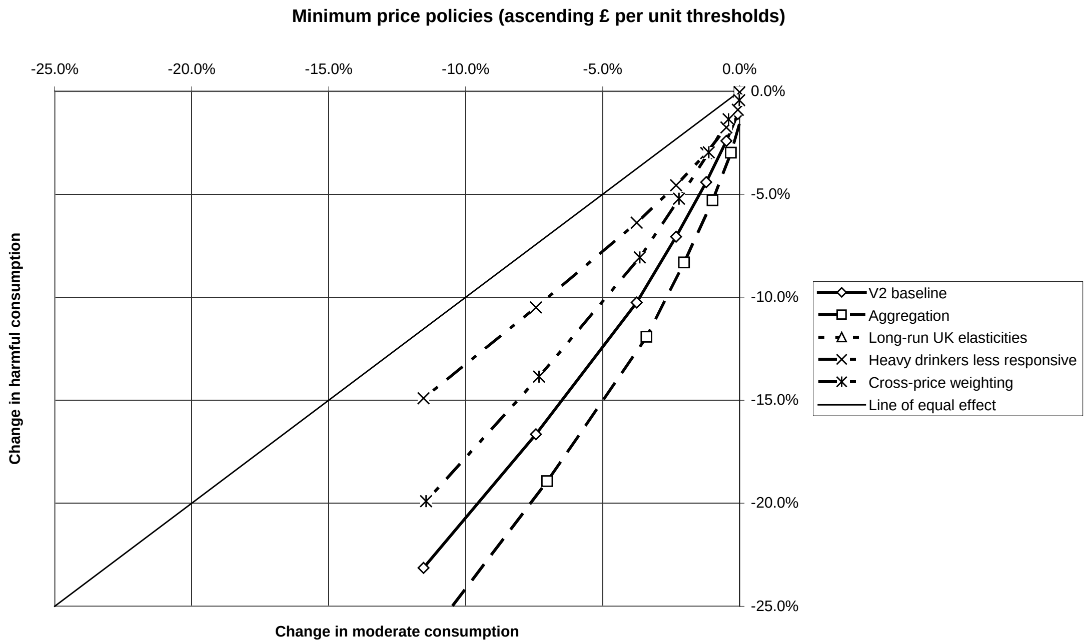

Figure 3.8: Moderate versus heavy drinker effectiveness estimates for minimum price policies

The parameter uncertainty around differential responsiveness can also be explored using the PSA results. Upper and lower 95% confidence interval estimates for moderate, hazardous and harmful drinkers are shown in Table 3.25. Scatter plots of the PSA results are shown in Figure 3.9. The confidence intervals do not overlap between moderate and harmful drinkers for either policy option (as demonstrated graphically in Figure 3.9b). However, there is overlap between the moderate and hazardous estimates for the minimum price policy (in 35 of the 100 simulation runs, hazardous drinkers were estimated to be less responsive to the policy, in terms of consumption, than moderate drinkers). The impact on hazardous drinkers decreases significantly from the general price increase because according to the EFS data they tend to purchase a greater proportion of alcohol in the, relatively more expensive, on-trade setting.

Policy	Drinker type	Lower 95% CI	Upper 95% CI
10% price increase	Moderate	-3.3%	-3.6%
	Hazardous	-4.3%	-4.6%

	Harmful	-4.3%	-4.6%
40p minimum price	Moderate	-0.8%	-1.6%
	Hazardous	-1.1%	-1.6%
	Harmful	-4.2%	-4.7%

Table 3.25: PSA results for moderate and harmful drinkers

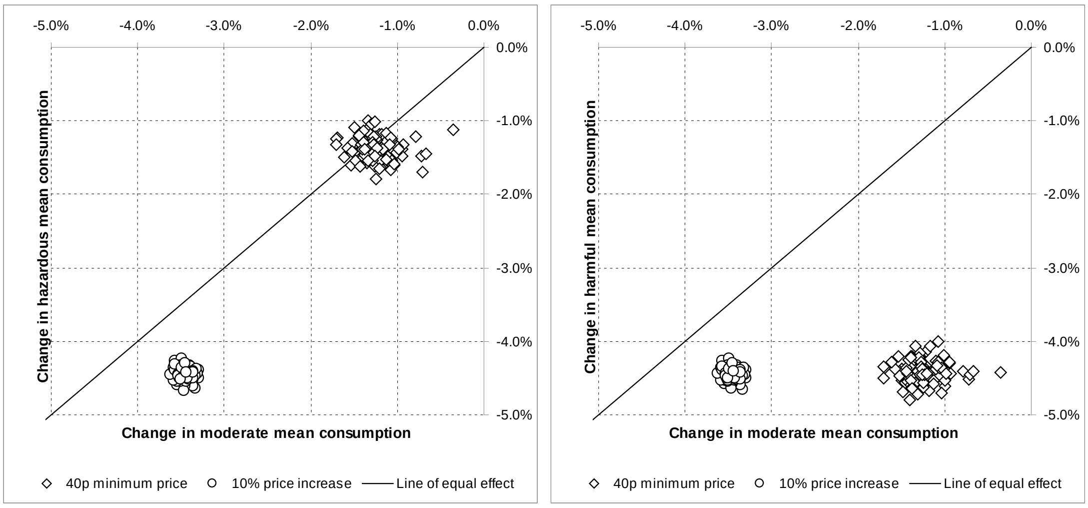

Figure 3.9: Scatter plot of PSA results, showing relative change in consumption by (a) moderate drinkers versus hazardous drinkers; (b) moderate drinkers versus harmful drinkers

3.3 Availability and advertising restrictions

3.3.1 Outlet density scenarios

All outlet density scenarios are based on a 10% decrease in the number of both off-trade and on-trade outlets. The estimated consumption changes, harm changes and financial valuation for six evidence scenarios are shown in Table 3.26a, Table 3.27a, and Table 3.28a respectively. Consumption changes range from a +13.2% (actually an increase) for the scenario based on Blake & Nied's (1997) model 1 (OUT1) to -3.7% (a decrease) for the Gruenewald scenario (OUT3). Excluding the OUT1 result – which looks like an outlier and is based on some very large elasticities around cider which may lack face validity – the effects range from -0.3% to -3.7%, more than a tenfold difference between alternative evidence sources. The median scenario is OUT6, with a -1.9% change in consumption (Table 3.26a). Such a change is estimated to lead to 640 fewer deaths each year at full effect, 23,000 fewer hospital admissions and 30,000 fewer crimes (Table 3.27a). Again, excluding the OUT1 result, overall cumulative ten year financial valuations range from -£0.5b to -£4.5b (Table 3.28a).

SUMMARY - TOTAL	Mean annual consumption per drinker (units)						Total spending on alcohol (£ millions)						Per drinker (£)	
Policy scenario	% change in consumption (all bevs)	Beer	Wine	Spirit	RTD	All beverages	Off-trade retail (exc duty + VAT)	On-trade retail (exc duty + VAT)	Off-trade duty + VAT	On-trade duty + VAT	Total spending change	% spending change	Change in spend per drinker p.a.	Change in spend p.a. if no change in con.
(a) 10% reduction in outlet density														
OUT1 Blake & Nied (1997) model 1	+13.2%	+54.0	+54.8	+0.0	+0.0	+108.9	+560.6	+554.2	+495.2	+219.8	+1829.9	+9.8%	+62.17	+0.00
OUT2 Blake & Nied (1997) model 3	-2.3%	-18.9	+0.0	+0.0	+0.0	-18.9	-52.0	-208.9	-54.7	-74.8	-390.4	-2.1%	-13.26	+0.00
OUT3 Gruenewald et al (1993)	-3.7%	-12.2	-12.8	-4.2	-1.2	-30.4	-125.9	-326.9	-124.2	-111.1	-688.1	-3.7%	-23.38	+0.00
OUT4 Hoadley et al (1984)	-0.3%	-1.0	-0.9	-0.3	-0.1	-2.2	-9.0	-24.2	-8.9	-8.3	-50.4	-0.3%	-1.71	+0.00
OUT5 Schonlau et al (2008)	-1.0%	-3.5	-3.4	-1.0	-0.3	-8.2	-33.5	-89.6	-32.9	-30.6	-186.5	-1.0%	-6.34	+0.00
OUT6 Xie et al (2000)	-1.9%	-6.7	-6.4	-2.0	-0.6	-15.6	-63.6	-170.3	-62.4	-58.1	-354.4	-1.9%	-12.04	+0.00
(b) 10% reduction in licensing hours														
HRS1 Carpenter & Eisenberg (2009)	-1.2%	-4.2	-4.0	-1.2	-0.3	-9.8	-39.8	-106.7	-39.1	-36.4	-222.0	-1.2%	-7.54	+0.00
HRS2 Hoadley et al (1984)	+0.2%	+1.5	+0.2	+0.2	+0.1	+2.0	+0.0	+58.3	+0.0	+19.9	+78.1	+0.4%	+2.65	+0.00
HRS3 Norstrom & Skog (2003)	-3.5%	-20.2	-5.7	-2.6	-0.7	-29.2	-85.8	-388.9	-88.1	-136.3	-699.0	-3.7%	-23.75	+0.00
(c) Advertising interventions														
AD1 Ads with 1/6th public health (base)	-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
AD2 Ads with 1/6th public health (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
AD3 Ads with 1/6th public health (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
AD4 No <18s TV ads exposure (base)	-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
AD5 No <18s TV ads exposure (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
AD6 No <18s TV ads exposure (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
AD7 Total ad ban (Saffer & Dave 2002)	-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
AD8 Total ad ban (Nelson & Young 1997)	+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 3.26:Summary of uncertainty in consumption effects for outlet density, licensing hours and advertising policies

SUMMARY - TOTAL	Health outcomes p.a. (first year)					Health outcomes p.a. (full effect)					Crime outcomes p.a.					Workplace outcomes p.a.	
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	Violent crime ('000s)	Criminal damage ('000s)	Other crime ('000s)	Total crimes ('000s)	QALYs of crime victims	Days absence ('000s days)	Unemployed ('000s people)
(a) 10% reduction in outlet density																	
OUT1 Blake & Nied (1997) model 1	+784	+6.6	+20.2	+36.0	+8.2	+4984	+72.7	+21.2	+173.0	+169.9	+40.1	+72.7	+44.2	+157.0	+3.1	+851.6	+41.7
OUT2 Blake & Nied (1997) model 3	-121	-0.9	-4.5	-6.8	-1.7	-692	-9.9	-5.0	-26.0	-29.1	-10.3	-19.4	-11.2	-40.9	-0.8	-188.4	-7.7
OUT3 Gruenewald et al (1993)	-203	-1.6	-6.6	-10.5	-2.6	-1219	-17.3	-7.2	-43.0	-47.0	-13.5	-24.1	-18.5	-56.1	-1.1	-271.1	-9.7
OUT4 Hoadley et al (1984)	-26	-0.1	-2.0	-2.4	-0.7	-102	-1.3	-2.5	-5.3	-8.4	-1.7	-2.9	-1.8	-6.4	-0.1	-35.6	-0.7
OUT5 Schonlau et al (2008)	-64	-0.4	-3.0	-4.2	-1.1	-344	-4.7	-3.5	-13.5	-16.7	-4.2	-7.5	-5.4	-17.1	-0.3	-85.9	-2.7
OUT6 Xie et al (2000)	-111	-0.8	-4.2	-6.3	-1.6	-639	-9.0	-4.8	-23.4	-26.9	-7.3	-13.1	-9.7	-30.1	-0.6	-148.1	-5.1
(b) 10% reduction in licensing hours																	
HRS1 Carpenter & Eisenberg (2009)	-74	-0.5	-3.3	-4.6	-1.2	-406	-5.6	-3.8	-15.6	-18.9	-4.9	-8.7	-6.3	-19.8	-0.4	-99.1	-3.2
HRS2 Hoadley et al (1984)	+8	+0.1	+1.4	+1.6	+0.4	+56	+0.9	+1.8	+3.7	+5.4	+0.7	+1.6	+1.7	+4.1	+0.1	+6.6	+0.6
HRS3 Norstrom & Skog (2003)	-189	-1.4	-6.4	-10.0	-2.5	-1103	-15.8	-7.0	-39.8	-43.9	-15.2	-28.3	-19.2	-62.7	-1.2	-279.7	-10.2
(c) Advertising interventions																	
AD1 Ads with 1/6th public health (base)	-26	-0.2	-0.7	-1.2	-0.3	-163	-2.3	-0.7	-5.5	-5.8	-1.9	-3.7	-3.9	-9.6	-0.2	-35.1	-1.3
AD2 Ads with 1/6th public health (low)	-7	-0.1	-0.2	-0.4	-0.1	-39	-0.6	-0.2	-1.5	-1.7	-0.8	-1.9	-3.1	-5.8	-0.1	-11.0	-0.4
AD3 Ads with 1/6th public health (high)	-115	-0.9	-3.1	-5.4	-1.3	-718	-10.3	-3.2	-24.4	-25.2	-8.0	-15.2	-13.9	-37.1	-0.6	-153.4	-5.9
AD4 No <18s TV ads exposure (base)	-6	-0.0	-0.7	-0.9	-0.3	-9	-0.3	-0.7	-1.4	-3.0	-3.6	-10.9	-23.5	-37.9	-0.4	-27.4	-0.4
AD5 No <18s TV ads exposure (low)	-2	-0.0	-0.3	-0.3	-0.1	-3	-0.1	-0.2	-0.5	-1.1	-1.4	-4.1	-8.9	-14.4	-0.2	-10.4	-0.2
AD6 No <18s TV ads exposure (high)	-8	-0.1	-0.9	-1.2	-0.4	-11	-0.4	-0.8	-1.8	-3.9	-4.6	-14.0	-30.3	-48.9	-0.5	-35.5	-0.5
AD7 Total ad ban (Saffer & Dave 2002)	-1301	-10.0	-36.4	-61.2	-14.9	-7871	-113.6	-37.6	-269.1	-285.8	-93.1	-167.8	-127.8	-388.7	-7.3	-1855.2	-60.8
AD8 Total ad ban (Nelson & Young 1997)	+282	+2.2	+10.7	+16.2	+4.0	+1677	+24.1	+12.1	+62.3	+69.2	+17.8	+32.2	+24.3	+74.3	+1.4	+356.2	+13.8

Table 3.27: Summary of uncertainty in harm reduction effects for outlet density, licensing hours and advertising policies

SUMMARY - TOTAL	Value of harm reduction in year 1 (£m)								Cumulative discounted value of harm reduction in year 10 (£m)							
Scenario	Healthcare costs	Crime costs	Absence costs	Unemployment costs	Total direct costs	Health QALY value	Crime QALY value	Total value of harm reduction incl QALYs	Healthcare costs	Crime costs	Absence costs	Unemployment costs	Total direct costs	Health QALY value	Crime QALY value	Total value of harm reduction incl QALYs
(a) 10% reduction in outlet density																
OUT1 Blake & Nied (1997) model 1	+151.3	+171.2	+85.0	+1,013.6	+1,421.0	+163.3	+62.6	+1,646.9	+2,732	+1,423	+707	+8,429	+13,291	+3,398	+521	+17,210
OUT2 Blake & Nied (1997) model 3	-30.9	-43.5	-18.6	-197.3	-290.4	-34.3	-16.1	-340.8	-466	-362	-155	-1,641	-2,623	-583	-134	-3,341
OUT3 Gruenewald et al (1993)	-46.7	-60.4	-25.6	-229.9	-362.6	-51.7	-21.1	-435.4	-756	-502	-213	-1,912	-3,383	-939	-175	-4,497
OUT4 Hoadley et al (1984)	-12.4	-7.3	-3.4	-17.4	-40.4	-13.5	-2.6	-56.5	-141	-60	-28	-145	-375	-167	-22	-564
OUT5 Schonlau et al (2008)	-19.8	-18.6	-8.2	-64.2	-110.8	-21.7	-6.6	-139.1	-274	-155	-68	-534	-1,030	-334	-55	-1,419
OUT6 Xie et al (2000)	-29.0	-32.6	-14.1	-121.3	-197.0	-31.9	-11.5	-240.3	-437	-271	-117	-1,009	-1,834	-539	-95	-2,468
(b) 10% reduction in licensing hours																
HRS1 Carpenter & Eisenberg (2009)	-21.7	-21.6	-9.4	-76.3	-129.0	-23.9	-7.6	-160.5	-308	-179	-78	-635	-1,201	-377	-63	-1,641
HRS2 Hoadley et al (1984)	+8.5	+3.8	+.5	+14.5	+27.2	+8.9	+1.4	+37.5	+99	+32	+4	+121	+255	+107	+11	+374
HRS3 Norstrom & Skog (2003)	-44.6	-66.4	-26.8	-251.3	-389.1	-49.5	-23.8	-462.4	-703	-552	-223	-2,090	-3,567	-878	-198	-4,643
(c) Advertising interventions																
AD1 Ads with 1/6th public health (base)	-5.2	-9.4	-3.2	-31.2	-49.1	-5.9	-3.2	-58.1	-91	-78	-27	-260	-456	-116	-26	-598
AD2 Ads with 1/6th public health (low)	-1.6	-4.8	-.9	-7.7	-15.0	-2.0	-1.5	-18.5	-26	-40	-7	-64	-137	-33	-13	-183
AD3 Ads with 1/6th public health (high)	-22.7	-37.8	-14.3	-138.4	-213.1	-25.4	-13.0	-251.5	-401	-314	-119	-1,151	-1,984	-504	-108	-2,596
AD4 No <18s TV ads exposure (base)	-4.2	-28.1	-.9	-1.7	-34.8	-6.1	-8.2	-49.1	-43	-233	-7	-14	-297	-61	-68	-426
AD5 No <18s TV ads exposure (low)	-1.6	-10.7	-.3	-.7	-13.2	-2.3	-3.1	-18.6	-16	-89	-3	-5	-113	-23	-26	-162
AD6 No <18s TV ads exposure (high)	-5.5	-36.2	-1.1	-2.1	-44.9	-7.8	-10.6	-63.4	-55	-301	-9	-18	-384	-79	-88	-550
AD7 Total ad ban (Saffer & Dave 2002)	-265.3	-416.7	-175.5	-1,449.3	-2,306.8	-297.2	-145.6	-2,749.6	-4,585	-3,466	-1,460	-12,054	-21,563	-5,717	-1,211	-28,491
AD8 Total ad ban (Nelson & Young 1997)	+73.6	+79.8	+33.8	+327.3	+514.5	+80.2	+28.1	+622.9	+1,134	+664	+281	+2,722	+4,801	+1,384	+234	+6,419

Table 3.28: Summary of uncertainty in financial value of outlet density, licensing hours and advertising policies

3.3.2 Licensing hours scenarios

All outlet density scenarios are based on a 10% decrease in the number of weekly hours for which alcohol may be sold. For two scenarios this applies to both the off-trade and on-trade (HRS1 and HRS3); for one scenario only the on-trade (HRS2). The estimated consumption changes, harm changes and financial valuation for the evidence scenarios are shown in Table 3.26b, Table 3.27b, and Table 3.28b respectively.

Consumption impacts range from +0.2% to -1.2% to -3.5%. Assuming a result of -1.2% for a 10% reduction in hours from the current situation in England, then the expected impacts include an approximate reduction in deaths of 610 at full effect, 16,000 fewer hospital admissions, 20,000 fewer crimes and 100,000 fewer days of absence from work. Cumulative ten year financial savings range from a loss of £370m to a gain of £4.6b.

3.3.2.1 Advertising scenarios

The analysis examines three specific areas:

- The possible effects of proposals to include public health based messages in one sixth of all alcohol advertising
- Eliminating exposure of under 18s to television advertising
- A total ban on all alcohol advertising.

An original analysis was previously documented in Brennan et al (2008). The results are updated here to account for revisions to the Sheffield model, and use of the NICE recommended discount rate (3.5%) and QALY valuation (£20,000).

3.3.2.2 Effects of proposals to include public health based messages in one sixth of advertising (AD1-3)

In scenarios AD1 to AD3, an attempt has been made to quantify the effects of possible government plans that one sixth of advertising time be used for public health messages (Department of Health, 2008). In line with Booth *et al's* (2008) systematic review of the evidence, no direct benefits are assumed. The impact is rather based around an assumption that advertisers would maintain their budget and that the policy would therefore reduce pro-alcohol advertising exposure pro rata. There is obviously a large degree of uncertainty around the appropriateness of this assumption. Note that the policy is also modelled as a total effect across all channels (not restricted to conventional broadcast media) and the modelling does not discriminate between end-frames and replacing one sixth of adverts.

The results in Table 3.26c show relatively small effects compared to some pricing policy options, with a change in mean consumption of -0.5% for the model based on the median elasticity from Gallet's (2007) meta-analysis. 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 are similarly varied, with for example 7 deaths saved in year 1 using the low estimate (AD2) and 115 using the higher estimate (AD3). This is reflected again in crime harms (which range from 800 to 8,000 violent crimes avoided depending on the assumption used). For employment there is almost a 14-fold difference between the lower and upper estimates of absent days.

Figure 3.10 shows the corresponding uncertainty in the expected financial value of savings.

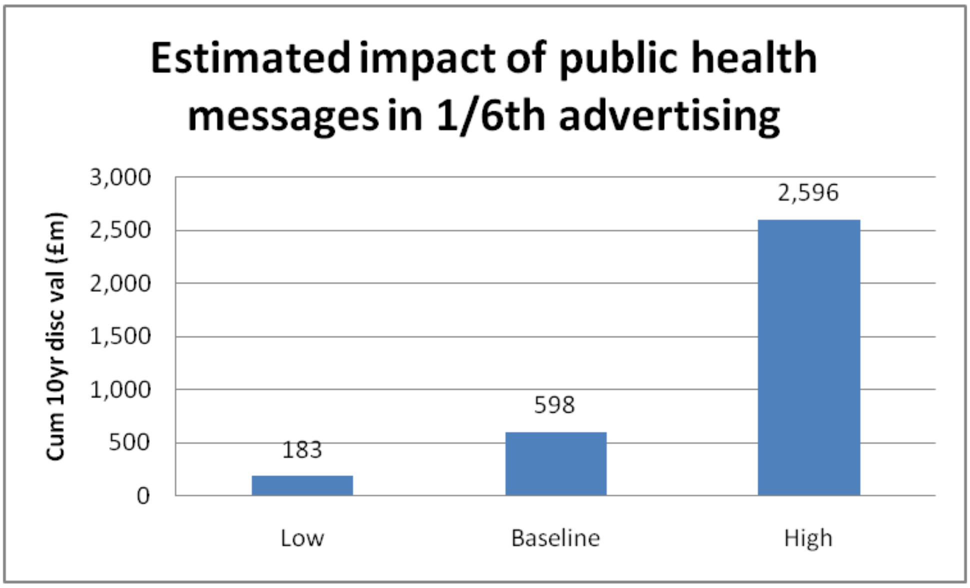

Figure 3.10: Uncertainty in ten year cumulative financial value of savings – proposals to include public health based messages in one sixth of advertising

3.3.2.3 Eliminating exposure of under 18s to TV based advertising (AD4-6)

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. The elimination is not evidence based, but rather a 'what-if? analysis' to obtain an estimate of the potential upper bound of some attempt at restriction on exposure.

In the baseline scenario (AD4), 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 in the study by Saffer & Dave (2002). As alternative evidence scenarios, Saffer & Dave's (2006) study presents several analyses providing estimated elasticities for alcohol exposure and the upper and lower estimates from the published range are used here.

The result of the baseline scenario is an estimated reduction in total consumption of just 0.3%. However the effects on 11 to 17 year olds (not shown in the tables) are estimated to be much more substantial – a reduction in consumption for this population group of 9%. The estimated consequent reduction in harm occurs particularly in the area of crime, with 38,000 fewer offences per annum and a crime cost reduction of £28m.

Using higher and lower estimates for elasticities (scenarios AD6 and AD5 respectively) provides a range of outcomes, for example -£11m to -£36m crime costs per year. This range does not account for further uncertainty concerning the posiibility for actually implementing a total elimination of exposure to TV advertising for the under 18s.

Figure 3.11 shows the corresponding uncertainty in the expected financial value of savings.

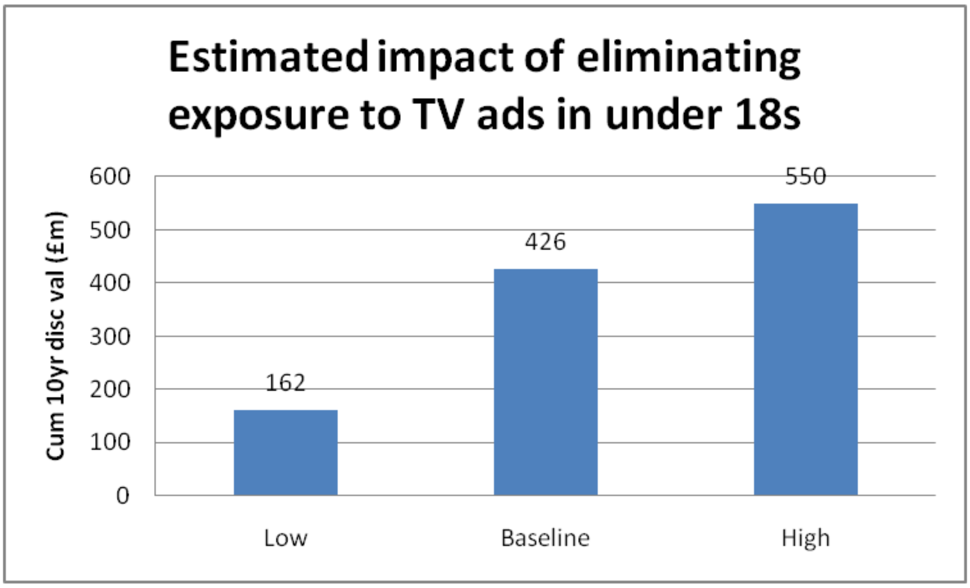

Figure 3.11: Uncertainty in the ten year cumulative financial value of savings – eliminating exposure of under 18s to TV advertising

3.3.2.4 Complete advertising ban (AD7-8)

Two scenarios (AD7 and AD8) have been examined to investigate a total ban on all advertising.

Scenario AD7 uses method and assumptions based again on Saffer & Dave (2002). *If* the assumptions and results of that study were believed to hold and apply to England now, then the estimated impact of a total ban on advertising would be substantial. A 26.9% estimated reduction in mean consumption would be the result (a ban on each of the three channels, each with elasticity -0.0898). If such a large result were believed then very high reductions in harm would result, giving a ten year cumulative financial value of harm reduction of £28b. This is much higher than any equivalent figure seen in the pricing policy scenarios examined.

Scenario AD8 uses work by Nelson and Young (1997), where the authors argue that advertising bans will have little benefit and in fact can cause harm because suppliers compete for market share instead on the basis of price – leading to consumption increases as prices fall. The result of using this assumption in the model is a 4.9% increase in consumption, and an associated increase in harms, with a ten year financial value effect of £6.4b more harm (compared to the estimate of £28b less harm above, as shown in Figure 3.12). Note that this assessment includes the potential industry response to an intervention, which has not been factored into the other analyses.

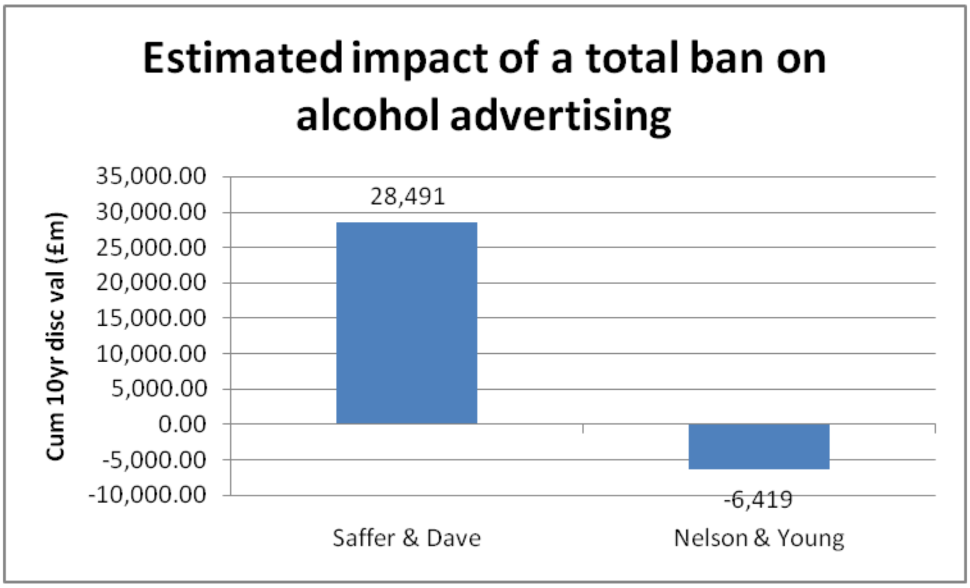

Figure 3.12: Uncertainty in the ten year cumulative financial value of savings – total advertising ban

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

4 MODELLING FINDINGS

4.1 Modelling findings on screening and brief interventions

M1. Screening and brief intervention policies have been examined in three contexts: for the intervention to take place at the next GP consultation, the next registration with a new GP, or the next accident and emergency attendance. The analysis compares health and social care costs versus health benefits in a similar fashion to NICE technology appraisals (excluding crime and workplace harms) and does not explicitly rank alternative settings in terms of cost-effectiveness, since it is clear that other factors, especially implementation issues, are going to be important for decision makers. In each context the analysis suggests that screening and brief intervention would be cost effective; indeed several examples are estimated as cost saving (provide additional health benefits and an overall reduced health service cost) , when compared against a 'do nothing' option.

M2. A policy of screening and brief intervention at next GP registration is a more phased approach over time than screening at next GP consultation. The former approach would screen an estimated 39% of the population, with 36% of hazardous and harmful drinkers receiving a brief intervention over the modelled 10 year screening programme. A policy of screening and brief intervention at next GP consultation is a very large-scale implementation, with an estimated 96% of the population screened after ten years (of whom the majority would be screened in the first year of implementation), and 79% of hazardous and harmful drinkers receiving a brief intervention.

M3. Screening and brief intervention in an accident and emergency setting is estimated to screen 78% of the population within ten years, but because the estimated uptake of brief interventions is just 30%, only 18% of hazardous and harmful drinkers are estimated to receive the brief intervention.

M4. Policy makers and local decision makers may need to balance the timing and scale of impact on the NHS in implementing such programmes with the health costs and health gains which are expected to accrue.

M5. Analysis has not been undertaken on implementing both GP based and A&E based screening and brief intervention policies at the same time. Implicitly we have assumed that an individual already given screening and brief intervention in one context would not take up the opportunity if offered in a second context.

M6. Sensitivity analysis shows that even fairly long brief interventions (eg. 25 minutes) would appear cost-effective versus a 'do nothing' policy. There is currently no conclusive evidence of differential effectiveness of delivery of the intervention by different types of staff. On this basis, decision makers might consider the less costly staffing options that were modeled for screening and intervention to be attractive. Evidence around the differential effectiveness of interventions of different duration is also inconclusive. Sensitivity analyses show that shorter duration interventions remain cost-effective when using the best available evidence on the relationship between duration and effectiveness.

M7. Screening and brief intervention appears more cost effective for men compared to women. This is because on average women incur lower levels of alcohol-attributable harm than males at baseline, and since the percentage reduction in alcohol consumption due to brief interventions is assumed to be the same for males and females, the estimated absolute reduction in harm is smaller for females.

4.2 Modelling findings on pricing strategies

M8. Pricing policies including general price increases, minimum price per unit of alcohol and restrictions to off-trade discounting have been examined. The direct costs to the government of implementing such policies are likely to be small and are not examined here. The analysis shows the estimated extent of changes in: (1) alcohol consumption; (2) health outcomes in terms of illnesses and deaths, hospitalisations and associated NHS costs, and quality adjusted life years; (3) crime outcomes in terms of volume of crimes, costs of crime and quality adjusted life years of victims of crime; and (4) workplace outcomes in terms of days absence and numbers of people unemployed. The total financial value of the direct costs savings in health and crime, quality of life year gains and the workplace harms reductions has been calculated. Also provided for information – as requested by policymakers – are the effects on changes in consumer spending as a result of price increases, increased income to alcohol retailers and the changes in duty and VAT income for government. It is very important to be clear that these increased costs to consumers, and increased sales value to retailers, cannot directly be interpreted as 'costs of the intervention' against which the 'savings of the intervention' (eg. in terms of public sector health and crime or wider workforce savings) should be balanced. Such an approach would require a dynamic analysis of the full effects of redistribution through the economic system. Finally, the public sector focus of NICE economic evaluations also excludes consideration of welfare losses (consumer surplus) arising from reduced consumption of alcohol and this is excluded from our analysis.

4.2.1 Modelling findings on general price increases

M9. General price increases (which equally affect all products in the on-trade and off-trade at once) tend to exhibit relatively large reductions in mean consumption for the population. This is partly due to limited scope for switching between products (because prices increase across the board) and partly because all consumer groups are targeted equally. As would be expected, greater overall price increases lead to larger consumption reductions. As an example an across-the-board price increase of 10% has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
-4.2%	-1,455	-50,000	-64,000	-294,000	-11,800

Table 4.1: Estimated effects of a 10% general price increase

M10. Policies targeting price changes specifically on low-priced products lead to smaller changes in consumption, as they only cover a part of the market and induce substitution for other products by consumers.

4.2.2 Modelling findings on minimum pricing options

M11. 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: --0.0%, -0.1%, -0.4%, -1.1%, -2.4%, -4.3%, -6.7%, -11.9% and -17.7%. Higher minimum prices reduce switching effects. Note that estimates for lower minimum prices are subject to less modelling uncertainty than those for higher minimum prices. This is because the consideration of supply-side responses, and in particular a possible restructuring of the market following large mandated price increases in sections of the market, was outside the scope of the model. As an example a minimum price of 40p per unit has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
-2.4%	-1,149	-39,000	-9,000	-91,000	-11,000

Table 4.2: Estimated effects of a 40p minimum price policy

M12. Minimum prices targeted at particular beverages are less effective than all-product minimum prices, and only minimum prices for beer show noticeable effects.

M13. Differential minimum pricing for on-trade and off-trade lead to somewhat greater reductions in consumption (eg. 40p off-trade minimum together with £1 on-trade minimum gives -2.8% consumption compared to -2.4% for 40p only). Note that this is the most significant difference between the previously published results for the Department of Health, which showed more substantial effects of adding in on-trade minimum prices at thresholds between 60p and £1, and the new version 2 of the model. This is due to the availability of new data on on-trade prices from CGA which suggests that the prevalence of beverages retailing at substantially less than £1 per unit in the on-trade is lower than the earlier estimates based on raw EFS data. Higher differential on-trade thresholds would produce a greater overall effect.

4.2.3 Modelling findings on restrictions for off-trade price promotions

M14. Bans of off-trade 'buy one get one free' offers have very 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 greater than 30% (covering "3 for the price of 2" offers) and greater than 20% (covering up to "5 for the price of 4") lead to overall consumption changes of -0.3% and -0.8% respectively. As an example a ban of discounts greater than 20% has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
-0.8%	-329	-12,000	-5,600	-51,000	-2,100

Table 4.3: Estimated effects of banning off-trade discounts >20%

M15. Bans on discounts only for lower-priced alcohol (within the lower price quartile for beer, wine, spirit or RTD) are not effective in reducing consumption. A total ban on off-trade discounting is estimated to change consumption by -2.7%.

4.2.4 Modelling findings: Policy effects on consumer spending, retail sales, duty and VAT

M16. For all policies in which prices are increased the overall spending on alcohol is estimated to increase. This is because overall the price elasticity magnitude is less than 1, so that for example a 10% price rise produces an estimated reduction in consumption of 4.2%, and an average increase in spending of around 5.7%.

M17. 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 spending for moderate drinkers affected very little.

M18. In general, increases in prices are estimated to increase the value of sales to alcohol retailers (since the overall price elasticity magnitude is smaller than 1). 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 prompt switching behaviour to on-trade consumption.

M19. Effects on sales tax (VAT) and duty receipts are estimated to be relatively small. 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).

4.2.5 Modelling findings on policy effects on health harms

M20. 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 and potentially dying from chronic disease.

M21. 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 one year post implementation for chronic diseases are estimated to be around one tenth of the level that will accrue when the full effect of consumption changes occurs.

4.2.6 Modelling findings on policy effects on crime harms

M22. 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 40p is estimated to reduce total crimes by 9,000 per annum.

M23. The evidence base for underage purchasing is limited (because the youngest ages for which purchasing data exists in EFS are 16 and 17, and there are concerns on reliability even for this). Given this caveat, crime harms are estimated to reduce particularly for 11 to 18 year olds because they are disproportionately involved in alcohol-related crime and are affected significantly by targeting price rises at low-priced products.

M24. 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 than polices that also affect the on-trade sector.

4.2.7 Modelling findings on policy effects on workplace harms

M25. Unemployment harm estimates reduce 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.

M26. Unemployment due to alcohol problems is focused on harmful drinkers and is estimated to reduce as prices increase: eg. 2,900 avoided unemployment cases for 30p versus 11,000 for 40p minimum price. Absence reductions are particularly focussed on hazardous and harmful drinkers: eg. for 40p, the 91,000 estimated reduction in days absence is made up of 26,000 days for hazardous and 44,000 days for harmful drinkers.

M27. Note that the estimated unemployment effects are based on evidence of association studies, rather than detailed prospective analysis of the dynamic effects of employed people becoming unemployed as a consequence of their drinking behaviour, or of unemployed people becoming employed again as consequence of reductions in alcohol consumption. The benefits estimated make no assumption about the directions of these effects and there is no analysis of how the current economic climate might affect these findings.

4.2.8 Modelling findings on financial valuation of policies

M28. 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. For example, a 40p minimum price is valued at £3.8bn over the ten year period. The financial value of harm reductions becomes larger as prices are increased.

M29. 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: eg. the value of health related QALY loss avoided changes from -£169m for the 30p minimum price to -£724m for 40p.

M30. Crime costs are also estimated to reduce as prices increase. Savings are minimal for minimum prices below 40p per unit and are greatest for policies that raise prices in the on-trade (£29m saving from a 25% increase in the price of lower priced off-trade products compared to £297m for the on-trade equivalent).

M31. 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.

M32. The largest financially valued component of harm avoided due to policies is in the estimated unemployment reductions (for example, representing £3b of the overall £3.8b for a 40p minimum price).

4.2.9 Modelling findings on differential effectiveness for priority groups

M33. 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.

M34. Harmful drinkers are expected to reduce their absolute consumption most, but in the more effective policy options also spend significantly more on their purchases.

M35. Policies which target low-priced alcohol affect harmful drinkers disproportionately. This is because moderate drinkers tend to drink a smaller proportion of the very low priced products available.

M36. There are significant effects on harmful drinkers, but important health gains also occur in hazardous and moderate drinkers. Even though moderate drinkers are at a lower risk of health-related harms, small changes in the consumption of the large number of moderate drinkers feed through in the model to small changes in risk and appreciable changes in population health.

M37. 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.

M38. 11 to 18 year old drinkers, and the 18 to 24 year old hazardous drinkers group 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 and any long-term effects beyond the ten year horizon of the policy appraisal are not considered.

M39. 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.

M40. When estimating policy impacts, crime avoided comes more from the harmful and hazardous drinking groups than 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 drink to intoxication and within the model it is this behaviour, i.e. the maximum daily intake of alcohol, that is related to risk of committing crime.

4.2.10 Modelling findings: Sensitivity analysis and uncertainty surrounding elasticities

M41. Sensitivity analysis, which provides information on the robustness of the modeled findings to changes in assumptions, has focused on the 'active ingredient' for pricing policies i.e. price elasticities. The most important is the probabilistic sensitivity analysis on the econometric modeling. The results found fairly tight confidence intervals for changes in alcohol consumption given the uncertainty in cross-price and own-price elasticities. For a 40p minimum price policy the confidence interval for change in alcohol consumption is -2.4% +/- 0.2%. For a general 10% price increase the confidence interval for change in alcohol consumption is -4.2% +/- 0.1%

M42. Other sensitivity analyses use alternative published evidence rather than the elasticity estimates from UK data derived specifically for the study. The first used long-run price-elasticity estimates from the UK (Huang 2003), in which own-price and cross-price elasticities are substantially larger than those from the EFS, applied to the model via a series of assumptions. For a 40p minimum price policy the estimated change in alcohol consumption is -2.2% (rather than -2.4%). For a general 10% price increase the estimated change in alcohol consumption is -9.1% (rather than -4.2%). This difference is because of much larger cross-price elasticities for on-trade alcohol in Huang (2003). As expected, the general price rise has a greater effect when using long-run rather than short-run elasticities.

M43. The second alternative published evidence used was a modelling assumption made by Chisholm et al. (2004) which reduces the elasticity estimates for hazardous and harmful drinkers by one third. For a 40p minimum price policy the estimated change in alcohol consumption is -2.0% (rather than -2.4%). For a general 10% price increase the estimated change in alcohol consumption is -2.7% (rather than -4.2%). For a 40p minimum price policy the estimated change in alcohol consumption is -2.0% (rather than -2.4%). Using the Chisholm et al. assumptions, minimum price policies are still estimated to have greater effects on harmful drinkers than moderate drinkers, eg. for a 40p minimum price the changes in consumption are -1.2% (moderate), -1.5% (hazardous), and -3% (harmful).

M44. A further sensitivity analysis re-examined the EFS data to align the EFS purchasing with GHS consumption by age-sex group because there was a concern that some alcohol purchased by females in the EFS was actually consumed by males in the household. The effect was to reallocate some purchases of alcohol from females to males in the baseline EFS. A new elasticity matrix was then estimated. The results showed very small differences from our original base-case analysis. For a 40p minimum price policy the estimated change in alcohol consumption is -2.7% (rather than -2.4%). For a general 10% price increase the estimated change in alcohol consumption is -4.0% (rather than -4.2%).

M45. In version 1-1 of the modelling published in 2008, a series of other sensitivity analyses were undertaken showing relatively small effect. These have not been re-run in version 2.0 but included: 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 Each had some small or modest effect (+/-25% of the basecase for 10-year cumulative value of harm) except for the relative risk of not working for harmful drinkers (+68%). All of these sensitivity analyses were 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.

4.2.11 Summary of modelling findings on pricing

M46. In summary, pricing strategies have been examined in detail and inducement of higher pricing for alcohol is likely to be effective in reducing consumption and harm, whether through general price increase, minimum price per unit policies or restrictions on discounting. It is left to policymakers to consider the balance between effects on health, crime and workplace harms and the higher prices paid by consumers in different age, sex and drinker sub-groups (moderate, hazardous and harmful).

4.3 Modelling findings on outlet density

M47. Most of the published evidence for outlet density signals a clear positive relationship between increased outlet density and alcohol consumption. One model (Blake and Nied model 1) suggests the opposite, but this model seems an outlier compared with other evidence and is based largely on effects seen in cider rather than all alcohol.

M48. The modelling undertaken examines reductions in outlet density in both on-trade and off-trade together at the same time. This is due to the absence of evidence concerning cross-trade elasticities, ie. switching from the on-trade to the off-trade when outlet densities in one sector are changed.

M49. In general, elasticities for outlet density appear smaller than for price eg. a 1% reduction in outlet density produces a range of estimates from -0.03 to -0.37 versus an overall implied elasticity for price of -0.42.

M50. Though smaller than price effects, outlet density reductions have been proven to reduce both consumption and harm. As an example, the 10% reduction in outlet density (assuming the 1997 UK based study model 3 of Blake and Nied) has the following estimated effects:

% change in consumption	Deaths p.a. (full effect)	Hospital admissions p.a.	Crimes pa	Work absences (days p.a.)	Un-employment (persons p.a.)
- 2.3%	-692	-26,000	-41,000	-190,000	-7,700

Table 4.4: Estimated effects of a 10% reduction in outlet density

M51. As is the case for pricing policies, the analysis of outlet density policies has not examined incremental cost-effectiveness because of a lack of available evidence/ data on the costs of implementation. Also note that these analyses are less specifically related to a policy and more illustrative of the potential scale of effects given evidence from the literature. Partly this is because policies on outlet density may well be implemented in localities rather than on a national basis, and partly it due to lack of easily available routine national data-sets on outlet density.

4.4 Modelling findings on licensing hours

M52. Evidence is limited on the effects of changes in licensing hours on consumption. The recent study of UK licensing hours changes by government agencies concluded that there was little evidence of large scale changes in consumption (via the GHS) and that the level of harms was relatively unchanged, though some crime and accidents had shifted to later times in the evening and night (for more details, see the accompanying systematic review by Jackson *et al.*, 2009). Unfortunately, these studies did not compute any detailed relationship between marginal changes in consumption and marginal changes in licensing hours, i.e. they did not compute a licensing hours elasticity.

M53. Three published studies have shown quantified relationships between licensing hours and consumption. All are non-UK. Two show reductions in off-trade licensing hours associated with reductions in alcohol consumption (one from Canada and one from Sweden). The other shows reductions in on-trade licensing hours being associated with a small increase in alcohol consumption; a possible reason being limited time for drinking perhaps causing drinkers to drink faster.

M54. Modelling a 10% change in licensing hours produces changes in alcohol consumption based on these three studies of -1.2% (Canadian), +0.2% (US), and -3.5% (Swedish). As an example, the 10% reduction in licensing hours (assuming the Carpenter & Eisenberg study results from Canada) has the following estimated effects:

% change in consumption	**Deaths p.a. (full effect)**	**Hospital admissions p.a.**	**Crimes pa**	**Work absences (days p.a.)**	**Un-employment (persons p.a.)**
- 1.2%	-406	-15,600	-20,000	-99,000	-3,200

Table 4.5: Estimated effects for a 10% reduction in licensing hours

4.5 Modelling findings on advertising

M55. 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.

M56. 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 one sixth of advertising be devoted to public health messages is modelled assuming no beneficial effects on consumption but a reduction in total pro-alcohol advertising by one sixth. 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 £0.2bn to £2.6bn.

M57. Similar exploratory analyses for the total elimination of exposure to TV 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 £0.2bn to £0.6bn.

M58. 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 a gain of £28.4bn to a loss of £6.4bn. 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.

M59. In summary, outlet density, licensing hours and advertising policy analyses are more exploratory due to a more limited evidence base and less available UK data on the baseline position. In each case the elasticities from the literature appear somewhat smaller than for prices and the corresponding harm reduction what-if analyses for a 10% reduction on a national basis are correspondingly slightly lower than those for a what-if 10% price increase analysis.

4.6 Modelling findings on combined effects of policies

M60. The analyses undertaken here have focused on screening and brief interventions and on the macro-level policy areas of pricing, outlet density, licensing hours, and advertising separately rather than in combination. Decision makers will be mindful of the need to recognise that complex interactions occur and that simple addition of separate policy results to produce a combined effect estimate may not be valid, whilst being aware that combined policy action over time may be needed to achieve harm reductions.

5 REFERENCES

1. Booth, A, Meier, P, Stockwell, T., Sutton, A, Wilkinson, A, Wong, R, Brennan, A, O'Reilly, D, Purshouse, R, and Taylor, K Independent review of the effects of alcohol pricing and promotion: systematic reviews. 2008

2. Brennan, A., Purshouse, R., Taylor, K., and Rafia, R. Independent review of the effects of 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). 2008

3. Goddard, E. Estimating alcohol consumption from survey data: updated method of convering volumes to units. 2007

4. Stockwell, T., Donath, S., Cooper-Stanbury, M., Chikritzhs, T., Catalano, P., and Mateo, C. Under-reporting of alcohol consumption in household surveys: a comparison of quantity-frequency, graduated-frequency and recent recall. *Addiction* 2004; **99** 1024-1033.

5. Goddard, E. General Household Survey 2005: smoking and drinking among adults. 2006

6. HM Revenue & Customs 2009

7. Fendrich, M. and Rosenbaum, D. P. Recanting of substance use reports in a longitudinal prevention study. *Drug & Alcohol Dependence* 5-6-2003; **70** 241-253.

8. Percy, A., McAlister, S., Higgins, K., McCrystal, P., and Thornton, M. Response consistency in young adolescents' drug use self-reports: a recanting rate analysis. *Addiction* 2005; **100** 189-196.

9. Clements, S., Jotangia, D., Lynch, S., Nicholson, S., and Pigott, S. Drug use, smoking and drinking among young people in England in 2007. 2008

10. Donmall, M., Aldridge, J., Meier, P., Millar, T., and Goins, A. Adolescent mental health: time trends in adolescent drug and alcohol use. Report for the Nuffield Foundation Adolescent Mental Health Programme. (Forthcoming).

11. Fillmore, K. M., Stockwell, T., Chikritzhs, T., Bostrom, A., and Kerr, W. Moderate alcohol use and reduced mortality risk: systematic error in prospective studies and new hypotheses. *Ann.Epidemiol.* 2007; **17** S16-S23.

12. Jones, L., Bellis, M., Dedman, D., Sumnall, H., and Tocque, K. Alcohol attributable fractions for England. 2008

13. Norstrom, T. and Skog, O. J. Alcohol and mortality: methodological and analytical issues in aggregate analyses. *Addiction* 2001; 96 Suppl 1 S5-17.

14. Kind, P., Dolan, P., Gudex, C., and Williams, A. Variations in population health status: results from a United Kingdom national questionnaire survey. *BMJ* 7-3-1998; **316** 736-741.

15. Brand, S. and Price, R. The economic and social costs of crime. 2000

16. Dubourg, R., Hamed, J., and Thorns, J. The economic and social costs of crime against individuals and households 2003/04. 2005

17. Carthy, T., Chilton, S., Covey, J., Hopkins, L., Jones-Lee, M., Loomes, G., Pidgeon, N., and Spencer, A. The Contingent Valuation of Safety and the Safety of Contingent Valuation Part 2: The CV/SG 'chained' approach. *Journal of Risk and Uncertainty* 1999; **17** 187-213.

18. MacDonald, Z. and Shields, M. A. Does problem drinking affect employment? Evidence from England. *Health Economics* 2004; **13** 139-155.

19. Roche, A. M., Pidd, K., Berry, J. G., and Harrison, J. E. Workers' drinking patterns: the impact on absenteeism in the Australian work-place. *Addiction* 2008; **103** 738-748.

20. McCambridge, J and Day, M. Randomised controlled trial of the effects of completing the Alcohol Use Disorders Identification Test questionnaire on self-reported hazardous drinking. *Addiction* 2008; **103** 241-248.

21. BMA and NHS Employers Clinical directed enhanced services (DES) guidance for GMS contract 2008/09. 2008

22. Patton, R., Hilton, C., Crawford, M. J., Touquet, R., The Paddington Alcohol Test: a short report. *Alcohol & Alcoholism* 2004; **39** 266-268.

23. Kaner, E. F. and et al Effectiveness of brief alcohol interventions in primary care populations. *Cochrane Database of Systematic Reviews* 2007; **2**

24. Fleming, M. F., Mundt, M. P., French, M. T., Manwell, L. B., Stauffacher, E. A., Barry, K. L., Brief physician advice for problem drinkers: long-term efficacy and benefit-cost analysis. *Alcoholism: Clinical & Experimental Research* 2002; **26** 36-43.

25. Crawford, M. J., Patton, R., Touquet, R., Drummond, C., Byford, S., Barrett, B., Reece, B., Brown, A., Henry, J. A., Screening and referral for brief intervention of alcohol-misusing patients in an emergency department: a pragmatic randomised controlled trial. *Lancet* 9-10-2004; **364** 1334-1339.

26. Lock, C. A., Kaner, E., Heather, N., Doughty, J., Crawshaw, A., McNamee, P., Purdy, S., Pearson, P., Effectiveness of nurse-led brief alcohol intervention: a cluster randomized controlled trial. *Journal of Advanced Nursing* 2006; **54** 426-439.

27. Gallet, C. The demand for alcohol: a meta-analysis of elasticities. *Australian Journal of Agricultural and Resource Economics* 2007; **51** 121-135.

28. Wagenaar, A., Salois, M. J., and Komro.K.A. Effects of beverage alcohol taxes and prices on consumption: a systematic review and meta-analysis of 1003 estimates from 112 studies. 2008

29. Huang, C. D. Econometric models of alcohol demand in the United Kingdom. 2003

30. Gruenewald, P. J., Ponicki, W. R., Holder, H. D., and Romelsjo, A. Alcohol prices, beverage quality, and the demand for alcohol: quality substitutions and price elasticities. *Alcohol Clin.Exp.Res.* 2006; **30** 96-105.

31. Manning, W. G., Blumberg, L., and Moulton, L. H. The demand for alcohol: the differential response to price. *J.Health Econ.* 1995; **14** 123-148.

32. Blake, D. and Nied, A. The demand for alcohol in the United Kingdom. *Applied Economics* 1997; **29** 1655-1672.

33. Gruenewald, P. J., Ponicki, W. R., Holder, H. D., The relationship of outlet densities to alcohol consumption: a time series cross-sectional analysis. *Alcoholism: Clinical & Experimental Research* 1993; **17** 38-47.

34. Hoadley, J. F., Fuchs, B. C., Holder, H. D., The effect of alcohol beverage restrictions on consumption: a 25-year longitudinal analysis. *American Journal of Drug & Alcohol Abuse* 1984; **10** 375-401.

35. Schonlau, M., Scribner, R., Farley, T. A., Theall, K. P., Bluthenthal, R. N., Scott, M., and Cohen, D. A. Alcohol outlet density and alcohol consumption in Los Angeles county and southern Louisiana. *Geospatial Health* 2008; **3** 91-101.

36. Xie, X., Mann, R. E., Smart, R. G., The direct and indirect relationships between alcohol prevention measures and alcoholic liver cirrhosis mortality. *Journal of Studies on Alcohol* 2000; **61** 499-506.

37. Carpenter, C. S. and Eisenberg, D. Effects of Sunday Sales Restrictions on Overall and Day-Specific Alcohol Consumption: Evidence From Canada. *Journal of Studies on Alcohol and Drugs* 2009; **70** 126-133.

38. Norstrom, T., Skog, O. J., Saturday opening of alcohol retail shops in Sweden: an impact analysis. *Journal of Studies on Alcohol* 2003; **64** 393-401.

39. Saffer, H. and Dave, D. Alcohol consumption and alcohol advertising bans. *Applied Economics* 2002; **34** 1325-1334.

40. Saffer, H. and Dave, D. Alcohol advertising and alcohol consumption by adolescents. *Health Econ.* 2006; **15** 617-637.