



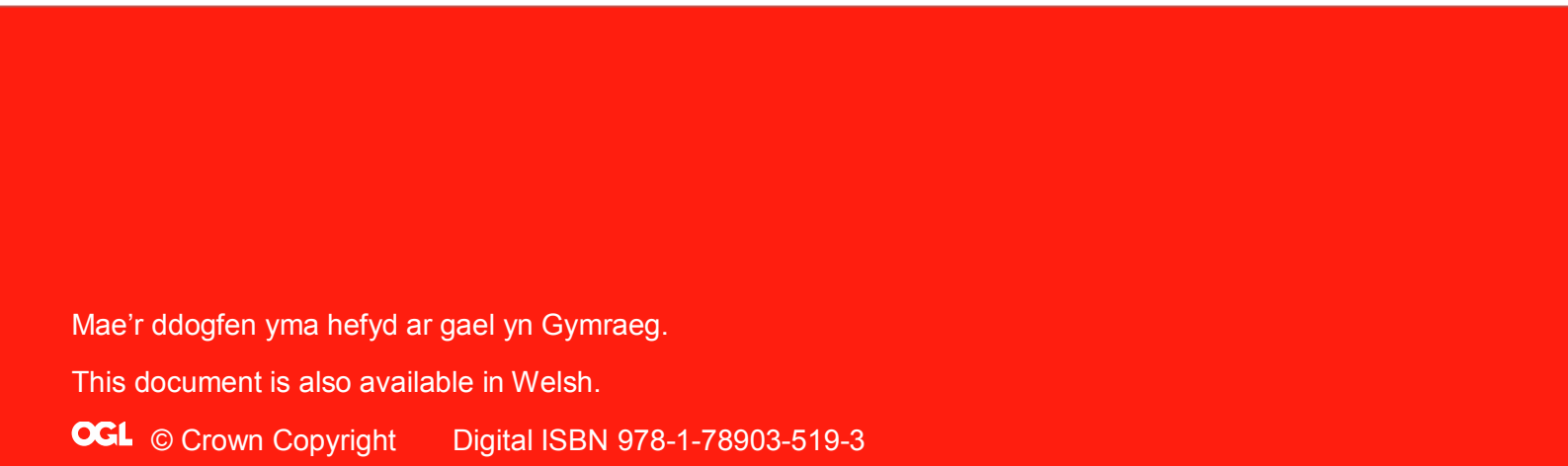
Social research number:

11/2018

Publication date:

22 February 2018

Model-based appraisal of the comparative impact of Minimum Unit Pricing and taxation policies in Wales: Final report



Mae'r ddogfen yma hefyd ar gael yn Gymraeg.

This document is also available in Welsh.

OGI © Crown Copyright Digital ISBN 978-1-78903-519-3

Title: Model-based appraisal of the comparative impact of Minimum Unit Pricing and taxation policies in Wales: Final report

Authors: Colin Angus, John Holmes, Alan Brennan & Petra Meier
Sheffield Alcohol Research Group
School of Health & Related Research
University of Sheffield

Angus, C., Holmes, J., Brennan, A. & Meier, P. (2018). *Model-based appraisal of the comparative impact of Minimum Unit Pricing and taxation policies in Wales: Final report*
Cardiff: Welsh Government
GSR report number 11/2018
Available at: <http://gov.wales/statistics-and-research/research-likely-impact-public-attitudes-towards-minimum-unit-price-alcohol/?lang=en>



The
University
Of
Sheffield.

Views expressed in this report are those of the researcher and not necessarily those of the Welsh Government

For further information please contact:

Janine Hale

Social Research and Information Division

Welsh Government

Cathays Park

Cardiff

CF10 3NQ

Tel: 0300 025 6539

Email: janine.hale@gov.wales

*Most of the material featured on this site is subject to Crown copyright protection. You may use and re-use the information featured in this website (not including logos) free of charge in any format or medium, under the terms of the **Open Government License**. You can view the Open Government License (<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>), on the National Archives website or you can write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.*

You must reproduce our material accurately and not use it in a misleading context. Where any of the Crown copyright items on this site are being republished or copied to others, the source of the material must be identified and the copyright status acknowledged (for example; Welsh Government © Crown copyright 2012). We also encourage you to establish hypertext links to this website.

The permission to reproduce Crown copyright material does not extend to any material on this site which is identified as being the copyright of a third party. Authorisation to reproduce such material would need to be obtained from the copyright holders concerned.

The Sheffield Alcohol Policy Model is the Intellectual Property of the University of Sheffield.

Glossary

Acronym/Key word	Definition
Moderate drinkers	People drinking within the current UK drinking guidelines of 14 units per week
Hazardous drinkers	People exceeding the UK guidelines, but drinking less than 50 units per week for men, or 35 for women
Harmful drinkers	People drinking over 50 units a week for men or 35 for women
Welsh Index of Multiple Deprivation (WIMD)	A small area-level composite measure of socioeconomic deprivation accounting for local levels of income, employment, health, education, access to services, community safety, physical environment and housing.
On-trade	Locations where alcohol is sold for consumption on the premises, e.g. pubs and restaurants
Off-trade	Locations where alcohol is sold for consumption off the premises, e.g. shops and supermarkets
Alcohol-related health conditions	Health conditions from which alcohol consumption increases (or decreases) the risk of death and/or hospital admission ¹
Alcohol-attributable outcomes	Outcomes (e.g. deaths) which would not have occurred in the absence of alcohol consumption, i.e. those which are directly attributable to alcohol

¹ Note that this definition is not the same as the Office for National Statistics definition of 'Alcohol-Related deaths' which has recently been revised.⁶⁰

Table of Contents

Glossary.....	2
Index of Tables.....	5
Index of Figures.....	7
Executive Summary	9
Main Conclusions	9
Research aims	9
Summary of model findings	10
Baseline alcohol consumption, related harm and purchasing in Wales	10
Modelled effects of minimum unit pricing on alcohol consumption, spending and revenue.....	11
Modelled effects of minimum unit pricing on alcohol-related harm	11
Comparing the modelled effects of minimum unit pricing and alcohol taxation increases ...	12
Introduction	14
Methods.....	15
Model overview	15
Data.....	16
Population data	16
Alcohol consumption data.....	16
Alcohol pricing data	16
Price elasticities.....	17
Tax passthrough rates.....	17
Mortality data.....	18
Morbidity data.....	18
Healthcare costs data.....	18
Health-Related Quality of Life.....	21
Relationships between alcohol consumption and risk of health harm	21
Crime volume data	21
Offender demographics	21
Costs of crime	21
Alcohol-Attributable Fractions for crime	21
Employment and absence rates	23
Costs of workplace absence.....	23
Alcohol-Attributable Fractions for workplace absence.....	23
Changes since the 2014 report	23
Results.....	26

Baseline alcohol consumption and purchasing	26
Baseline alcohol-attributable mortality and hospital admissions.....	31
Baseline alcohol-attributable crime	36
Baseline alcohol-attributable workplace absence	36
Baseline costs of alcohol	36
Appraisal of the potential impact of a range of MUP thresholds	37
Estimated impact of MUP on alcohol consumption	37
Estimated impact of MUP on spending on alcohol.....	40
Estimated impact of MUP on retailer and exchequer revenue	43
Estimated impact of MUP on health outcomes	44
Estimated impact of MUP on crime outcomes	54
Estimated impact of MUP on workplace outcomes	57
Estimated impact of MUP policies on societal costs	58
Comparison of MUP policies and taxation.....	61
Equivalisation of taxation rates	61
Comparative impacts on consumption and spending of MUP and tax	62
Comparative impacts of MUP and taxation policies on exchequer and retailer revenue	67
Comparative impacts of MUP and taxation policies on health.....	69
Comparative impact of MUP and taxation policies on crime	76
Comparative impact of MUP and taxation policies on workplace absence	77
Comparative impact of MUP and taxation policies on health inequalities	78
Discussion	79
Summary of key findings	79
Strengths and limitations	80
References	83
Appendix.....	87

Index of Tables

Table 1: Alcohol-related health conditions included in SAPM3.5 with baseline volumes and costs	19
Table 2: Annual estimated crime volumes and costs.....	22
Table 3: Estimates employment and workplace absence rates	23
Table 4: Estimates duty rates per unit of alcohol based on UK duty rates from March 2017	24
Table 5: Baseline drinker characteristics by drinker type	26
Table 6: Baseline drinker characteristics by WIMD quintile	26
Table 7: Proportion of alcohol purchased below a range of price thresholds by drinker type	29
Table 8: Proportion of alcohol sold below a range of price thresholds by drink type and channel	30
Table 9: Estimated annual deaths and hospital admissions caused by alcohol by condition	32
Table 10: Estimated annual deaths and hospital admissions caused by alcohol by drinker type	34
Table 11: Estimated annual deaths and hospital admissions caused by alcohol by WIMD quintile	34
Table 12: Contribution of alcohol to overall mortality by gender and deprivation	35
Table 13: Estimated baseline alcohol-attributable crime volumes.....	36
Table 14: Estimated baseline alcohol-attributable workplace absence	36
Table 15: Estimated baseline costs of alcohol to society in Wales	37
Table 16: Estimated impact of MUP policies on alcohol consumption by drinker group	37
Table 17: Estimated impact of MUP policies on mean consumption by deprivation.....	38
Table 18: Estimated proportion of MUP policy impacts on consumption accounted for by selected groups.....	40
Table 19: Estimated impact of MUP policies on consumer spending by drinker group	41
Table 20: Estimated impact of MUP policies on consumer spending by deprivation.....	42
Table 21: Estimated impact of MUP policies on exchequer and retailer revenues	43
Table 22: Estimated impact of MUP policies on alcohol-attributable mortality by drinker group	45
Table 23: Estimated impact of MUP policies on alcohol-attributable mortality by deprivation	47
Table 24: Estimated proportion of MUP policy impacts on mortality accounted for by selected groups.....	49
Table 25: Estimated impact of MUP policies on alcohol-attributable admissions by drinker group	50
Table 26: Estimated impact of MUP policies on alcohol-attributable admissions by deprivation	52
Table 27: Proportion MUP impacts on alcohol-attributable admissions accounted for by selected groups.....	53
Table 28: Estimated 'partial effects' - impacts of MUP policies on health outcomes in years 1, 5, 10, 15 and 20	54
Table 29: Estimated cumulative impacts of MUP policies on health outcomes following implementation.....	54
Table 30: Estimated impact of MUP policies on alcohol-attributable crime by drinker group.....	55
Table 31: Estimated impact of MUP policies on alcohol-attributable workplace absence by drinker group.....	57
Table 32: Estimated impact of MUP policies on societal costs over 20 years following policy implementation.....	59
Table 33: Equivalised duty rates	61
Table 34: Estimated impact of MUP and taxation policies on consumption by drinker type	62
Table 35: Estimated impact of MUP and taxation policies on consumption by deprivation	63

Table 36: Estimated impact of MUP and taxation policies on spending by drinker type	65
Table 37: Estimated impact of MUP and taxation policies on spending by deprivation	66
Table 38: Estimated impact of MUP and taxation policies on annual exchequer revenue.....	68
Table 39: Estimated impact of MUP and taxation policies on annual retailer revenue	69
Table 40: Estimated impact of MUP and taxation policies on deaths by drinker group	70
Table 41: Estimated impact of MUP and taxation policies on mortality by deprivation	71
Table 42: Estimated impact of MUP and taxation policies on hospital admissions by drinker type	73
Table 43: Estimated impact of MUP and taxation policies on hospital admissions by deprivation	74
Table 44: Estimated impact of MUP and taxation policies on crime.....	76
Table 45: Estimated impact of MUP and taxation policies on workplace absence	77
Table 46: Estimated impact of MUP and taxation policies on health inequalities	78
Table 47: Annual working days and days absent by income quintile	82
Table 48: Estimated annual deaths and hospital admissions caused by alcohol by drinker group and deprivation quintile	87
Table 49: Estimated impact of MUP policies on consumption by drinker group and deprivation	88
Table 50: Proportion of total reduction in consumption under MUP policies accounted for by population subgroups.....	89
Table 51: Estimated impact of MUP policies on consumer spending by drinker group and deprivation	90
Table 52: Estimated impact of MUP policies on alcohol-attributable deaths by drinker group and deprivation	91
Table 53: Proportion of total reduction in alcohol-attributable deaths under MUP policies accounted for by population subgroups.....	92
Table 54: Estimated impact of MUP policies on alcohol-attributable admissions by drinker group and deprivation	98
Table 55: Estimated impact of MUP and taxation policies on consumption by drinker group and deprivation	99
Table 56: Estimated impact of MUP and taxation policies on spending by drinker group and deprivation	100
Table 57: Estimated impact of MUP and taxation policies on alcohol-attributable mortality by drinker group and deprivation.....	101
Table 58: Estimated impact of MUP and taxation policies on alcohol-attributable hospital admissions by drinker group and deprivation	102

Index of Figures

Figure 1: Cumulative distributions of prices paid for alcohol by channel and beverage type (LCFS 2010-15 and Nielsen 2016).....	17
Figure 2: Estimated rates at which duty increases are passed through to off-trade alcohol prices taken from Ally et al.....	18
Figure 3: Distribution of the population, alcohol consumption and spending by drinker type.....	27
Figure 4: Beverage preferences by drinker type.....	27
Figure 5: Channel preferences by drinker type.....	28
Figure 6: Average prices paid by beverage and drinker type.....	28
Figure 7: Average prices paid by beverage type and WIMD quintile.....	29
Figure 8: Proportion of alcohol purchased for below a range of price thresholds by drinker type.....	30
Figure 9: Proportion of off-trade alcohol sold below a range of price thresholds by drink type ...	31
Figure 10: Proportional causes of alcohol-attributable death and hospital admission (excluding protective conditions).....	33
Figure 11: Estimated annual deaths caused by alcohol by drinker group and WIMD quintile	35
Figure 12: Modelled effects of MUP policies on consumption by drinker group.....	38
Figure 13: Modelled effects of MUP policies on consumption by deprivation.....	39
Figure 14: Distribution of reductions in consumption under MUP policies across drinker groups.....	39
Figure 15: Distribution of reductions in consumption under MUP policies across WIMD quintiles.....	40
Figure 16: Modelled effects of MUP policies on consumer spending by drinker group.....	41
Figure 17: Modelled effects of MUP policies on consumer spending by deprivation.....	42
Figure 18: Modelled effects of MUP policies on exchequer revenues.....	44
Figure 19: Modelled effects of MUP policies on retailer revenues.....	44
Figure 20: Modelled effects of MUP policies on mortality by drinker group.....	46
Figure 21: Modelled effects of MUP policies on mortality by deprivation.....	48
Figure 22: Distribution of reductions in alcohol-attributable deaths under MUP policies across drinker groups.....	48
Figure 23: Distribution of reductions in alcohol-attributable deaths under MUP policies across WIMD quintiles.....	49
Figure 24: Modelled effects of MUP policies on admissions by drinker group.....	51
Figure 25: Modelled effects of MUP policies on admissions by deprivation.....	53
Figure 26: Modelled effects of MUP policies on crime by drinker group.....	56
Figure 27: Modelled effects of MUP policies on workplace absence by drinker group.....	58
Figure 28: Modelled effects of MUP policies on societal costs.....	60
Figure 29: Change in mean price under MUP and taxation policies by beverage type and channel.....	62
Figure 30: Comparative impact of MUP and tax on consumption by drinker type.....	63
Figure 31: Comparative impact of MUP and taxation policies on consumption by deprivation...	64
Figure 32: Distribution of reductions in consumption across the population under a 50p MUP and a 34.06% tax rise.....	64
Figure 33: Comparative impact of MUP and taxation policies on spending by drinker type.....	65
Figure 34: Comparative impact of MUP and taxation policies on spending by deprivation.....	66
Figure 35: Comparative impact of MUP and taxation policies on spending by drinker type and deprivation.....	67
Figure 36: Comparative impact of MUP and taxation policies on exchequer receipts.....	68

Figure 37: Comparative impact of MUP and taxation policies on retailer revenue	69
Figure 38: Comparative impact of MUP and taxation policies on mortality by drinker type	70
Figure 39: Comparative impact of MUP and taxation policies on mortality by deprivation	72
Figure 40: Distribution of reductions in alcohol-attributable deaths across the population under a 50p MUP and a 34.06% tax rise.....	72
Figure 41: Comparative impact of MUP and taxation policies on hospital admissions by drinker type.....	73
Figure 42: Comparative impact of MUP and taxation policies on hospital admissions by deprivation	75
Figure 43: Distribution of reductions in alcohol-attributable hospital admissions across the population under a 50p MUP and a 34.06% tax rise.....	75
Figure 44: Comparative impact of MUP and taxation policies on crime	77
Figure 45: Comparative impact of MUP and taxation policies on workplace absence.....	78
Figure 46: Comparative impact of MUP and taxation policies on health inequalities	79

Executive Summary

Main Conclusions

Estimates from an updated version of the Welsh adaptation of the Sheffield Alcohol Policy Model suggest:

1. A minimum unit price set at between 35 and 70p would be effective in reducing alcohol consumption among hazardous and, particularly, harmful drinkers. These consumption reductions would lead to reductions in alcohol-related mortality and hospitalisations. Higher levels of MUP lead to greater reductions in consumption and harm.
2. Moderate drinkers would experience only small impacts on their alcohol consumption and spending following the introduction of a minimum unit price. This is because they tend to buy alcohol which would be subject to little or no increase in price under the policy. Higher levels of MUP have larger impacts on the consumption of moderate drinkers.
3. The greatest impact of a minimum unit price would be on the most deprived harmful drinkers. Deprived drinkers consuming at moderate levels would be more affected than other moderate drinkers, but the overall impact on their alcohol consumption and spending remains small.
4. Large alcohol tax increases would be required to achieve the same effects as a 50p minimum unit price. Specifically:
 - a. A 33% tax increase would achieve the same reduction in **alcohol consumption** among **hazardous and harmful drinkers**;
 - b. A 48% tax increase would achieve the same reduction in **alcohol consumption** among **harmful drinkers**;
 - c. A 34% tax increase would achieve the same reduction in **alcohol-attributable deaths** among **hazardous and harmful drinkers**;
 - d. A 47% tax increase would achieve the same reduction in **alcohol-attributable deaths** among **harmful drinkers**.
5. The effects of the above tax increases would be distributed differently across the population compared to a 50p minimum unit price. The above tax increases all lead to larger reductions in alcohol consumption and larger increases in alcohol spending among moderate drinkers and *less* deprived drinkers. For *more* deprived drinkers, the above tax increases still lead to larger increases in alcohol spending but lead to smaller reductions in this group's alcohol consumption.
6. This pattern of consumption changes means reductions in alcohol-related harm are less concentrated in deprived groups than would be the case under a 50p minimum unit price. Therefore, the reduction in alcohol-attributable health inequalities will be smaller for the above tax increases than for a 50p minimum unit price.

Research aims

This report was commissioned in June 2017 by the Welsh Government. It uses newly available datasets to update our previously published analyses of the potential impact on the population and population subgroups of different levels of minimum unit pricing (MUP) for alcohol in Wales. In particular, newly available data on alcohol consumption, from the 2016-17 National Survey for Wales, is included. The report also includes new analyses of the increases in alcohol taxation required to achieve the same effects on key outcomes as a 50p minimum unit price. Finally, it

examines how the effects of minimum unit pricing and tax increases are differently distributed across key population subgroups.

Summary of model findings

Baseline alcohol consumption, related harm and purchasing in Wales

M1. 20% of the Welsh adult population are abstainers, 58% are moderate drinkers, 19% are hazardous drinkers and 3% are harmful drinkers. The 22% of the population who are hazardous or harmful drinkers consume 75% of all alcohol drunk by the Welsh population. The 3% who are harmful drinkers consume 27% of all alcohol consumed by the Welsh population.

M2. Moderate drinkers consume an average of 211 units of alcohol per year compared to 1,236 for hazardous drinkers and 3,924 for harmful drinkers. Moderate drinkers spend an average of £276 per year on this alcohol compared to £1,209 for hazardous drinkers and £2,882 for harmful drinkers.

M3. The abstention rate is higher in the most deprived quintile of the Welsh population (26.7%) than in the least deprived quintile (13.9%). However, average annual consumption among drinkers is higher in the least and second-least deprived quintiles (648 and 649 units per year respectively) than the most deprived quintiles (546 units per year).

M4. The population buys 37% of its alcohol for less than 50p per unit and 15% for less than 40p per unit. Heavier drinkers are more likely to buy alcohol sold below these thresholds. Moderate, hazardous and harmful drinkers respectively buy 22%, 36% and 46% of their alcohol for less than 50p per unit and 9%, 14% and 19% of their alcohol for less than 40p per unit.

M5. Alcohol sold for less than 50p per unit is largely sold in the off-trade. Only 2% of on-trade alcohol is sold for less than 50p per unit compared to 47% of off-trade alcohol. Comparing across off-trade beverage types, 62% of beer, 73% of cider, 32% of wine and 60% of spirits are sold for less than 50p per unit. Also in the off-trade, 19% of all alcohol, 34% of beer, 56% of cider, 8% of wine and 19% of spirits are sold for less than 40p per unit.

M6. There are an estimated 777 alcohol-attributable deaths per year in Wales and 35,637 alcohol-attributable hospital admissions. Liver disease and cancers account for the greatest proportion of alcohol-attributable deaths. Hypertension and mental or behavioural disorders due to alcohol account for the greatest proportion of alcohol-attributable hospital admissions.

M7. Alcohol-attributable deaths and hospital admissions are concentrated in hazardous and, particularly, harmful drinkers and particularly harmful drinkers who are more deprived. Among the most deprived quintile, 5.0% of all deaths are attributable to alcohol compared to 3.2% for the next most deprived quintile and 2.2% for the least deprived.

M9. There are an estimated 88,908 crimes attributable to alcohol per year. An estimated 42,440 of these are committed by hazardous drinkers compared to 38,057 by moderate drinkers and 8,411 by harmful drinkers.

Modelled effects of minimum unit pricing on alcohol consumption, spending and revenue

M10. Introducing a 50p MUP in Wales would be associated with an estimated 3.6% fall in consumption, equivalent to 22.0 units per drinker per year. Estimated reductions in consumption for other levels of MUP range from 0.8% (4.9 units per drinker per year) for a 35p MUP to 10.7% (65.4 units per drinker per year) for a 70p MUP. For the remainder of this executive summary, we focus on a 50p MUP, as this has been the example level used and the focus of much of the policy debate. Full results for other MUP levels can be found in the main report and, in general, policy effects are larger for higher minimum prices.

M11. Consumption reductions under a 50p MUP are estimated to be largest among harmful drinkers (6.8%, 268.7 units per drinker per year) and hazardous drinkers (3.0%, 37.4 units per drinker per year). The smallest effects would be seen among moderate drinkers (1.1%, 2.4 units per drinker per year).

M12. Consumption reductions under a 50p MUP are also estimated to be largest among the most deprived quintile of drinkers (12.6%, 68.7 units per drinker per year) with a reduced effect among the next most deprived quintile (4.1%, 23.9 units per drinker per year) and small effects among the least deprived quintile (0.3%, 1.9 units per drinker per year).

M13. Of the total reduction in units consumed under a 50p MUP, 52% would occur among harmful drinkers, 40% among hazardous drinkers and 8% among moderate drinkers. Drinkers from the most deprived quintile would account for 50% of the reduction in units consumed; however, approximately two-thirds of this would be among harmful drinkers in this quintile.

M14. Following these consumption changes, spending on alcohol is estimated to increase by 1.4% or £8 per drinker per year under a 50p MUP. The largest spending increases would be seen among harmful drinkers (1.7%, £48 per drinker per year) with smaller increases seen for hazardous drinkers (1.5%, £18 per drinker per year) and moderate drinkers (1.1%, £3 per drinker per year).

M15. Those in the most deprived quintile are estimated to reduce their spending on alcohol by 1.5% or £7 per drinker per year, following the above consumption changes. Drinkers in other deprivation quintiles are estimated to increase their spending by between £9 and £13 per drinker per year.

M16. Annual revenue to the exchequer from alcohol duties and VAT in Wales is estimated to fall by 0.4% or £1.9m following the introduction of a 50p MUP. Total annual revenue to retailers from alcohol sales is estimated to increase by 9.9% or £16.8m in the off-trade and 0.2% or £1m in the on-trade.

Modelled effects of minimum unit pricing on alcohol-related harm

M17. A 50p MUP is estimated to lead to 66 or 8.5% fewer alcohol-attributable deaths per year and 1,281 or 3.6% fewer alcohol-attributable hospital admissions per year.

M18. Of the total reduction in deaths arising from a 50p MUP, an estimated 69% occur among harmful drinkers, 57% occur among the most deprived quintile and 45% occur among harmful drinkers in the most deprived quintile. The equivalent figures for reductions in alcohol-attributable hospital admissions are 44%, 49% and 24%; suggesting reductions in hospital admissions remain concentrated in the highest risk groups but are somewhat more widely distributed across the population.

M19. Each year, there are currently an estimated 46.4 more alcohol-attributable deaths per 100,000 drinkers in the most deprived quintile in Wales than the least deprived. The above pattern of mortality reductions under a 50p MUP reduces this inequality gap by an estimated 26% to 34.2 extra deaths per 100,000 drinkers per year.

M20. A 50p MUP is estimated to lead to 2.4% or 2,093 fewer alcohol-attributable crimes per year. The largest reduction is seen in crimes committed by hazardous drinkers at 3.0% or 1,277 fewer crimes per year, compared to 1.7% or 657 fewer crimes per year for moderate drinkers and 1.9% or 159 fewer crimes per year for harmful drinkers.

M21. The number of working days lost to alcohol-attributable workplace absences is estimated to fall by 1.9% or 9,808 days per year under a 50p MUP. The largest reduction is seen in days absent for hazardous drinkers at 2.7% or 6,138 fewer days absent per year, compared to 1.2% or 2,621 fewer days absent per year for moderate drinkers and 1.6% or 1,049 fewer days absent per year for harmful drinkers.

M22. The discounted total reduction in societal costs of alcohol over 20 years arising from these reductions in alcohol-attributable harm is £783m or a reduction in total costs of 4.7%. This is comprised of a 4.6% or £91m reduction in direct healthcare costs, a 7.5% or £490m reduction in losses of Quality Adjusted Life Years (QALYs), a 2.5% or £188m reduction in the direct and QALY-related costs of crime and a 2.1% or £14m reduction in costs associated with workplace absences.

Comparing the modelled effects of minimum unit pricing and alcohol taxation increases

M23. A 50p MUP is estimated to lead to hazardous and harmful drinkers consuming an average of 73 fewer units per drinker per year. An estimated 33% increase in alcohol taxes would be required to achieve the same effect. Tax increases of 34%, 47% and 48% respectively would be required to achieve the same effects as a 50p MUP on consumption among harmful drinkers only, alcohol-attributable deaths among hazardous and harmful drinkers, and alcohol-attributable deaths among harmful drinkers only.

M24. The above alcohol tax increases are estimated to have larger impacts on alcohol consumption among moderate drinkers than a 50p MUP. A 50p MUP is estimated to reduce consumption among moderate drinkers by 1.1% whereas tax increases of 33%, 34%, 46% and 47% are estimated to reduce consumption among moderate drinkers by 3.1%, 3.2%, 4.5% and 4.6% respectively. However, the absolute size of these consumption reductions remains small at between 7 and 10 units per drinker per year compared to 2 units per drinker per year for a 50p MUP.

M25. In contrast, the above tax increases are estimated to have smaller impacts on alcohol consumption among the most deprived drinkers than a 50p MUP. A 50p MUP is estimated to reduce consumption among the most deprived drinkers by 12.6% whereas tax increases of 33%, 34%, 46% and 47% are estimated to reduce consumption among moderate drinkers by 6.9%, 7.1%, 9.8% and 10.2% respectively. The absolute size of these consumption reductions ranges between 37 and 56 units per drinker per year compared to 69 units per drinker per year for a 50p MUP.

M26. The above alcohol tax increases are estimated to lead to larger increases in alcohol spending across all drinker groups, after consumption changes, than a 50p MUP. Estimated increases in spending under a 50p MUP range between 1.1% or £3 and 1.7% or £48. For the tax increases, estimated changes in spending range between increases of 5.7% or £16 and

increases of 10.5% or £303. The same is true across all deprivation groups, with MUP estimated to change spending by between a decrease of 1.5% or £7 and an increases of 1.9% or £13, compared to increases of between 4.8% or £21 and 9.6% or £72[†].

M27. The above alcohol tax increases are estimated to lead to an increase in revenue to the exchequer of between 21.0% or £101m and 29.8% or £144m per year. This compares to a decrease in revenue of 0.4% or £1.9m under a 50p MUP.

M28. The impact on revenue to off-trade retailers is estimated to range between decreases of 10.5% or £18m and decreases of 15.4% or £26m. This compares to increases of 9.9% or £17m under a 50p MUP. For on-trade retailers, the estimated impact of the tax changes on revenue ranges between decreases of 2.2% or £11m and decreases of 3.2% or £16m. This compares to increases of 0.2% or £1m under a 50p MUP.

M29. Reductions in alcohol-attributable mortality and hospital admissions arising from the above tax increases would still be concentrated among the most deprived and harmful drinkers but to a lesser extent than under a 50p MUP. This reflects the pattern of consumption reductions described above. As a result, the inequality gap in alcohol-attributable mortality between the most and least deprived group would fall from 46.4 extra deaths per 100,000 drinkers in the most deprived group per year at baseline to 34.2 extra deaths under a 50p MUP but would only fall to between 39.3 and 41.5 extra deaths under the tax increases. This suggests alcohol-attributable health inequalities would fall by a greater amount under a 50p MUP than the above tax changes.

[†] Note that the largest (or smallest) relative spending change may not be in the same group as the largest (or smallest) absolute spending change.

Introduction

In June 2017, the Sheffield Alcohol Research Group (SARG) at University of Sheffield were commissioned by the Welsh Government to model the potential impact of a Minimum Unit Pricing (MUP) policy for alcohol and how this might compare to rises in alcohol duty. This work builds on previous modelling work undertaken by SARG in 2014¹ and involves the adaptation of the Sheffield Alcohol Policy Model v3.5 (SAPM) to Wales. SAPM is an alcohol policy appraisal tool which has been widely used to examine the potential impact of alcohol pricing policies, including both taxation and Minimum Unit Pricing^{2,3}, restrictions on availability and marketing⁴ and delivery of Screening and Brief Intervention programmes^{5,6} on a broad range of outcomes of relevance to policy makers. The outcomes assessed include the estimated impacts on alcohol consumption, exchequer revenue, mortality, hospital admissions, healthcare costs, crime volumes and costs and workplace productivity. Versions of SAPM have been developed and adapted for a broad range of countries including England^{7,8}, Wales¹, Scotland^{9,10}, Northern Ireland¹¹, the Republic of Ireland¹², Canada¹³ and Italy¹⁴.

The specific research questions to be addressed in this new analysis for Wales are:

1. To use new data and new modelling approaches to provide new estimates of the impact of a MUP (at levels in 5p increments from 35-70p) on alcohol consumption, spending, health, crime and workplace outcomes, and how these impacts will vary across different levels of drinking and deprivation.
2. To establish the proportional increases in alcohol duty which would be required to achieve the same reduction in the alcohol consumption of hazardous and harmful drinkers combined (those drinking over the current UK drinking guidelines) and harmful drinkers alone (those drinking over 50 units/week for men and 35 units/week for women) as a 50p MUP and to illustrate how the impact of these two policies (MUP and duty rises) are distributed differently across the population.
3. To establish the proportional increases in alcohol duty which would be required to achieve the same reduction in alcohol-attributable deaths among hazardous and harmful drinkers and harmful drinkers alone as a 50p MUP and illustrate the differences in distribution of impact across the population.

A short report providing preliminary results from this modelling, focussing on the impact of an illustrative example 50p MUP policy on health outcomes only was published in November 2017¹⁵. The current report presents the final analysis addressing the three research questions set out above.

Methods

Model overview

The Sheffield Alcohol Policy Model is a deterministic economic and epidemiological policy appraisal tool which operates as a series of linked models to explore the potential impact of a range of alcohol policy options on a broad spectrum of outcome measures. Critically, SAPM also provides estimates of the distribution of policy impacts across different groups in the population.

Briefly, SAPM operates in the following steps when modelling the impact of a pricing-based policy:

1. Model the current distribution of alcohol consumption, preferences for different types of alcoholic beverage and prices paid
2. Model the impact of a policy on the distribution of alcohol prices
3. Model the impact of these changes on alcohol consumption in both the on- and off-trades[‡]
4. Model the impact of these changes in consumption on consumer spending and revenue for retailers and the exchequer
5. Model the current scale and distribution of alcohol-related harm (in terms of the impact on health, crime and workplace outcomes)
6. Model the impact of changes in alcohol consumption on risk of alcohol-related health outcomes
7. Model the impact of these changes in risk on mortality rates, population health, hospital admission levels and associated healthcare costs
8. Model the impact of these changes in alcohol consumption on alcohol-related crime and associated costs to society (in terms of both direct policing costs and the negative impact of crime on the health of victims)
9. Model the impact of these changes in alcohol consumption on workplace absence and associated costs to society

These steps are operationalised in two linked models. The first, primarily economic model, covers steps 1-4, while the second, primarily epidemiological model, covers steps 5-9. Throughout both models, consideration is given to both levels and patterns of alcohol consumption, and how these and other baseline characteristics vary across the population. In the version of SAPM used for the present analysis (SAPM v3.5), this heterogeneity is modelled across sex, age (in 4 groups – 18-24, 25-34, 35-55 and 55+ years old) and quintiles of the Welsh Index of Multiple Deprivation (WIMD), a multi-component area-based measure of deprivation calculated by the Welsh Government¹⁶. In addition, the model is further stratified into three drinker groups:

- Moderate drinkers (those drinking within the current UK Chief Medical Officer's guidelines of 14 units per week)
- Hazardous drinkers (those exceeding the current guidelines, but drinking no more than 35 units per week in the case of women or 50 units per week for men)

[‡] 'On-trade' refers to outlets, such as pubs and restaurants, where alcohol is sold for consumption on the premises. 'Off-trade' refers to outlets, such as shops and supermarkets, where alcohol is sold for consumption elsewhere.

- Harmful drinkers (women drinking more than 35 units per week or men drinking more than 50 units per week)

A detailed description of the modelling methodology that underpins both of these models can be found in the 2014 report for Wales ¹ and in other more recent publications ^{3,10,17}. This report describes only the data sources which are used to populate the model and key changes since 2014.

Data

The Sheffield Alcohol Policy Model synthesises data from a wide range of sources. These are outlined briefly below:

Population data

Data on the number of adults (aged 18+) living in Wales by age (in single years), sex and deprivation (measured in quintiles of the Welsh Index of Multiple Deprivation (WIMD)) was obtained from the Office for National Statistics' mid-year population estimates for 2015 for every Lower Super Output Area[§] in Wales ¹⁸ combined with WIMD rankings from StatsWales ¹⁹.

Alcohol consumption data

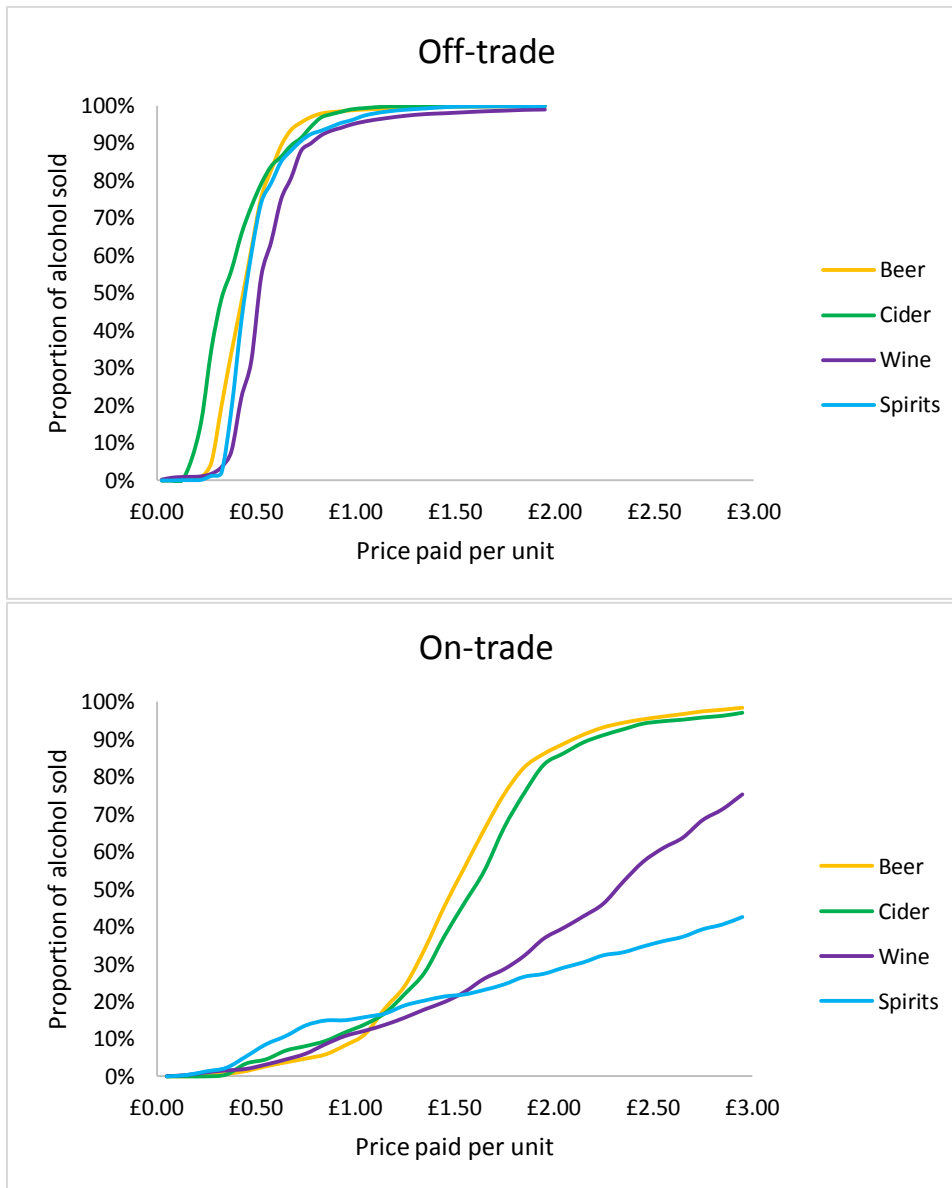
Individual-level self-reported alcohol consumption data for Wales was obtained from the 2016-17 National Survey for Wales (NSW), provided directly by the Welsh Government.

Alcohol pricing data

Individual transaction-level self-reported alcohol purchasing data for Wales and England (as the Welsh sample alone was insufficiently large) was obtained from the 2010-15 (pooled) Living Costs and Food Survey, provided by the Department for the Environment, Food and Rural Affairs and the Office for National Statistics. This data was inflated to 2016 prices using alcohol-specific inflation indices published by the Office for National Statistics ²⁰. The data was then calibrated to beverage-specific off-trade sales pricing data for the Wales and West TV region for 2016 from The Nielsen Company provided by the Welsh Government. As it is necessary to align this data (which includes data on household income, but not on WIMD) with the consumption data from the NSW (which includes data on WIMD, but not on household income), we have had to assume that purchasing patterns in each quintile of equivalised household income are equivalent to those in the equivalent WIMD quintile. The resulting population-level distribution of prices by beverage type (beer, cider, wine and spirits) and channel (on- and off-trade) are shown in Figure 1.

[§] A geographical unit with a population of around 1,500 at which WIMD rankings are calculated

Figure 1: Cumulative distributions of prices paid for alcohol by channel and beverage type (LCFS 2010-15 and Nielsen 2016)



Price elasticities

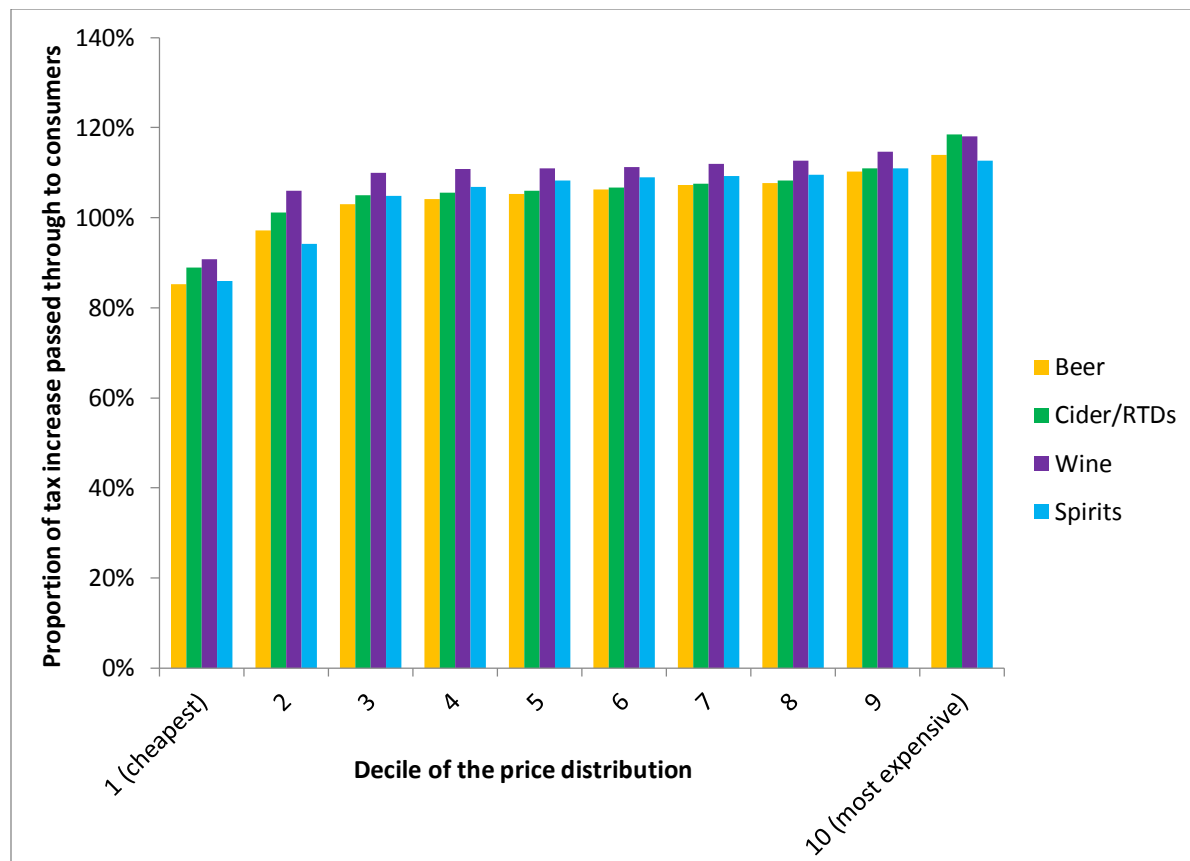
Price elasticities, which estimate the proportional change in alcohol consumption following a proportional change in alcohol prices were taken from published estimates derived using data from England and Wales ²¹.

Tax passthrough rates

Estimates of the extent to which increases in alcohol duty rates are passed through to customers as increases in price for the off-trade were taken from published estimates derived using data from England ²². These rates are illustrated in Figure 2. No similar estimates exist for the on-trade and we therefore assume any increases in duty are passed through in full to the customer (a passthrough rate of 1). This assumption is likely to lead to an overestimation of the impact of tax policies, as there is limited evidence to suggest that passthrough rates in the on-trade are lower than those in the off-trade ²³, i.e. that on-trade retailers absorb a greater

proportion of any duty increases rather than pass them on to customers, however the precise extent to which this may be the case is unclear.

Figure 2: Estimated rates at which duty increases are passed through to off-trade alcohol prices taken from Ally et al. (2014)



Mortality data

Mortality records for 43 alcohol-related health conditions (listed in Table 1), and for all other causes combined, for Wales for the years 2014-16 were obtained from the Office for National Statistics²⁴. These figures were stratified by age group (18-24, 25-34, 35-54, 55+), sex and WIMD quintiles.

Morbidity data

Hospital admission records, corrected for repeat admissions by the same individuals in the same year, for 43 alcohol-related health conditions for Wales for the years 2014-16 were obtained from NHS Wales Informatics Services (NWIS). The same data was also analysed to produce estimates of the average number of hospital admissions in a year for an individual with each of the 43 health conditions included in the model.

Healthcare costs data

Estimates of the average annual NHS costs associated with each of the 43 modelled health conditions were taken from published figures for England and Wales and inflated to 2016 prices using the Personal Social Services Research Unit's (PSSRU) Hospital and Community Health Services (HCHS) index²⁵. These costs, alongside observed annual mortality and admission volumes for Wales for each condition are shown in Table 1.

Table 1: Alcohol-related health conditions included in SAPM3.5 with baseline volumes and costs

Condition	ICD-10 code	Average annual number of deaths (2014-16)	Average annual number of admissions (2014-16)	Mean admissions per year per individual	Mean annual cost per patient to NHS	Estimated total annual cost to NHS
Alcohol-induced pseudo-Cushing's syndrome	E24.4	0	1	1.00	£6,709	£4,472
Degeneration	G31.2	0	43	2.15	£19,519	£390,385
Alcoholic polyneuropathy	G62.1	0	27	2.05	£12,164	£162,189
Alcoholic myopathy	G72.1	0	7	1.50	£15,013	£70,063
Alcoholic cardiomyopathy	I42.6	4	87	2.02	£9,929	£426,940
Alcoholic gastritis	K29.2	0	100	1.55	£14,398	£926,255
Alcoholic liver disease	K70	309	3,330	2.10	£5,346	£8,495,020
Acute pancreatitis	K85.2	2	181	1.57	£8,361	£964,339
Chronic pancreatitis (alcohol induced)	K86.0	1	256	2.17	£22,332	£2,635,191
Maternal care for (suspected) damage to foetus from alcohol	O35.4	0	0	1.00	£8,361	£0
Mental and Behavioural disorders due to use of alcohol	F10	29	9,332	1.45	£6,867	£44,054,369
Excessive Blood Level of Alcohol	R78.0	0	19	1.18	£8,361	£136,568
Toxic effect of Alcohol	T51.0, T51.1, T51.9	1	1,678	1.29	£6,222	£8,122,159
Accidental poisoning by exposure to alcohol	X45	20	8	1.14	£2,084	£15,282
Intentional self-poisoning by and exposure to alcohol	X65	0	23	1.26	£8,361	£150,504
Poisoning by and exposure to alcohol, undetermined intent	Y15	0	2	1.00	£8,361	£19,510
Evidence of alcohol involvement determined by blood alcohol level	Y90	0	9	1.13	£8,361	£64,103
Tuberculosis	A15-A19	10	128	1.44	£8,361	£741,371
Malignant neoplasm of lip, oral cavity and pharynx	C00-C14	141	1,647	2.69	£9,655	£5,909,097
Malignant neoplasm of oesophagus	C15	415	2,040	2.61	£7,116	£5,562,271
Malignant neoplasm of colon and rectum	C18-C21	854	4,993	2.38	£10,248	£21,523,404
Malignant neoplasm of liver and intrahepatic bile ducts	C22	266	439	2.44	£7,292	£1,312,576
Malignant neoplasm of larynx	C32	42	433	2.45	£6,861	£1,214,310
Malignant neoplasm of breast	C50	509	5,458	1.82	£5,193	£15,551,138
Diabetes mellitus (type II)	E10-E14	271	24,449	2.04	£6,098	£73,234,384
Epilepsy and status epilepticus	G40-G41	39	10,660	1.68	£9,060	£57,478,347
Hypertensive diseases	I10-I13	224	124,383	1.56	£5,795	£462,683,976
Ischaemic heart disease	I20-I25	3,284	23,308	2.00	£5,283	£61,655,939
Cardiac arrhythmias	I47-I48	221	36,345	1.83	£8,266	£164,443,732
Haemorrhagic and other non-ischaemic stroke	I60-I62, I69.0-I69.2	462	1,108	1.57	£6,631	£4,692,584
Ischaemic stroke	I63-I66, I69.3-I69.4	877	3,019	1.75	£8,669	£14,977,320
Lower respiratory infections: pneumonia	J10.0, J11.0, J12-J15, J18	1,323	11,215	1.40	£8,361	£66,865,501
Cirrhosis of the liver	K73-K74	116	1,851	1.88	£5,310	£5,228,374
Acute and chronic pancreatitis	K85-K86 excluding K85.2, K86.0	67	3,009	1.57	£5,728	£10,998,791

Condition	ICD-10 code	Average annual number of deaths (2014-16)	Average annual number of admissions (2014-16)	Mean admissions per year per individual	Mean annual cost per patient to NHS	Estimated total annual cost to NHS
Transport injuries (including road traffic accidents)	V01-V98, Y85.0	111	2,167	1.08	£16,826	£33,679,336
Fall injuries	W00-W19	260	10,421	1.21	£4,918	£42,447,793
Exposure to mechanical forces (including machinery accidents)	W20-W52	6	4,001	1.08	£6,058	£22,549,669
Drowning	W65-W74	16	7	1.18	£3,488	£19,766
Other Unintentional Injuries	W75-W99, X30-X33, X50-X58	37	0	1.00	£4,212	£0
Accidental Poisoning by exposure to Noxious Substances	X40-X49 excluding X45	180	839	1.21	£8,361	£5,788,823
Intentional self-harm	X60-X84, Y87.0 excluding X65	244	2,441	1.45	£4,879	£8,206,827
Assault	X85 -Y09, Y87.1	11	908	1.09	£5,275	£4,379,796
Other Intentional Injuries	Y35	0	865	1.14	£8,361	£6,371,328
Total		10,354	291,238			£1,164,153,802

Health-Related Quality of Life

Previously published estimates of age- and sex-specific health utility values for each of the 43 modelled health conditions, and the general population were used, based on analysis of data from the Health Outcomes Data Repository (HODaR) ^{4,26}.

Relationships between alcohol consumption and risk of health harm

For each of the 17 health conditions in the model which are partially attributable to alcohol and for which risk is associated with chronic, rather than acute consumption, estimates of the relationship between levels of mean alcohol consumption and risk of harm are taken from the scientific literature. These relationships are drawn from a range of recent meta-analysis and are aligned with those used in recent international burden of disease studies ²⁷. A full list of the sources for each disease and the associated risk equations can be found in Rehm et al. ²⁸.

Crime volume data

Data on the total volume of recorded crime in each of the 4 Welsh police forces (Dyfed-Powys, Gwent, North Wales and South Wales) for 19 different alcohol-related offences (listed in Table 2) was obtained from published Home Office figures for 2014/15, 2015/16 and 2016/17 ²⁹.

These figures were adjusted to account for underrecording of the true rates of each offence using Home Office estimates of the rate of underrecording ³⁰.

Offender demographics

As the published crime volume figures do not give any information on the demographic characteristics of the offenders, we obtained a detailed breakdown of the age and sex distribution of offenders appearing before any of the 22 magistrates or 4 crown courts in Wales for each of the 19 offence categories during 2014/15, 2015/16 and 2016/17 from the Ministry of Justice. This is used to apportion the estimated total number of offences across the population, under the assumption that the age-sex distribution of those appearing in court matches the age-sex distribution of offenders. Unfortunately, this data was not available further stratified by WIMD quintile of the offender and therefore we have had to assume that offence volumes are independent of deprivation, an assumption which may be unlikely to hold true in practice, particularly since neighbourhood crime rates are themselves a component of the WIMD calculation.

Costs of crime

Estimates of the costs to society of each of the 19 offence categories were taken from published Home Office figures ³⁰ inflated to 2016 prices using ONS inflation data ²⁰. Note that these estimates include both the costs of crime prevention and policing, costs associated with prosecution and also an estimate of the financial valuation of the harm caused to the victim and these figures should not, therefore, be viewed as an estimate of the direct saving to the police and criminal justice system as a result of implementing any policy.

Alcohol-Attributable Fractions for crime

Published estimates of the proportion of offences in each category which are attributable to alcohol, derived from the Offending Crime and Justice Survey were used ⁴. These are summarised in Table 2.

Table 2: Annual estimated crime volumes and costs

Offence	Average annual recorded volume (2014/15-2016/17)	Uprating factor to account for under-recording	Estimated total annual offences	Estimated cost per offence	Estimated total annual cost	Male Alcohol-Attributable Fraction	Female Alcohol-Attributable Fraction
Causing death by careless driving under influence of drink or drugs	0	1	0	£1,936,383	£0	100.0%	100.0%
Assault with intent to cause serious harm/endorsing life	1,564	1.5	2,346	£28,576	£67,039,358	11.3%	28.3%
Assault with injury	21,543	1.5	32,315	£10,866	£351,125,250	11.3%	28.3%
Assault without injury	17,833	7.9	140,878	£1,942	£273,625,546	18.0%	14.7%
Criminal damage	32,078	5.9	189,262	£1,604	£303,638,692	31.1%	34.1%
Theft from the person	1,749	2.7	4,722	£847	£3,999,018	1.4%	1.3%
Robbery (Personal)	644	4.8	3,093	£9,778	£30,241,474	1.4%	1.3%
Robbery (Business)	85	4.8	406	£10,402	£4,227,282	1.4%	1.3%
Burglary in a dwelling	7,014	2.8	19,639	£4,356	£85,553,674	1.4%	1.3%
Burglary not in a dwelling	10,177	1.9	19,336	£5,114	£98,891,976	1.4%	1.3%
Theft of a pedal cycle	3,117	3.6	11,221	£847	£9,502,526	5.3%	51.4%
Theft from vehicle	10,097	3.5	35,341	£1,266	£44,754,385	5.3%	51.4%
Aggravated vehicle taking	404	1.3	525	£5,516	£2,897,052	5.3%	51.4%
Theft of vehicle	2,856	1.3	3,712	£8,331	£30,928,835	5.3%	51.4%
Other theft	15,769	2.7	42,577	£847	£36,055,942	1.4%	1.3%
Theft from shops	17,797	16.1	286,537	£138	£39,434,624	1.4%	1.3%
Violent disorder	17	1.5	26	£19,721	£512,743	14.5%	21.2%
Sexual offences	5,324	13.6	72,411	£41,012	£2,969,732,307	14.5%	21.2%
Homicide	29	1	29	£1,936,383	£56,155,104	14.5%	21.2%

Employment and absence rates

The proportion of each age-sex group in the model who are in employment, as opposed to being unemployed or economically inactive, was calculated from the Welsh sample of the Quarterly Labour Force Survey (QLFS) from October 2015 – September 2017 (pooled) obtained from the Office for National Statistics. This data was also used to produce estimates of the average number of scheduled days' work and the number of day's absence in the past week. Note that as the QLFS does not record drinking behaviour, we have had to assume that drinking is independent of rates of employment.

Costs of workplace absence

Days of absence from work are valued using the mean gross salary for individuals in each age-sex group. These are also derived from the QLFS data.

Alcohol-Attributable Fractions for workplace absence

No Welsh, or even UK, data could be identified on the proportion of workplace absences which were attributable to alcohol. We therefore took self-reported estimates of these figures, broken down by age and sex, from published figures for Ireland, derived from the National Alcohol Diary Survey 2013¹². These are presented in Table 3 alongside annual absence rates. Note that these estimates are based on individuals own attribution of their absence to alcohol, so may underestimate the true absence burden of alcohol as survey respondents may not have attributed some alcohol-attributable health problems that caused them to miss work as being directly caused by alcohol.

Table 3: Estimates employment and workplace absence rates

		Population	Employment rate	Average working days per week	Overall absence rate	Mean gross annual income	Alcohol-Attributable Fraction
Male	18-24	151,280	61.9%	4.58	1.1%	£15,343	36%
	25-34	190,819	85.3%	4.92	0.6%	£23,591	23%
	35-54	390,106	87.5%	4.90	1.1%	£31,238	8%
	55+	464,123	34.6%	4.78	2.2%	£28,952	10%
Female	18-24	141,168	61.2%	4.10	1.0%	£12,048	33%
	25-34	187,475	75.4%	4.30	1.7%	£18,100	9%
	35-54	404,204	79.7%	4.38	2.1%	£21,059	4%
	55+	521,820	25.6%	4.25	1.7%	£18,124	0%
Population		2,450,995	58.7%	4.60	1.5%	£22,796	12%

Changes since the 2014 report

As illustrated in the previous section, there have been significant changes to the data used in SAPM since the 2014 report. The most significant of these changes are the use of a large, recent survey on alcohol consumption, the 2016-17 National Survey for Wales, in place of a much smaller sample of data from the 2008-11 General Household Surveys. In addition, the use of much more recent alcohol purchasing data (2010-15 rather than 2001-09) is a significant

advance. There have also been notable changes in the relationships between alcohol consumption and harm taken from the international literature, particularly for cancers where there has been a significant increase in the evidence base in recent years³¹ and for Ischaemic Heart Disease, where new evidence has shown that episodic heavy drinking removes any protective effects conferred by moderate levels of consumption^{32,33}.

In addition to these improvements in the data used in the model, this report also looks at the impact of increasing taxation on alcohol consumption and resulting health, crime and workplace outcomes. Modelling the impact of duty changes on alcohol prices is achieved through adjusting the transaction level data from the Living Costs and Food Survey described in the data section. The first step in this process is to estimate the effective rates of duty per unit of alcohol for each beverage type in the model (beer, cider, wine, spirits and Ready-To-Drinks** (RTDs)). These are based on the latest (effective March 2017) duty rates, however some beverage types (e.g. beer) have differential duty rates depending on their alcoholic strength. For these products, we use data from the Nielsen Company on the proportion of alcohol sold at particularly high and low strengths to calculate a weighted average duty rate per unit. As cider and wine are taxed based on the volume of product, not their alcoholic strength, we assume ABVs based on market research data. Details of these assumptions and the resulting estimates of the tax per unit (both including and excluding VAT on the duty) are shown in Table 4.

Table 4: Estimates duty rates per unit of alcohol based on UK duty rates from March 2017

Category	Sub-category	Current duty rate	Estimated mean ABV	Estimated duty rate per unit (pence)	Proportion of category	Weighted average duty rate per unit (pence)
Beer	General	£19.08 per litre of ethanol	N/A	19.08	98.4%	19.15
	High strength >7.5%	£24.77 per litre of ethanol		24.77	1.5%	
	Lower strength 1.2%-2.8%	£8.42 per litre of ethanol		8.42	0.1%	
Cider (and perry)	1.2%-7.5%	£40.38 per 100 litres of product	4.5%	8.97	88.7%	8.88
	7.5%-8.5%	£61.04 per 100 litres of product	7.5%	8.14	11.3%	
	Sparkling 1.2%-5.5%	£40.38 per 100 litres of product	4.5%	8.97	0.0%	
	Sparkling 5.5%-8.5%	£279.46 per 100 litres of product	7.5%	37.26	0.0%	
Wine	1.2%-4%	£88.93 per 100 litres of product	4.0%	22.23	0.0%	23.75
	4%-5.5%	£122.30 per 100 litres of product	5.5%	22.24	0.4%	
	5.5%-15%	£288.65 per 100 litres of product	12.5%	23.15	84.9%	
	15%-22%	£384.82 per 100 litres of product	17.0%	22.64	4.7%	
	22% above	£28.74 per litre of ethanol	N/A	28.74	0.0%	
	Sparkling 5.5%-8.5%	£279.46 per 100 litres of product	7.0%	39.92	0.0%	
	Sparkling 8.5-15%	£369.72 per 100 litres of product	12.5%	29.58	9.9%	
Spirits and spirits-based RTDs		£28.74 per litre of ethanol	N/A	28.74	100.0%	28.74

** Pre-mixed drinks often referred to as alcopops

For the analysis in this report, we estimate the impact of a flat percentage increase in current alcohol duties (i.e. all duty rates are increased by the same relative amount). If we call this increase $x\%$ then, for each beverage type i , we can express the change in price per standard drink as:

$$\delta_i^* = \delta_i \times x\% \times (1 + VAT)$$

Where δ_i^* is the change in price per standard drink, δ_i is the baseline duty per standard drink and VAT is the VAT rate.

This beverage-specific increase is applied to all transactions in the LCFS.

As outlined in the data section, SAPM incorporates evidence of the extent to which tax changes are passed through to off-trade prices. As illustrated in Figure 2, this shows that, while more expensive products are over-shifted (i.e. the price increase is greater than the increase from the tax rise alone), cheaper products are under-shifted (i.e. the price increase is smaller than would be expected). This gradient is observed across all beverage types, although it is notable that beer and spirits see lower rates of passthrough across all price levels compared to wine.

This evidence is incorporated in SAPM by first sifting through off-trade transaction level prices of each beverage type (i) and determining the decile of the price distribution into which the transaction price falls. Thereafter, a post duty increase per unit price (p_i^*) is calculated by summing the baseline per unit price (p_i) of beverage i and the product of duty plus VAT per unit increase (δ_i^*) and corresponding pass-through rate:

$$p_i^* = p_i + \delta_i^* \times (\text{passthrough rate})$$

For instance, if the baseline price of beer sold in the off-trade is in the lowest decile of prices per unit then a pass-through rate of 0.852 would be applied to any duty increase.

Following these adjustments the revised dataset is used to estimate changes in prices paid in the same way as when modelling MUP policies – see the 2014 report for details.

The final new aspect of this analysis is the use of ‘equivalisation’, the process whereby the duty increase is identified which corresponds to the same impact on a specific outcome measure of interest as a specific index policy (in this case a 50p MUP). In order to calculate the equivalised duty increase for any measure, SAPM is run iteratively across a range of duty increases, until the duty level is identified which produces the equivalent outcome value as the index policy, within a margin of error of <0.5%. This approach has previously been used in both England³ and Scotland¹⁰.

Results

Baseline alcohol consumption and purchasing

Table 5 illustrates that there are just under 2million adults in Wales who drink alcohol, each consuming an average of 610 units and spending £607 per year. Almost three quarters of these drinkers consume within the UK Chief Medical Officer's drinking guidelines of 14 units/week, however 24% of drinkers are drinking at potentially hazardous levels (14-50 units/week for men and 14-35 for women), and over 4% are harmful drinkers (over 50 units/week for men and 35 for women). The average harmful drinker consumes 3,924 units a year, equivalent to around 30 pints of beer, or 8 bottles of wine a week, and spends almost £3,000 per year on alcohol.

Table 5: Baseline drinker characteristics by drinker type

	All drinkers	Moderate	Hazardous	Harmful
Drinker population	1,910,072	1,379,341	449,339	81,392
% of all drinkers	100.00%	72.21%	23.52%	4.26%
Baseline consumption per drinker per year (units)	610	211	1,236	3,924
Baseline spending per drinker per year	£607	£276	£1,209	£2,882

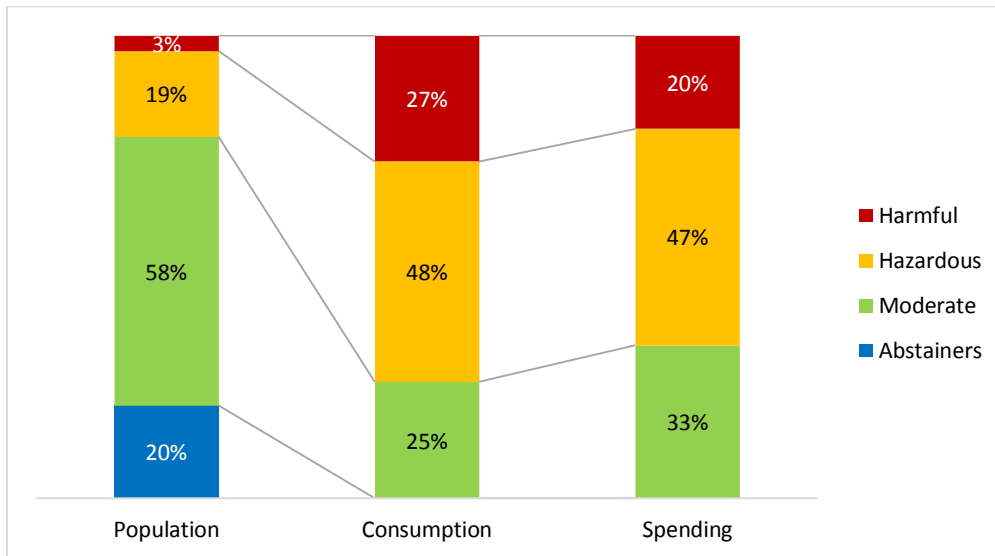
Equivalent figures showing variation in drinking across quintiles of deprivation are presented in Table 6. These show that people in more deprived areas are more likely to abstain from drinking entirely, with almost 27% of those in the most deprived quintile, compared to 14% in the least deprived, being non-drinkers. Among those who do drink, those in more deprived areas drink less on average (546 units per year compared to 648 in the least deprived quintile) and spend considerably less (£441 per year vs. £780 per year).

Table 6: Baseline drinker characteristics by WIMD quintile

	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population	428,613	406,718	406,692	361,987	306,062
Abstention rate	13.9%	18.9%	19.4%	20.7%	26.7%
Baseline consumption per drinker per year (units)	648	649	598	589	546
Baseline spending per drinker per year	£780	£676	£563	£515	£441

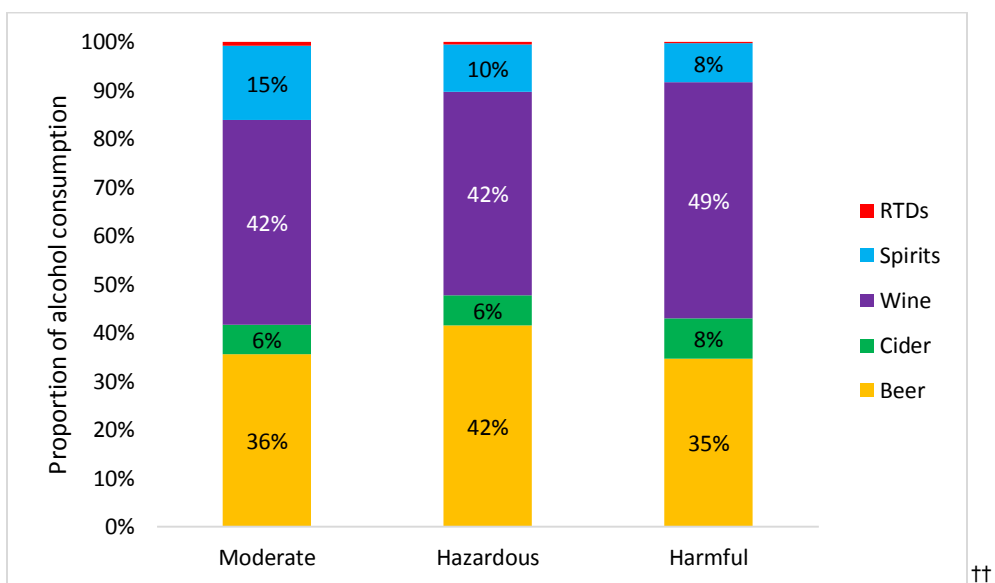
A summary of population patterns in drinking, consumption and spending on alcohol is shown in Figure 3. This highlights that even though hazardous and harmful drinkers combined account for 22% of the entire adult population, they drink 75% of, and are responsible for 67% of all spending on, all alcohol consumed in Wales.

Figure 3: Distribution of the population, alcohol consumption and spending by drinker type



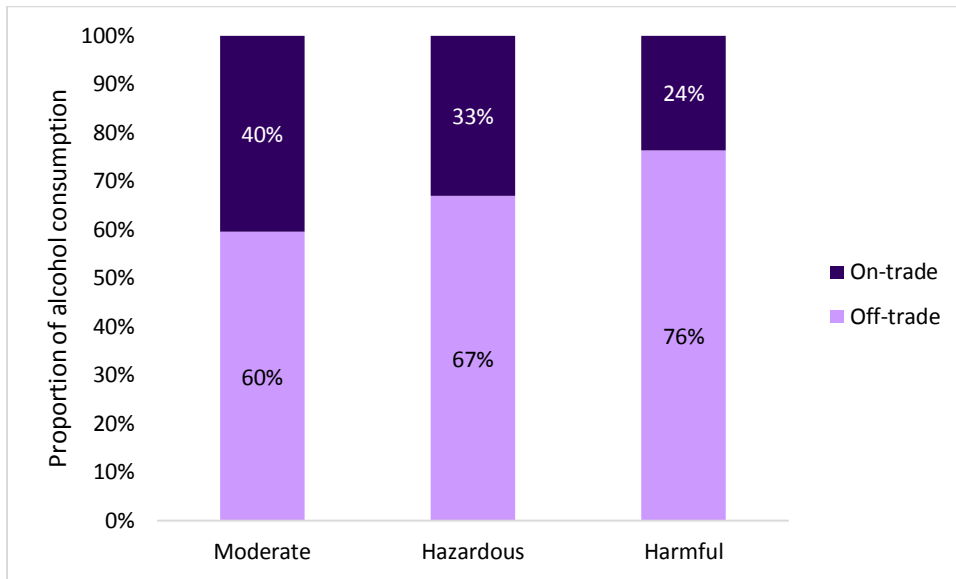
As well as differing in the amount that they drink, those in different drinker groups drink different products. Moderate drinkers consume a greater proportion of their alcohol as spirits and wine, while heavier drinkers drink more cider, as illustrated in Figure 4. These proportional differences should be considered alongside the figures from Table 5 – while harmful drinkers consume 8% of their alcohol as cider compared to 6% for moderate drinkers, the respective numbers of units consumed on average are 326 and 13 per year. Heavier drinkers also drink a greater proportion of their alcohol in the off-trade rather than the on-trade (i.e. alcohol purchased from shops and supermarkets, rather than in pubs and restaurants), as illustrated in Figure 5, although all drinkers consume the majority of their alcohol in the off-trade, on average.

Figure 4: Beverage preferences by drinker type



†† Values below 5% not labelled.

Figure 5: Channel preferences by drinker type



There are also substantial differences in the prices that those in different groups pay for their alcohol, with heavier drinkers, and those living in more deprived areas, typically paying less for each unit they drink. These patterns, shown in Figure 6 and Figure 7 are partly due to drinkers in these groups consuming more of their alcohol in the off-trade, where prices are typically lower, and partly due to these drinkers purchasing cheaper products. On average, moderate drinkers pay 60p/unit for off-trade alcohol and £2.36/unit for on-trade alcohol, compared to 56p and £1.82 respectively for hazardous drinkers and 48p and £1.55 for harmful drinkers.

Figure 6: Average prices paid by beverage and drinker type

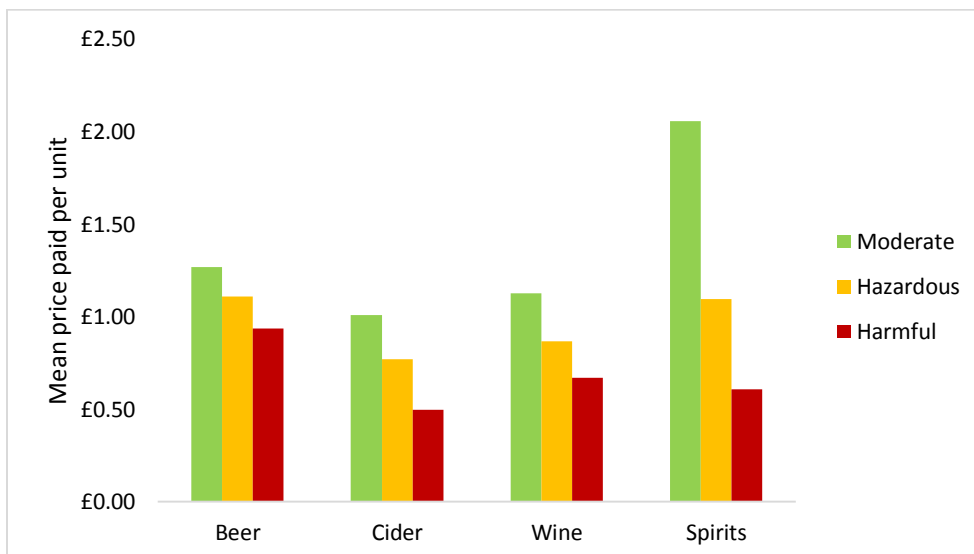
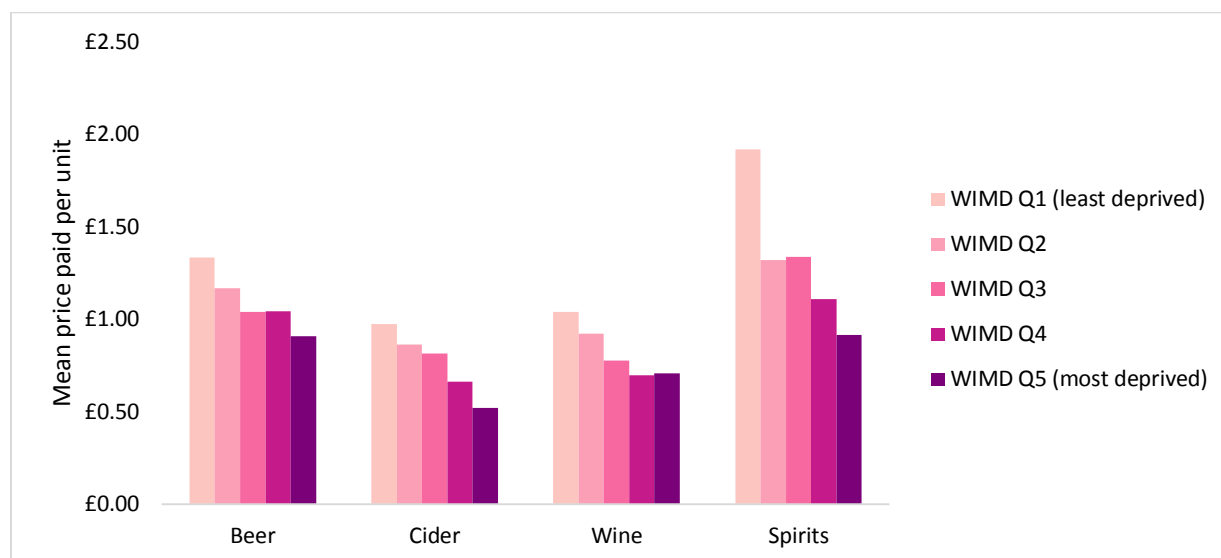


Figure 7: Average prices paid by beverage type and WIMD quintile



In addition to highlighting differences between population groups in prices paid for alcohol, Figure 6 and Figure 7 also highlight variation in prices between products. These differences are shown further in Table 7 and Figure 8, which present the estimated proportion of alcohol units which are sold below a range of price thresholds. A more detailed breakdown, by drink type and channel, focussing on 50p only can be found in the interim report. These estimates show that at all potential MUP levels, the heavier the drinker, the greater the proportion of their alcohol which will be affected by the policy. However, the proportion of moderate drinkers' consumption which is affected also rises as the MUP threshold increases, from 4% at 35p to 22% at 50p and 50% at 70p/unit.

Table 7: Proportion of alcohol purchased below a range of price thresholds by drinker type

	Price threshold							
	35p	40p	45p	50p	55p	60p	65p	70p
All drinkers	7%	15%	27%	37%	50%	56%	63%	66%
Moderate	4%	9%	16%	22%	34%	40%	47%	50%
Hazardous	7%	14%	26%	36%	49%	55%	62%	65%
Harmful	10%	19%	35%	46%	62%	67%	74%	78%

Figure 8: Proportion of alcohol purchased for below a range of price thresholds by drinker type

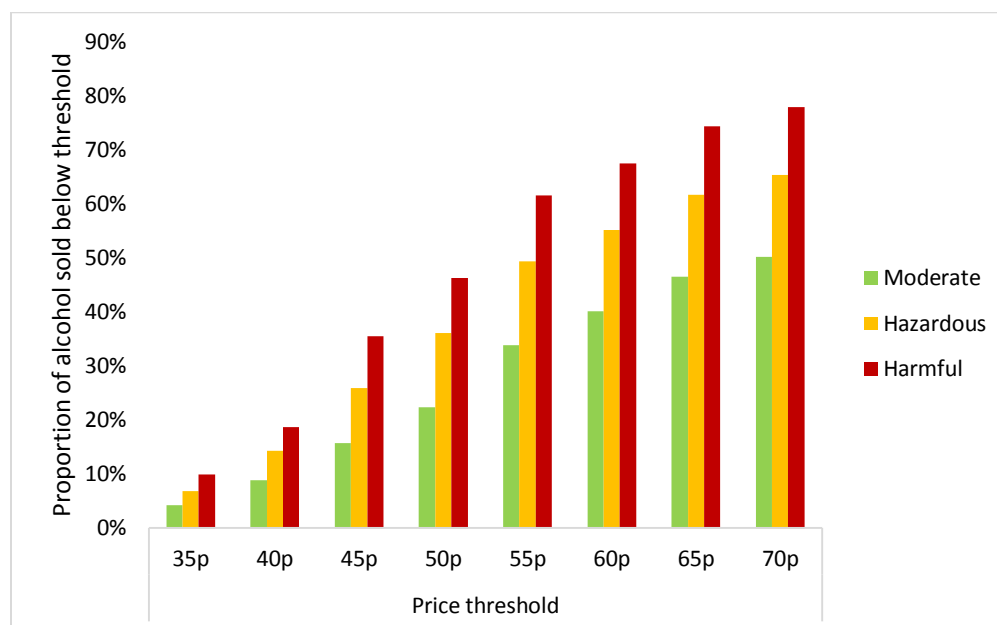
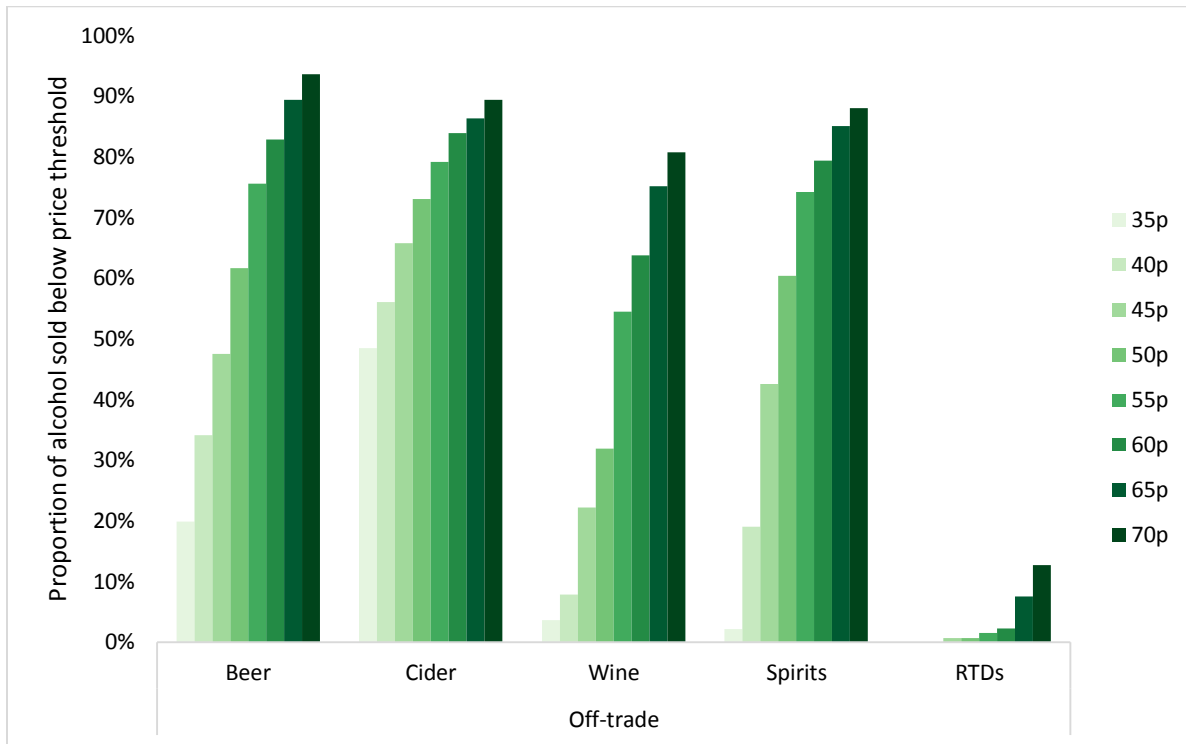


Table 8 presents the breakdown of units sold below a range of price thresholds by drink type and channel. This shows that across the modelled range of potential MUP thresholds, prices in the on-trade are almost entirely unaffected, however the extent of the impact on off-trade prices varies hugely from 9% of all sales (by volume) at 35p/unit up to 85% at 70p. The proportion of alcohol sold below different price thresholds also varies widely between beverage types even within the off-trade, as illustrated in Figure 9.

Table 8: Proportion of alcohol sold below a range of price thresholds by drink type and channel

		Price threshold							
		35p	40p	45p	50p	55p	60p	65p	70p
Off-trade	Beer	20%	34%	47%	62%	76%	83%	89%	94%
	Cider	48%	56%	66%	73%	79%	84%	86%	89%
	Wine	4%	8%	22%	32%	55%	64%	75%	81%
	Spirits	2%	19%	43%	60%	74%	79%	85%	88%
	RTDs	0%	0%	1%	1%	2%	2%	8%	13%
On-trade	Beer	0%	1%	1%	1%	2%	3%	3%	4%
	Cider	0%	0%	2%	3%	4%	5%	6%	7%
	Wine	1%	2%	2%	2%	3%	3%	4%	5%
	Spirits	2%	2%	4%	5%	8%	9%	9%	11%
	RTDs	0%	0%	0%	0%	0%	1%	1%	1%
All off-trade		9%	19%	35%	47%	65%	72%	81%	85%
All on-trade		1%	1%	1%	2%	3%	3%	4%	5%
All alcohol		7%	15%	27%	37%	50%	56%	63%	66%

Figure 9: Proportion of off-trade alcohol sold below a range of price thresholds by drink type



Baseline alcohol-attributable mortality and hospital admissions

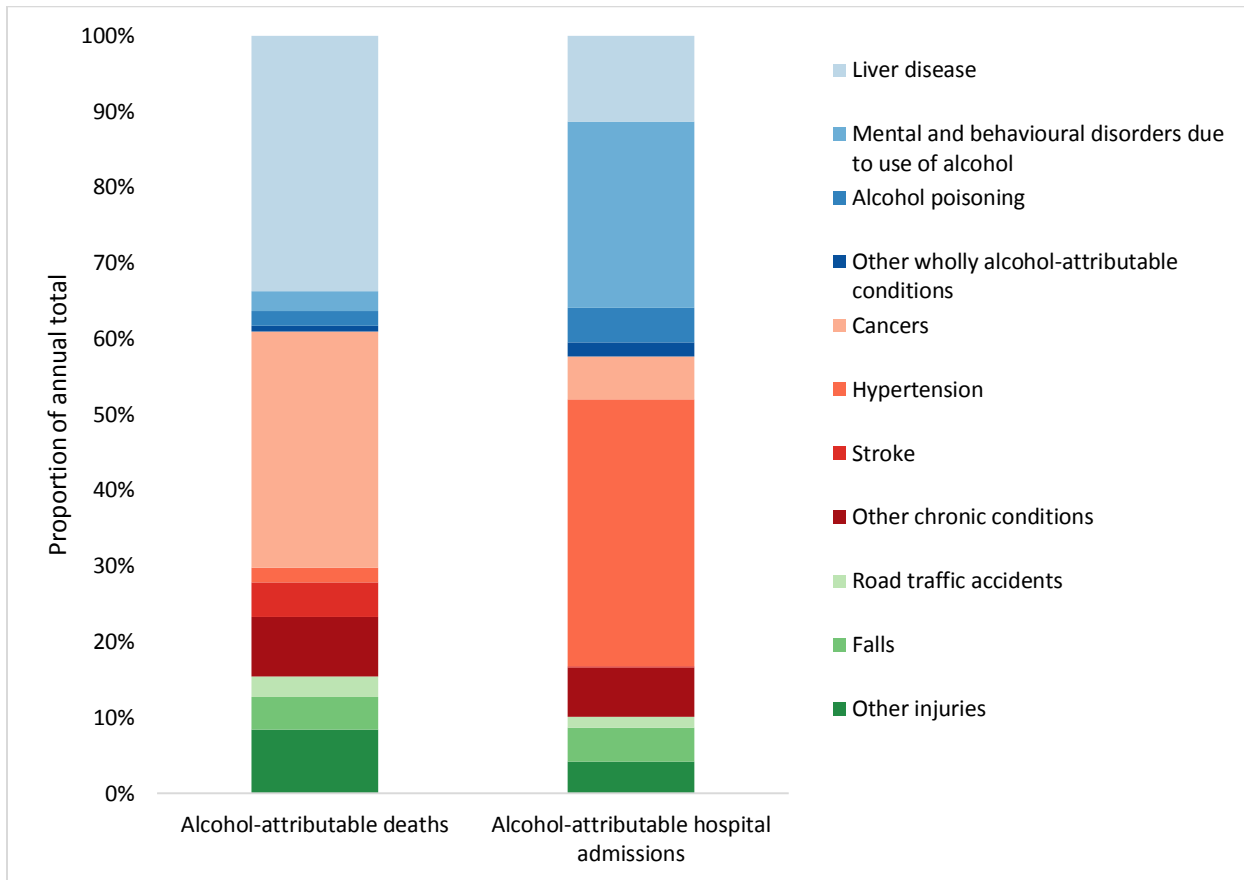
Overall, SAPM estimates that 777 deaths and 35,637 hospital admissions in Wales are directly caused by alcohol.

Table 9 breaks these down by condition, showing that liver disease is the single largest cause of deaths due to alcohol, followed closely by cancer. For hospital admissions the pattern is somewhat different, with the largest contributors to the overall burden of alcohol of hospital admissions being through hypertension and conditions related to alcohol dependence. These figures also illustrate that alcohol is estimated to have a protective effect for diabetes, stroke and other cardiovascular conditions. These effects are widely disputed in the academic literature, which may make estimates of both the burden of harm from alcohol and the effectiveness of alcohol policies as modelled by SAPM, which includes these effects, conservative. Figure 10 shows these patterns visually, excluding protective conditions for ease of interpretation.

Table 9: Estimated annual deaths and hospital admissions caused by alcohol by condition

	Annual alcohol-attributable deaths	Annual alcohol-attributable hospital admissions
Liver disease	369	4,288
Mental and behavioural disorders due to use of alcohol	29	9,307
Alcohol poisoning	22	1,736
Other wholly alcohol-attributable conditions	8	701
Cancers	342	2,169
Hypertension	22	13,345
Stroke	-27	-227
Other cardiovascular conditions	-215	595
Diabetes (type II)	-26	-2,575
Other chronic conditions	86	2,484
Road traffic accidents	29	533
Falls	47	1,689
Other injuries	92	1,593
Total	777	35,637

Figure 10: Proportional causes of alcohol-attributable death and hospital admission (excluding protective conditions)



Estimates of the variation in the burden of alcohol on health by drinker group are presented in Table 10. As with all harm outcomes, we present both the absolute numbers and the rates. The former are most appropriate when considering the absolute burden of alcohol, or impact of policy on this burden, while the latter is more appropriate when comparing between groups (as these groups are often of very different sizes). These estimates show a very substantial gradient in harm, with hazardous and harmful drinkers suffering a substantial burden of harm as a result of their drinking – e.g. an estimated 685 deaths and 15,421 hospital admissions each year for every 100,000 harmful drinkers.

Table 10: Estimated annual deaths and hospital admissions caused by alcohol by drinker type

	All drinkers	Moderate	Hazardous	Harmful
Baseline alcohol-attributable deaths per year	777	-77	297	557
Baseline alcohol-attributable deaths per 100,000 drinkers per year	41	-6	66	685
Baseline alcohol-attributable hospital admissions per year	35,637	5,735	17,350	12,552
Baseline alcohol-attributable hospital admissions per 100,000 drinkers per year	1,866	416	3,861	15,421

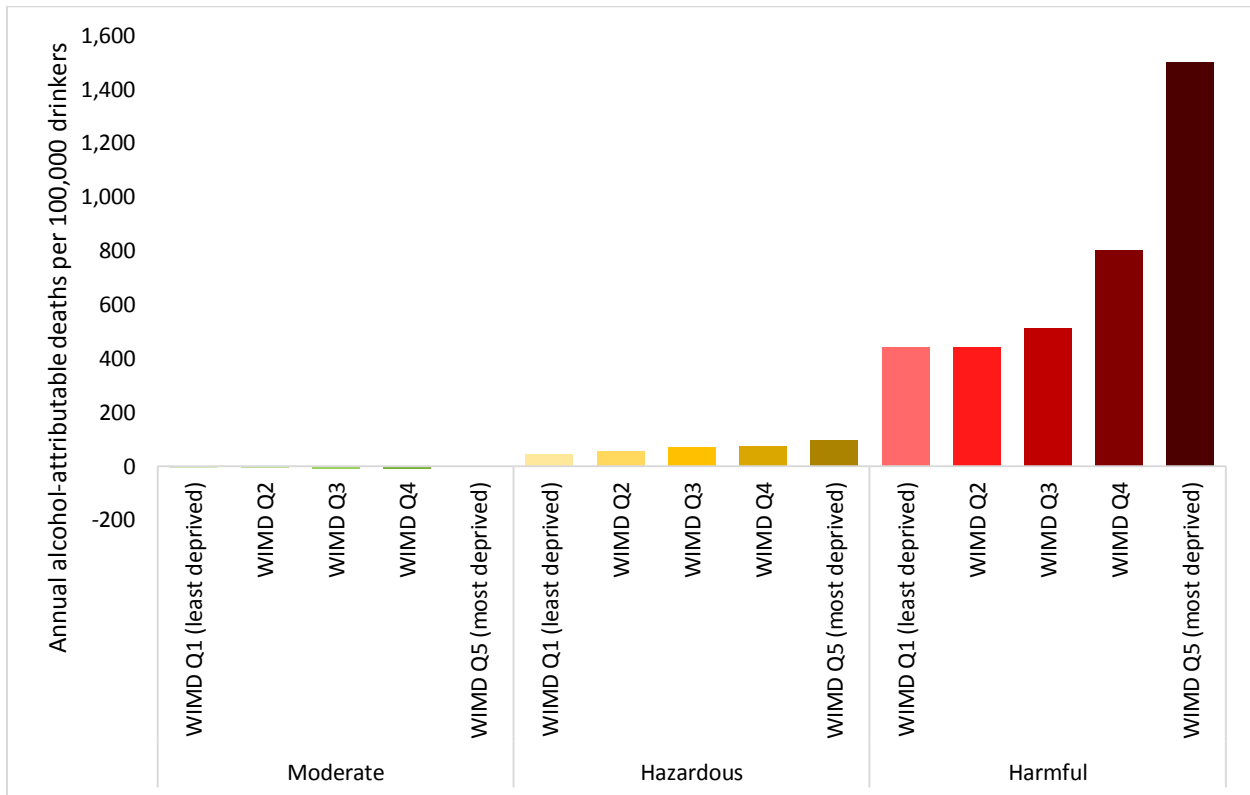
Table 11 shows that there is also a significant deprivation gradient in harm. In spite of the fact that drinkers in most deprived groups drink less on average, this group experiences almost 3 times as many deaths and twice as many hospital admissions per drinker than those in the least deprived group. This phenomenon is widely referred to as the ‘Alcohol Harm Paradox’^{34–37}.

Table 11: Estimated annual deaths and hospital admissions caused by alcohol by WIMD quintile

	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Baseline alcohol-attributable deaths per year	120	123	141	165	228
Baseline alcohol-attributable deaths per 100,000 drinkers per year	28	30	35	45	75
Baseline alcohol-attributable hospital admissions per year	5,956	6,270	7,082	7,689	8,639
Baseline alcohol-attributable hospital admissions per 100,000 drinkers per year	1,390	1,542	1,741	2,124	2,823

Figure 11 shows the combined gradient in alcohol-attributable deaths across both deprivation and drinker groups. This highlights that the negative impacts of alcohol on health are disproportionately concentrated in heavier drinkers in the lowest socioeconomic groups. The underlying figures are shown in Table 48 in the Appendix.

Figure 11: Estimated annual deaths caused by alcohol by drinker group and WIMD quintile



Finally, Table 12 illustrates that 2.9% of all deaths among adults in Wales in 2016 are estimated to have been caused directly by alcohol. This proportion is higher in men than in women (3.8% vs. 1.9%) and substantially higher in the most compared to the least deprived areas (5.0% vs. 2.2%).

Table 12: Contribution of alcohol to overall mortality by gender and deprivation

	Proportion of all deaths which are attributable to alcohol
Population	2.9%
Men	3.8%
Women	1.9%
WIMD Q1 (least deprived)	2.2%
WIMD Q2	2.1%
WIMD Q3	2.5%
WIMD Q4	3.2%
WIMD Q5 (most deprived)	5.0%

Baseline alcohol-attributable crime

Analysis from SAPM estimates that there are 88,908 alcohol-attributable crimes committed each year in Wales, with the vast majority of these being for criminal damage (56%) and violent offences (28%). These results are shown in Table 13 further broken down by drinker group, illustrating that the greatest number of offences are committed by hazardous drinkers, but that the rate of offending is highest among harmful drinkers. No breakdown by WIMD is presented, as crime data was not available by WIMD.

Table 13: Estimated baseline alcohol-attributable crime volumes

	All drinkers	Moderate	Hazardous	Harmful
Violent crimes	24,543	10,641	11,559	2,343
Criminal damage	50,193	21,669	23,906	4,618
Theft	6,135	2,599	2,942	595
Sexual offences	8,036	3,148	4,033	855
Total	88,908	38,057	42,440	8,411
Rate per 100,000 drinkers	4,655	2,759	9,445	10,334

Baseline alcohol-attributable workplace absence

Our analysis finds that just over half a million days' work are estimated to be lost in Wales to alcohol every year. This is presented in Table 14, which also shows that, as for crime, the largest absolute volumes of absence are in hazardous drinkers, while the rate of alcohol-attributable absence is highest in harmful drinkers.

Table 14: Estimated baseline alcohol-attributable workplace absence

	All drinkers	Moderate	Hazardous	Harmful
Days absence	507,795	212,963	227,856	66,975
Rate per 100,000 drinkers	26,585	15,440	50,709	82,287

Baseline costs of alcohol

Finally, Table 15 illustrates the estimated costs of alcohol to society. Each year SAPM estimates that alcohol costs the NHS £159m in Wales, while reducing the number of Quality-Adjusted Life Years (QALYS) by 6,022. We calculate the estimated notional financial value of this improvement in population health using the Department of Health's figure of £60,000 per QALY³⁸. Alcohol is estimated to cost Welsh society £509m through police and criminal justice costs and the impact on victims of crime, and £45m through reduced workplace productivity due to absence.

Table 15: Estimated baseline costs of alcohol to society in Wales

Direct healthcare costs	£158,811,082
Annual QALY loss	6,022
Estimated QALY valuation	£361,323,595
Estimated crime costs	£508,980,525
Estimated workplace costs	£45,420,203

Appraisal of the potential impact of a range of MUP thresholds

For a detailed appraisal of the potential impact of a 50p MUP, please see the recently published interim report¹⁵. This report presents a broader comparison of the impact of a range of MUP thresholds from 35p to 70p per unit.

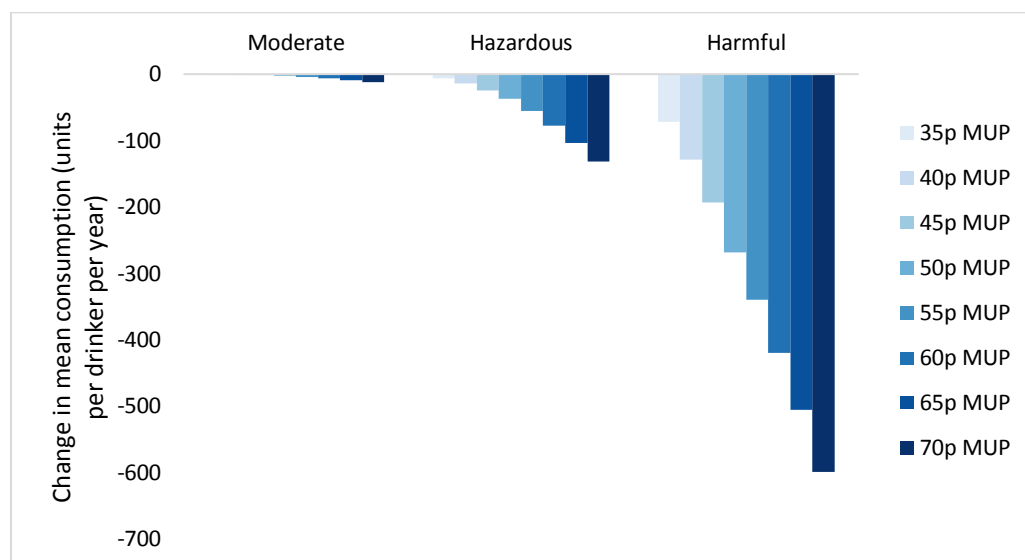
Estimated impact of MUP on alcohol consumption

The modelled impact of each MUP threshold on mean consumption for the population and by drinker group is shown in Table 16 and Figure 12. This shows that higher MUP thresholds lead to greater overall reductions in consumption and that the greatest increases in effect with each increase in the threshold occur in the heaviest drinkers. However, they also highlight that higher MUP levels have an increasing impact on moderate drinkers.

Table 16: Estimated impact of MUP policies on alcohol consumption by drinker group

		All drinkers	Moderate	Hazardous	Harmful
Drinker population		1,910,072	1,379,341	449,339	81,392
Baseline consumption per drinker per year		610	211	1,236	3,924
Absolute change (units per drinker per year)	35p MUP	-4.9	-0.4	-6.6	-71.9
	40p MUP	-9.4	-0.8	-13.9	-128.6
	45p MUP	-14.9	-1.4	-24.0	-193.1
	50p MUP	-22.0	-2.4	-37.4	-268.7
	55p MUP	-30.3	-4.0	-55.0	-339.3
	60p MUP	-40.7	-6.2	-77.7	-419.5
	65p MUP	-52.5	-9.0	-103.9	-505.3
	70p MUP	-65.4	-12.3	-131.7	-599.2
Relative change	35p MUP	-0.8%	-0.2%	-0.5%	-1.8%
	40p MUP	-1.5%	-0.4%	-1.1%	-3.3%
	45p MUP	-2.4%	-0.7%	-1.9%	-4.9%
	50p MUP	-3.6%	-1.1%	-3.0%	-6.8%
	55p MUP	-5.0%	-1.9%	-4.4%	-8.6%
	60p MUP	-6.7%	-3.0%	-6.3%	-10.7%
	65p MUP	-8.6%	-4.3%	-8.4%	-12.9%
	70p MUP	-10.7%	-5.8%	-10.7%	-15.3%

Figure 12: Modelled effects of MUP policies on consumption by drinker group

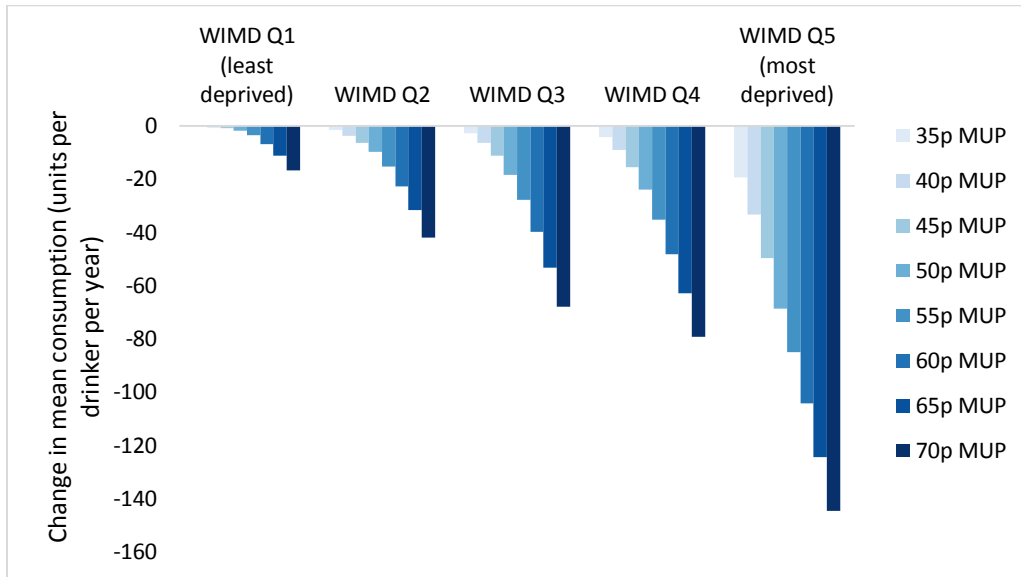


Equivalent estimates, broken down by WIMD quintile are shown in Table 17 and Figure 13. These show a similar pattern, with effects increasing most quickly in more deprived groups as the MUP threshold rises.

Table 17: Estimated impact of MUP policies on mean consumption by deprivation

		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population		428,613	406,718	406,692	361,987	306,062
Baseline consumption per drinker per year		648	649	598	589	546
Absolute change (units per drinker per year)	35p MUP	-0.2	-1.7	-2.8	-4.2	-19.4
	40p MUP	-0.6	-3.7	-6.4	-9.1	-33.2
	45p MUP	-1.0	-6.3	-11.4	-15.5	-49.7
	50p MUP	-1.9	-9.9	-18.4	-23.9	-68.7
	55p MUP	-3.6	-15.3	-27.8	-35.2	-85.1
	60p MUP	-6.9	-22.7	-39.7	-48.1	-104.2
	65p MUP	-11.3	-31.7	-53.2	-63.0	-124.5
	70p MUP	-16.8	-42.0	-68.0	-79.3	-144.5
Relative change	35p MUP	0.0%	-0.3%	-0.5%	-0.7%	-3.6%
	40p MUP	-0.1%	-0.6%	-1.1%	-1.5%	-6.1%
	45p MUP	-0.2%	-1.0%	-1.9%	-2.6%	-9.1%
	50p MUP	-0.3%	-1.5%	-3.1%	-4.1%	-12.6%
	55p MUP	-0.6%	-2.4%	-4.7%	-6.0%	-15.6%
	60p MUP	-1.1%	-3.5%	-6.7%	-8.2%	-19.1%
	65p MUP	-1.7%	-4.9%	-8.9%	-10.7%	-22.8%
	70p MUP	-2.6%	-6.5%	-11.4%	-13.5%	-26.5%

Figure 13: Modelled effects of MUP policies on consumption by deprivation



A detailed breakdown of results by both drinker group and deprivation can be found in Table 49 in the Appendix.

Finally, Figure 14 and Figure 15 illustrate the extent to which the impact of each MUP policy is accounted for by different drinker and WIMD groups in the population, alongside the proportion of the total drinker population in each group. Table 18 shows these results for selected groups while full results also broken down by drinker group and WIMD are in Table 50 in the Appendix. These results clearly show that as the MUP level increases, the extent to which consumption effects are concentrated in the heaviest drinking and most deprived groups falls significantly.

Figure 14: Distribution of reductions in consumption under MUP policies across drinker groups

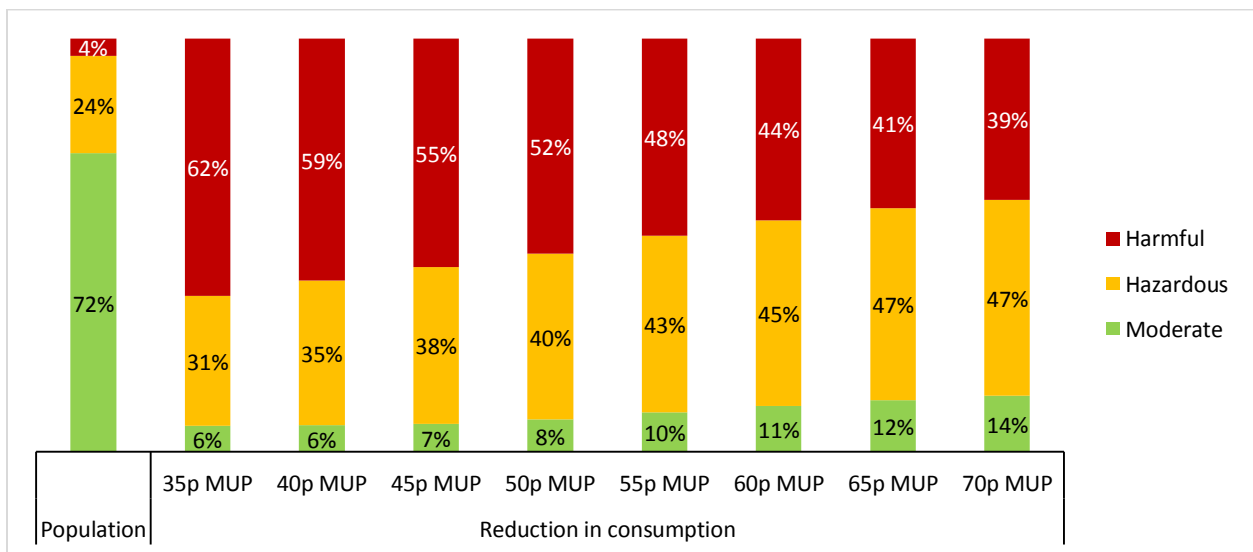
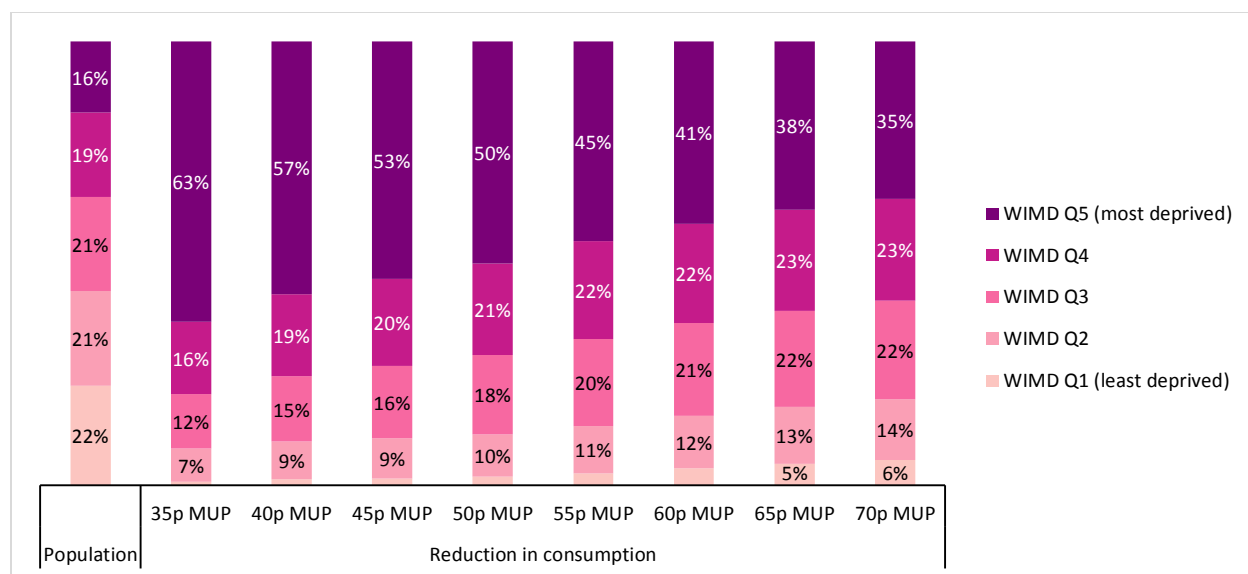


Figure 15: Distribution of reductions in consumption under MUP policies across WIMD quintiles



‡‡

Table 18: Estimated proportion of MUP policy impacts on consumption accounted for by selected groups

	Proportion of change in consumption accounted for by:		
	Harmful drinkers	Drinkers from the most deprived WIMD quintile	Harmful drinkers from the most deprived WIMD quintile
35p MUP	62.3%	63.2%	45.6%
40p MUP	58.6%	56.9%	39.8%
45p MUP	55.3%	53.5%	36.2%
50p MUP	52.1%	50.1%	32.6%
55p MUP	47.7%	45.0%	27.1%
60p MUP	44.0%	41.0%	23.0%
65p MUP	41.0%	38.0%	20.0%
70p MUP	39.1%	35.4%	18.0%

Estimated impact of MUP on spending on alcohol

Modelled estimates of the impact of a range of MUP policies on consumer spending on alcohol are presented broken down by drinker group in Table 19 and Figure 16 and by deprivation in Table 20 and Figure 17. Results broken down by both drinker group and deprivation are in Table 51 in the Appendix. For drinker groups, these results show a similar pattern to consumption, with larger effects in harmful drinkers and larger increases in effects in this group as the MUP threshold rises. For deprivation, however, the pattern is different, with smaller impacts on spending on more deprived groups, and larger changes in these impacts in the least deprived groups as the MUP level increases. Indeed, there is little difference in the estimated impact on the spending of drinkers in the most deprived quintile between a 45p and 65p MUP level.

‡‡ Values below 5% are not labelled.

Table 19: Estimated impact of MUP policies on consumer spending by drinker group

		All drinkers	Moderate	Hazardous	Harmful
Drinker population		1,910,072	1,379,341	449,339	81,392
Baseline spending per drinker per year		£607	£276	£1,209	£2,882
Absolute change in annual spending per drinker	35p MUP	£1	£0	£1	£6
	40p MUP	£1	£1	£3	£10
	45p MUP	£4	£2	£8	£24
	50p MUP	£8	£3	£18	£48
	55p MUP	£14	£5	£30	£88
	60p MUP	£21	£7	£43	£130
	65p MUP	£27	£10	£56	£174
	70p MUP	£33	£12	£67	£211
Relative change	35p MUP	0.1%	0.1%	0.1%	0.2%
	40p MUP	0.2%	0.2%	0.2%	0.3%
	45p MUP	0.7%	0.6%	0.7%	0.8%
	50p MUP	1.4%	1.1%	1.5%	1.7%
	55p MUP	2.4%	1.8%	2.5%	3.0%
	60p MUP	3.5%	2.6%	3.6%	4.5%
	65p MUP	4.5%	3.5%	4.6%	6.0%
	70p MUP	5.5%	4.3%	5.5%	7.3%

Figure 16: Modelled effects of MUP policies on consumer spending by drinker group

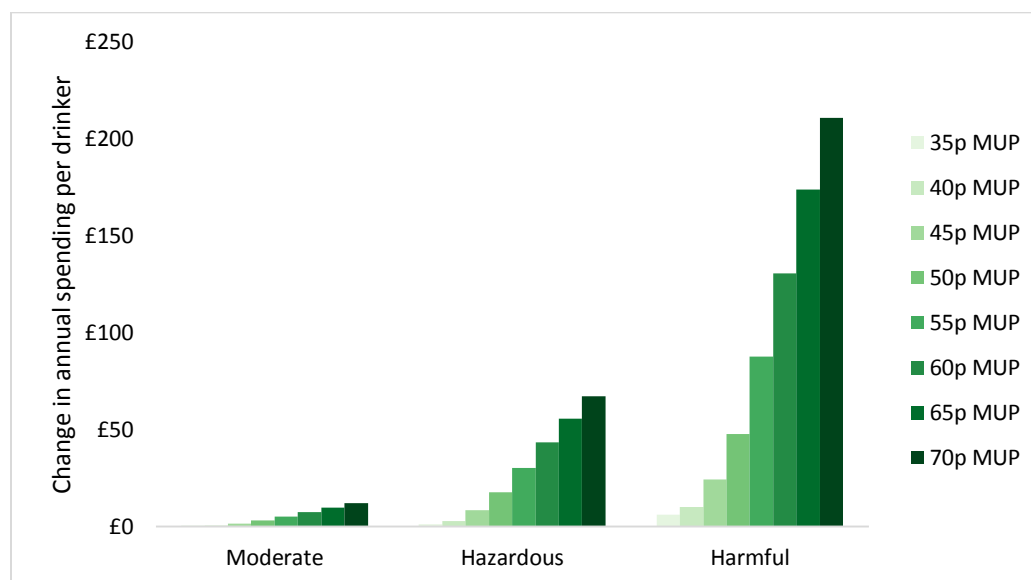
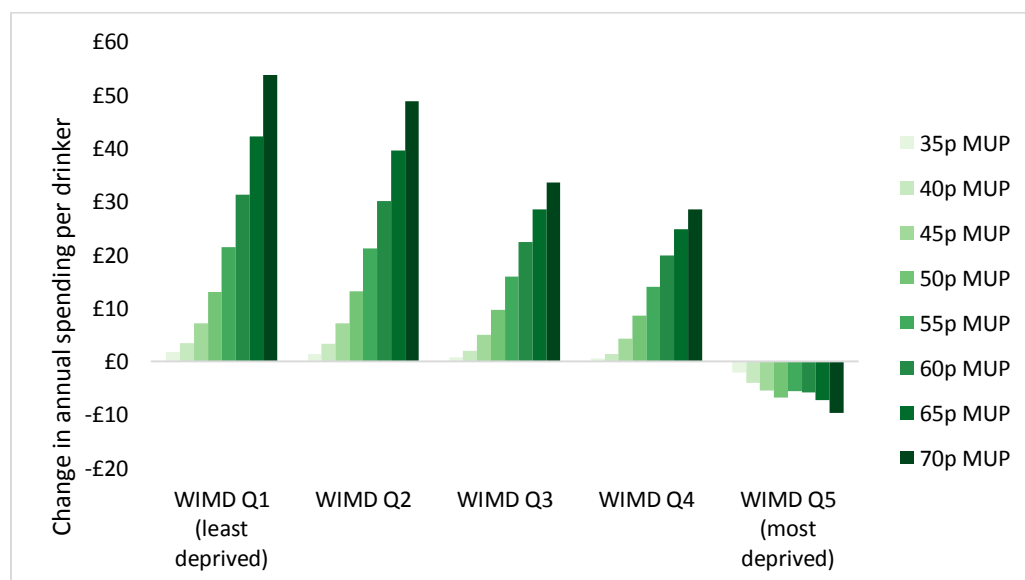


Table 20: Estimated impact of MUP policies on consumer spending by deprivation

		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population		428,613	406,718	406,692	361,987	306,062
Baseline spending per drinker per year		£780	£676	£563	£515	£441
Absolute change in annual spending per drinker						
	35p MUP	£2	£1	£1	£1	-£2
	40p MUP	£3	£3	£2	£1	-£4
	45p MUP	£7	£7	£5	£4	-£6
	50p MUP	£13	£13	£10	£9	-£7
	55p MUP	£21	£21	£16	£14	-£6
	60p MUP	£31	£30	£22	£20	-£6
	65p MUP	£42	£40	£28	£25	-£7
	70p MUP	£54	£49	£34	£28	-£10
Relative change						
	35p MUP	0.2%	0.2%	0.1%	0.1%	-0.5%
	40p MUP	0.4%	0.5%	0.3%	0.3%	-0.9%
	45p MUP	0.9%	1.1%	0.9%	0.8%	-1.3%
	50p MUP	1.7%	1.9%	1.7%	1.7%	-1.5%
	55p MUP	2.7%	3.1%	2.8%	2.7%	-1.3%
	60p MUP	4.0%	4.4%	4.0%	3.8%	-1.3%
	65p MUP	5.4%	5.8%	5.1%	4.8%	-1.7%
	70p MUP	6.9%	7.2%	6.0%	5.5%	-2.2%

Figure 17: Modelled effects of MUP policies on consumer spending by deprivation



Estimated impact of MUP on retailer and exchequer revenue

Modelled estimates of the impact across the range of MUP thresholds on annual revenue to the exchequer through taxation and to retailers through sales, after accounting for duty and VAT, are shown in Table 21, Figure 18 and Figure 19. These show that all MUP policies are estimated to reduce the total tax take from alcohol duties, with these losses increasing more quickly at MUP levels above 55p/unit. For all MUP levels modelled, exchequer revenues from the off-trade are expected to fall, while revenues from the on-trade actually increase at MUP levels above 50p/unit, as individuals switch their consumption to the on-trade.

All MUP policies are estimated to increase revenue to retailers, particularly in the off-trade. This is as the increase in prices under MUP more than compensates for the loss in sales volumes as consumers buy less alcohol. For MUP levels below 50p, there is estimated to be a small fall in revenue in the on-trade (e.g. £800,000/year for a 40p MUP), but from 50p upwards, revenue in the on-trade increases modestly due to the switching behaviour discussed above.

Table 21: Estimated impact of MUP policies on exchequer and retailer revenues

		Exchequer			Retailers		
		Off-trade	On-trade	Total	Off-trade	On-trade	Total
Baseline receipts (£m)		£262	£221	£483	£171	£506	£676
Absolute change in annual revenue (£m)	35p MUP	-£0.1	-£0.5	-£0.6	£2.5	-£0.8	£1.7
	40p MUP	-£0.7	-£0.6	-£1.2	£4.9	-£0.8	£4.1
	45p MUP	-£1.2	-£0.4	-£1.6	£9.6	-£0.2	£9.4
	50p MUP	-£1.8	£0.0	-£1.9	£16.8	£1.0	£17.8
	55p MUP	-£2.6	£0.5	-£2.1	£27.1	£2.5	£29.7
	60p MUP	-£3.9	£0.9	-£3.0	£39.1	£3.9	£43.1
	65p MUP	-£5.8	£1.3	-£4.5	£51.6	£5.4	£57.0
	70p MUP	-£8.5	£1.6	-£6.8	£64.0	£6.7	£70.7
Relative change	35p MUP	0.0%	-0.2%	-0.1%	1.5%	-0.2%	0.3%
	40p MUP	-0.3%	-0.3%	-0.3%	2.9%	-0.2%	0.6%
	45p MUP	-0.5%	-0.2%	-0.3%	5.6%	0.0%	1.4%
	50p MUP	-0.7%	0.0%	-0.4%	9.9%	0.2%	2.6%
	55p MUP	-1.0%	0.2%	-0.4%	15.9%	0.5%	4.4%
	60p MUP	-1.5%	0.4%	-0.6%	22.9%	0.8%	6.4%
	65p MUP	-2.2%	0.6%	-0.9%	30.3%	1.1%	8.4%
	70p MUP	-3.2%	0.7%	-1.4%	37.5%	1.3%	10.5%

Figure 18: Modelled effects of MUP policies on exchequer revenues

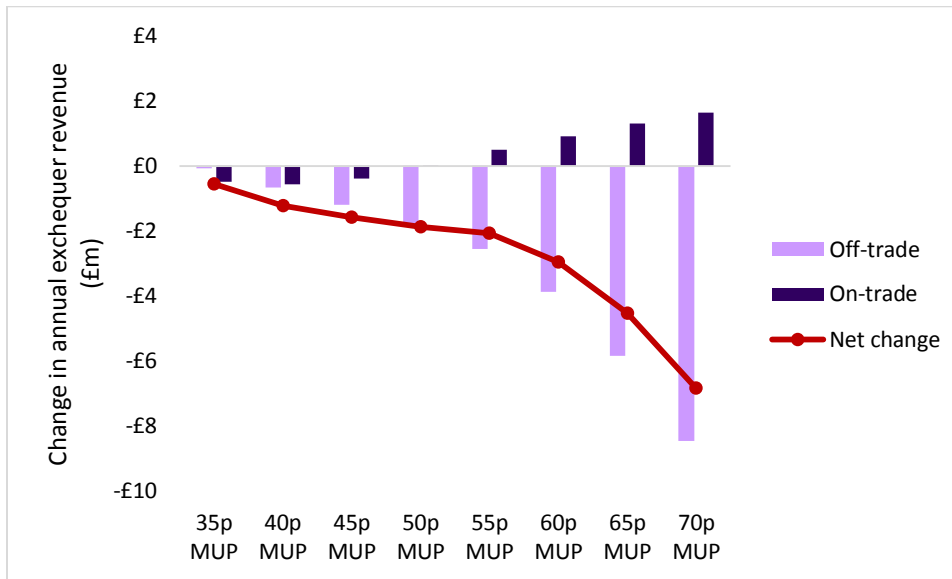
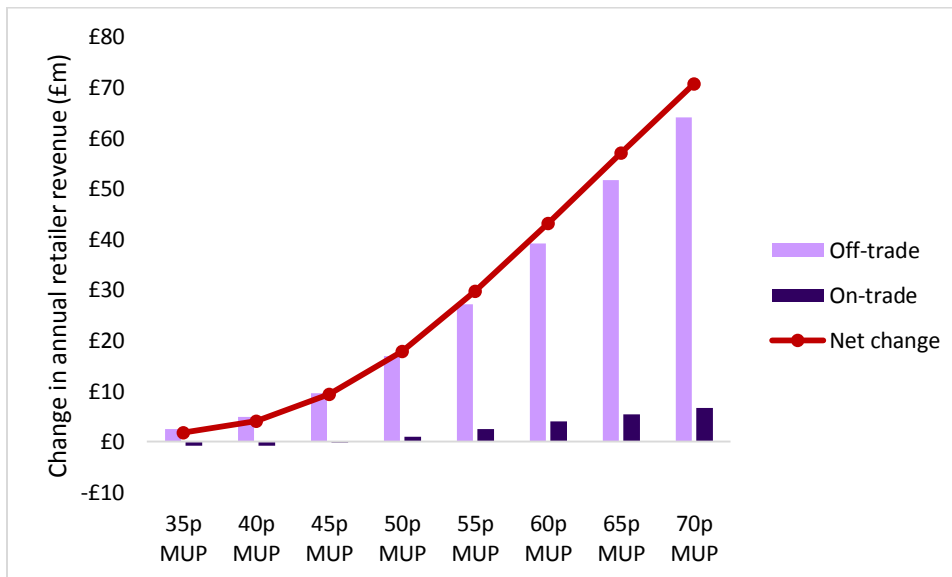


Figure 19: Modelled effects of MUP policies on retailer revenues



Estimated impact of MUP on health outcomes

Estimates of the effect of the range of MUP policies on alcohol-attributable mortality rates are presented in Table 22 and Figure 20, broken down by drinker group, and Table 23 and Figure 21 broken down by deprivation quintile. Full results broken down by both drinker group and deprivation are in Table 52 in the Appendix. Due to the known lag for some health conditions, most notably cancer, between changes in drinking and changes in risk of negative health consequences, which can extend to up to 20 years³⁹, all health results are reported as being the estimated impact after 20 years have elapsed. This time horizon thus represents the ‘full

effect' of the policy on health. The distribution of effects over time from the modelled MUP policies is illustrated in Table 28 and Table 29.

The pattern of these results is extremely similar to the effects on consumption, with the greatest proportion of the alcohol-attributable deaths averted being in heavier drinkers and those in the most deprived groups and with these groups seeing the fastest absolute increases in benefits as the MUP level increases. However, Figure 22 and Figure 23 show the proportion of deaths averted which accrue in each drinker and deprivation group. Table 24 shows these figures for selected groups, with full results available in Table 53 in the Appendix. These results show that, as for consumption, the higher the MUP threshold, the less 'targeted' the policy is at these groups.

Table 22: Estimated impact of MUP policies on alcohol-attributable mortality by drinker group

		All drinkers	Moderate	Hazardous	Harmful
Baseline annual alcohol-attributable deaths per year		777	-77	297	557
Baseline annual alcohol-attributable deaths per 100,000 drinkers		41	-6	66	685
Absolute change in deaths per year	35p MUP	-16	0	-4	-12
	40p MUP	-29	0	-8	-21
	45p MUP	-45	0	-13	-32
	50p MUP	-66	0	-20	-46
	55p MUP	-87	-1	-29	-58
	60p MUP	-113	-1	-40	-72
	65p MUP	-141	-2	-52	-87
	70p MUP	-170	-4	-64	-103
Absolute change in deaths per 100,000 drinkers per year	35p MUP	-1	0	-1	-15
	40p MUP	-2	0	-2	-25
	45p MUP	-2	0	-3	-39
	50p MUP	-3	0	-4	-56
	55p MUP	-5	0	-6	-71
	60p MUP	-6	0	-9	-88
	65p MUP	-7	0	-12	-107
	70p MUP	-9	0	-14	-127
Relative change	35p MUP	-2.0%	-0.1%	-1.3%	-2.1%
	40p MUP	-3.7%	-0.2%	-2.7%	-3.7%
	45p MUP	-5.8%	-0.1%	-4.5%	-5.7%
	50p MUP	-8.5%	0.0%	-6.8%	-8.2%
	55p MUP	-11.2%	0.7% ^{§§}	-9.6%	-10.3%
	60p MUP	-14.5%	1.8%**	-13.3%	-12.8%
	65p MUP	-18.2%	3.2%**	-17.4%	-15.6%
	70p MUP	-21.9%	4.7%**	-21.5%	-18.5%

^{§§} As the baseline number of alcohol-attributable deaths in this group is negative (i.e. alcohol is estimated to be overall protective for moderate drinkers), a reduction in the number of deaths following the introduction of an MUP policy appears as a positive, rather than a negative relative change.

Figure 20: Modelled effects of MUP policies on mortality by drinker group

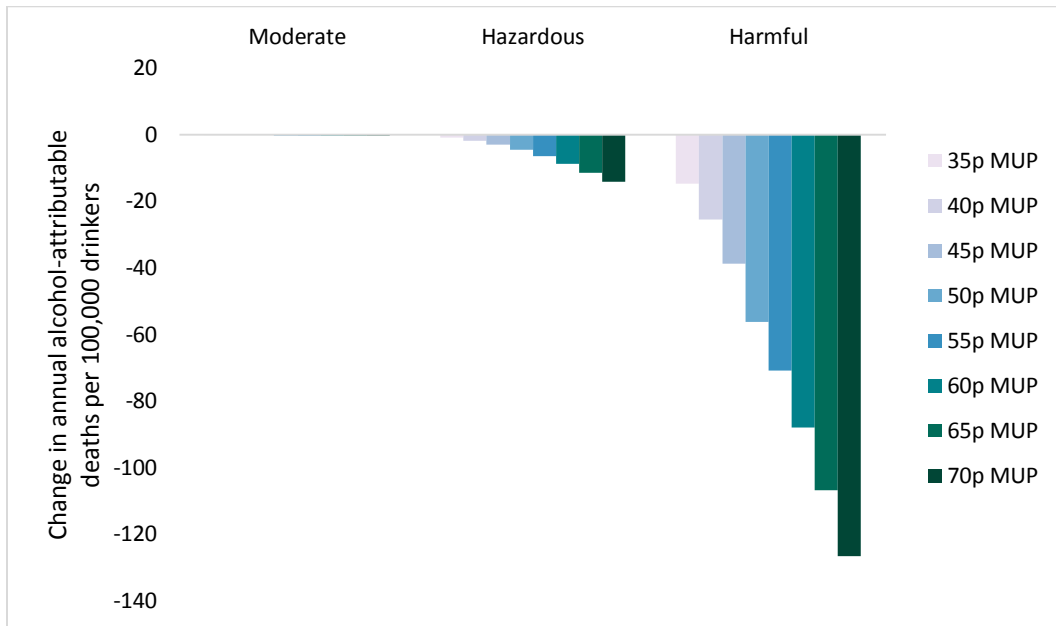


Table 23: Estimated impact of MUP policies on alcohol-attributable mortality by deprivation

		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Baseline annual alcohol-attributable deaths		120	123	141	165	228
Baseline annual alcohol-attributable deaths per 100,000 drinkers		28	30	35	45	75
Absolute change in deaths per year	35p MUP	0	-1	-1	-2	-11
	40p MUP	0	-1	-4	-5	-18
	45p MUP	0	-2	-7	-9	-27
	50p MUP	0	-4	-11	-13	-38
	55p MUP	-1	-6	-16	-19	-45
	60p MUP	-2	-9	-23	-25	-53
	65p MUP	-4	-12	-30	-33	-63
	70p MUP	-5	-16	-37	-40	-72
Absolute change in deaths per 100,000 drinkers per year	35p MUP	0	0	0	-1	-4
	40p MUP	0	0	-1	-1	-6
	45p MUP	0	-1	-2	-2	-9
	50p MUP	0	-1	-3	-4	-12
	55p MUP	0	-1	-4	-5	-15
	60p MUP	0	-2	-6	-7	-17
	65p MUP	-1	-3	-7	-9	-20
	70p MUP	-1	-4	-9	-11	-23
Relative change	35p MUP	-0.1%	-0.6%	-1.0%	-1.4%	-4.9%
	40p MUP	-0.2%	-1.2%	-2.5%	-3.1%	-8.1%
	45p MUP	-0.2%	-1.9%	-4.7%	-5.3%	-11.8%
	50p MUP	-0.3%	-3.1%	-7.7%	-8.0%	-16.5%
	55p MUP	-0.8%	-4.8%	-11.5%	-11.4%	-19.7%
	60p MUP	-1.7%	-7.1%	-16.3%	-15.4%	-23.4%
	65p MUP	-2.9%	-9.9%	-21.3%	-20.0%	-27.5%
	70p MUP	-4.4%	-13.2%	-26.3%	-24.5%	-31.4%

Figure 21: Modelled effects of MUP policies on mortality by deprivation

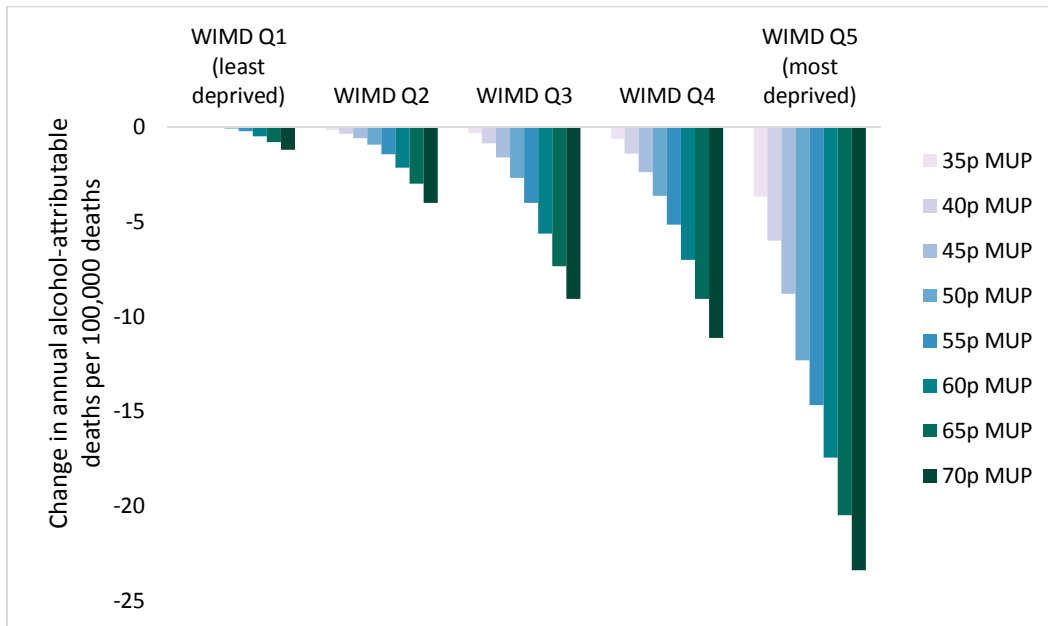
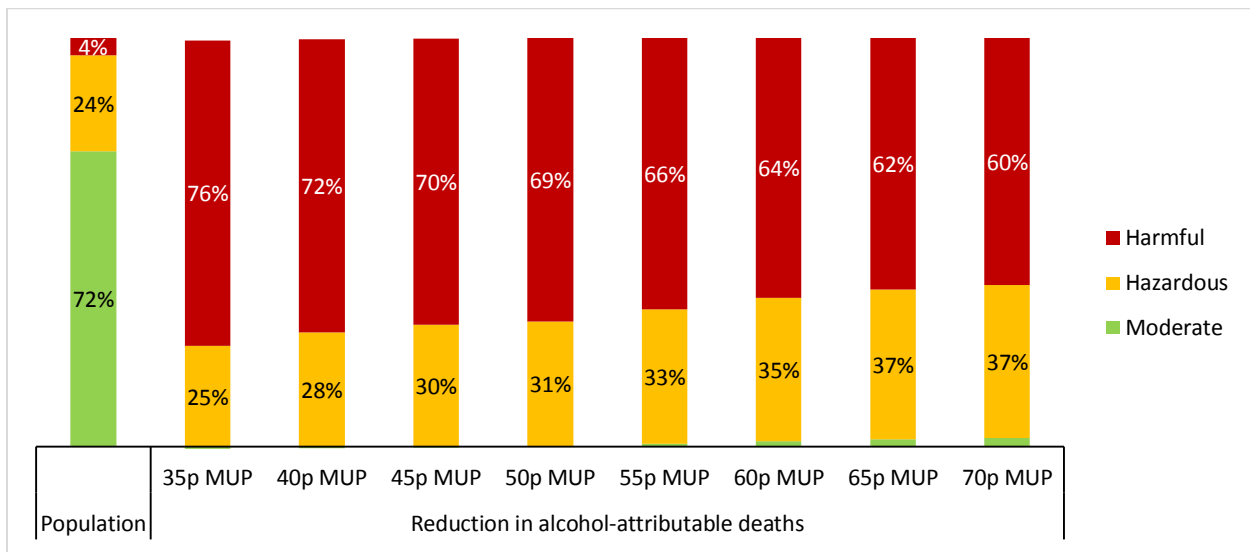
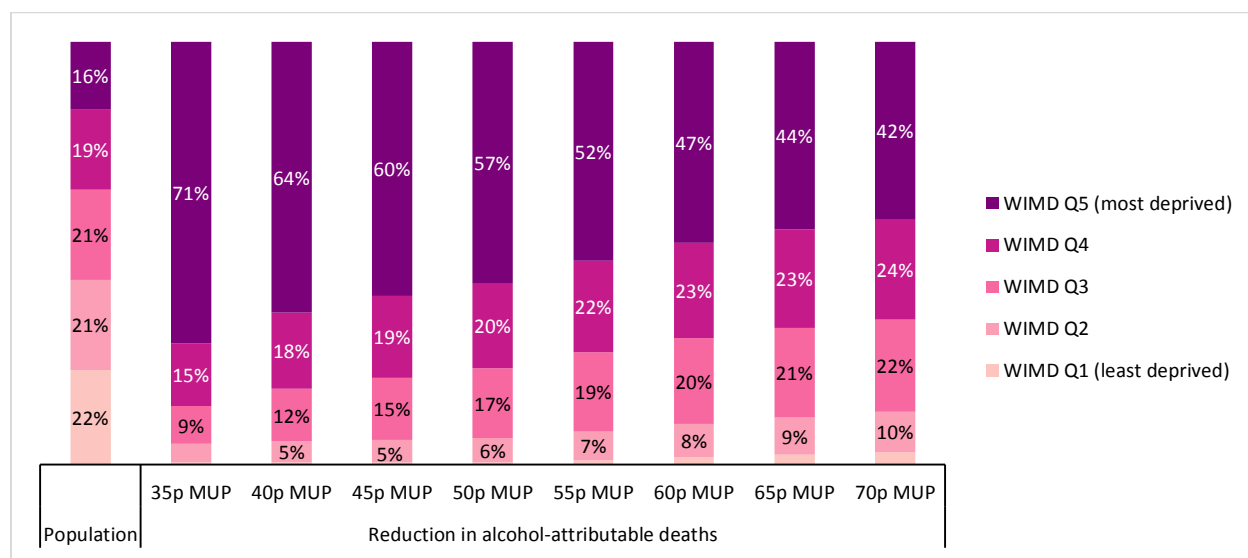


Figure 22: Distribution of reductions in alcohol-attributable deaths under MUP policies across drinker groups



*** Values below 5% not labelled.

Figure 23: Distribution of reductions in alcohol-attributable deaths under MUP policies across WIMD quintiles



†††

Table 24: Estimated proportion of MUP policy impacts on mortality accounted for by selected groups

	Proportion of reduction in alcohol-attributable deaths accounted for by:		
	Harmful drinkers	Drinkers from the most deprived WIMD quintile	Harmful drinkers from the most deprived WIMD quintile
35p MUP	75.6%	71.2%	58.9%
40p MUP	72.3%	64.1%	51.5%
45p MUP	70.4%	60.0%	47.4%
50p MUP	69.4%	57.2%	45.0%
55p MUP	66.4%	51.8%	39.0%
60p MUP	63.6%	47.5%	34.5%
65p MUP	61.6%	44.4%	31.5%
70p MUP	60.5%	42.0%	29.6%

Equivalent results for alcohol-attributable hospital admissions are presented in Table 25, Figure 24, Table 26, Figure 25 and Table 27, with full results broken down by both drinker group and deprivation again found in the Appendix, in Table 54. The pattern of results is generally similar to that for alcohol-attributable mortality, however in general the impact on admissions is less concentrated in heavier drinker and more deprived groups. This is in large part due to the fact that a smaller proportion of alcohol-attributable hospital admissions compared to alcohol-attributable deaths are caused by health conditions whose prevalence is more strongly associated with heavy drinking and greater levels of deprivation, as suggested by Figure 10.

††† Values below 5% not labelled.

Table 25: Estimated impact of MUP policies on alcohol-attributable admissions by drinker group

		All drinkers	Moderate	Hazardous	Harmful
Baseline annual alcohol-attributable admissions		35,637	5,735	17,350	12,552
Baseline annual alcohol-attributable admissions per 100,000 drinkers		1,866	416	3,861	15,421
Absolute change in admissions per year	35p MUP	-262	-24	-108	-129
	40p MUP	-517	-46	-226	-245
	45p MUP	-857	-79	-383	-396
	50p MUP	-1,281	-131	-590	-560
	55p MUP	-1,807	-216	-858	-733
	60p MUP	-2,476	-333	-1,208	-935
	65p MUP	-3,266	-474	-1,602	-1,190
	70p MUP	-4,075	-629	-2,002	-1,444
Absolute change in admissions per 100,000 drinkers per year	35p MUP	-14	-2	-24	-159
	40p MUP	-27	-3	-50	-301
	45p MUP	-45	-6	-85	-486
	50p MUP	-67	-10	-131	-688
	55p MUP	-95	-16	-191	-901
	60p MUP	-130	-24	-269	-1,149
	65p MUP	-171	-34	-357	-1,462
	70p MUP	-213	-46	-445	-1,774
Relative change	35p MUP	-0.7%	-0.4%	-0.6%	-1.0%
	40p MUP	-1.5%	-0.8%	-1.3%	-1.9%
	45p MUP	-2.4%	-1.4%	-2.2%	-3.2%
	50p MUP	-3.6%	-2.3%	-3.4%	-4.5%
	55p MUP	-5.1%	-3.8%	-4.9%	-5.8%
	60p MUP	-6.9%	-5.8%	-7.0%	-7.5%
	65p MUP	-9.2%	-8.3%	-9.2%	-9.5%
	70p MUP	-11.4%	-11.0%	-11.5%	-11.5%

Figure 24: Modelled effects of MUP policies on admissions by drinker group

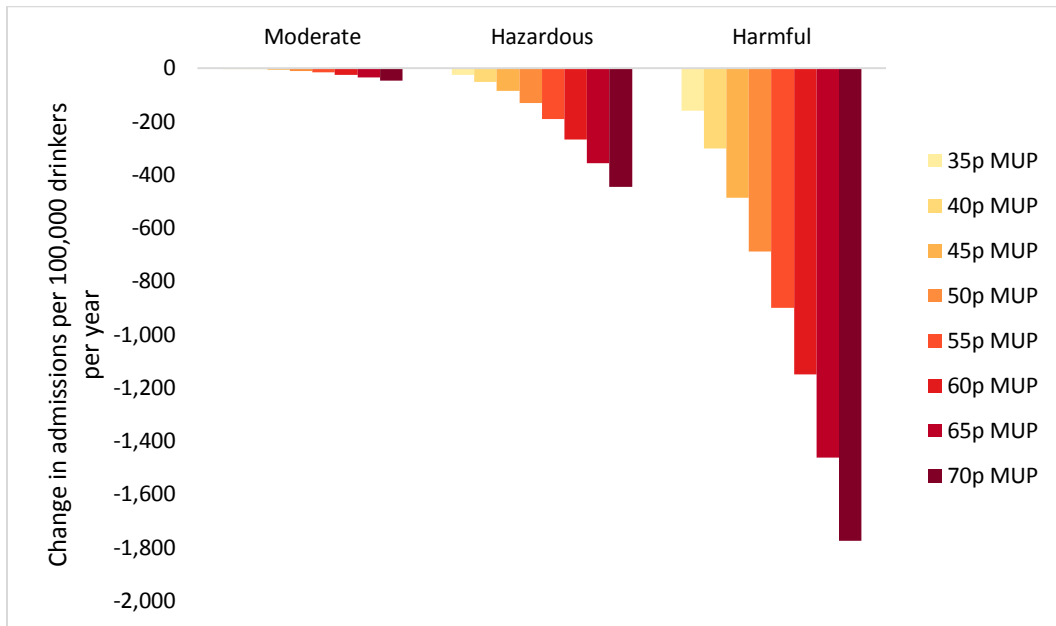


Table 26: Estimated impact of MUP policies on alcohol-attributable admissions by deprivation

		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Baseline annual alcohol-attributable admissions		5956	6270	7082	7689	8639
Baseline annual alcohol-attributable admissions per 100,000 drinkers		1,390	1,542	1,741	2,124	2,823
Absolute change in admissions per year	35p MUP	2	-11	-31	-57	-165
	40p MUP	1	-28	-82	-123	-284
	45p MUP	-4	-47	-151	-219	-437
	50p MUP	-8	-80	-233	-338	-622
	55p MUP	-22	-135	-350	-487	-812
	60p MUP	-49	-209	-502	-676	-1,040
	65p MUP	-93	-302	-679	-896	-1,298
	70p MUP	-147	-410	-874	-1,105	-1,539
Absolute change in admissions per 100,000 drinkers per year	35p MUP	0	-3	-8	-16	-54
	40p MUP	0	-7	-20	-34	-93
	45p MUP	-1	-11	-37	-60	-143
	50p MUP	-2	-20	-57	-93	-203
	55p MUP	-5	-33	-86	-135	-265
	60p MUP	-12	-51	-123	-187	-340
	65p MUP	-22	-74	-167	-247	-424
	70p MUP	-34	-101	-215	-305	-503
Relative change	35p MUP	0.0%	-0.2%	-0.4%	-0.7%	-1.9%
	40p MUP	0.0%	-0.5%	-1.2%	-1.6%	-3.3%
	45p MUP	-0.1%	-0.7%	-2.1%	-2.8%	-5.1%
	50p MUP	-0.1%	-1.3%	-3.3%	-4.4%	-7.2%
	55p MUP	-0.4%	-2.2%	-4.9%	-6.3%	-9.4%
	60p MUP	-0.8%	-3.3%	-7.1%	-8.8%	-12.0%
	65p MUP	-1.6%	-4.8%	-9.6%	-11.6%	-15.0%
	70p MUP	-2.5%	-6.5%	-12.3%	-14.4%	-17.8%

Figure 25: Modelled effects of MUP policies on admissions by deprivation

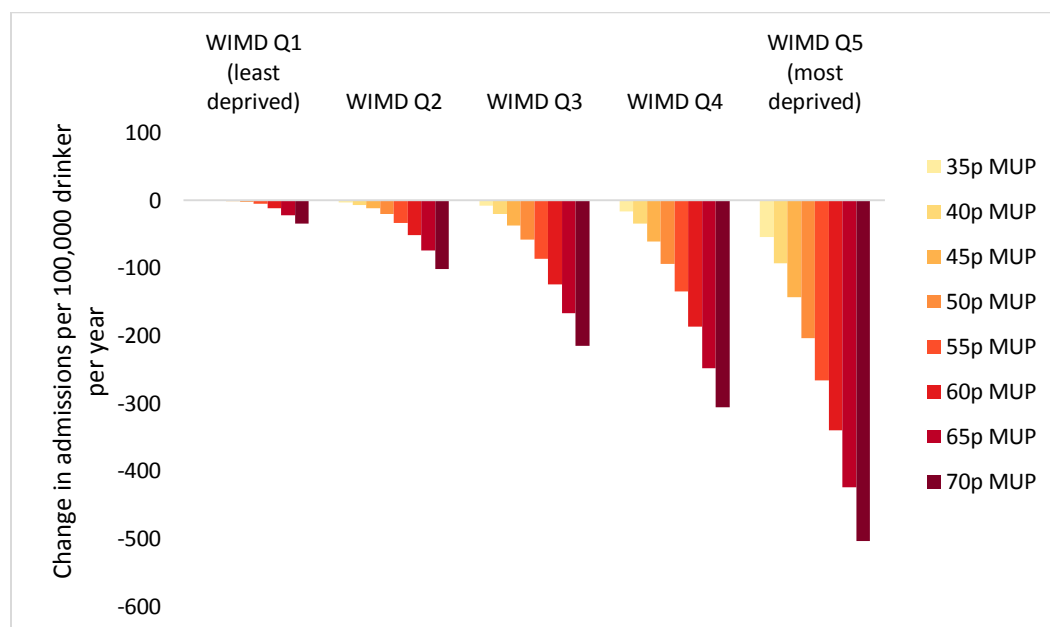


Table 27: Proportion MUP impacts on alcohol-attributable admissions accounted for by selected groups

	Proportion of reduction in alcohol-attributable admissions accounted for by:		
	Harmful drinkers	Drinkers from the most deprived WIMD quintile	Harmful drinkers from the most deprived WIMD quintile
35p MUP	49.5%	63.1%	36.8%
40p MUP	47.4%	54.9%	29.7%
45p MUP	46.2%	51.0%	26.3%
50p MUP	43.7%	48.6%	23.8%
55p MUP	40.6%	44.9%	19.8%
60p MUP	37.8%	42.0%	16.8%
65p MUP	36.4%	39.7%	15.0%
70p MUP	35.4%	37.8%	13.9%

Finally, Table 28 shows the ‘partial effects’ of each MUP policy on alcohol-attributable deaths and hospital admissions. These reflect the lags between changes in consumption and changes in risk. Table 29 shows the estimated cumulative number of deaths and admissions averted at various points following policy implementation.

Table 28: Estimated 'partial effects' - impacts of MUP policies on health outcomes in years 1, 5, 10, 15 and 20

	Change in alcohol-attributable deaths per year					Change in alcohol-attributable hospital admissions per year				
	Year 1	Year 5	Year 10	Year 15	Year 20	Year 1	Year 5	Year 10	Year 15	Year 20 ^{###}
35p MUP	-8	-14	-14	-15	-16	-193	-308	-321	-296	-262
40p MUP	-14	-25	-26	-28	-29	-366	-585	-618	-576	-517
45p MUP	-22	-38	-39	-44	-45	-591	-946	-1,010	-948	-857
50p MUP	-31	-53	-56	-63	-66	-876	-1,391	-1,491	-1,408	-1,281
55p MUP	-41	-69	-73	-83	-87	-1,211	-1,906	-2,063	-1,964	-1,807
60p MUP	-52	-88	-94	-107	-113	-1,628	-2,550	-2,780	-2,668	-2,476
65p MUP	-65	-108	-116	-133	-141	-2,108	-3,300	-3,621	-3,496	-3,266
70p MUP	-78	-129	-139	-160	-170	-2,601	-4,064	-4,478	-4,341	-4,075

Table 29: Estimated cumulative impacts of MUP policies on health outcomes following implementation

	Cumulative change in alcohol-attributable deaths since policy implementation					Cumulative change in alcohol-attributable hospital admissions since policy implementation				
	Year 1	Year 5	Year 10	Year 15	Year 20	Year 1	Year 5	Year 10	Year 15	Year 20
35p MUP	-8	-57	-128	-203	-282	-193	-1,310	-2,911	-4,448	-5,824
40p MUP	-14	-103	-231	-367	-510	-366	-2,482	-5,553	-8,536	-11,236
45p MUP	-22	-158	-354	-566	-788	-591	-4,004	-9,000	-13,892	-18,358
50p MUP	-31	-224	-504	-809	-1,134	-876	-5,895	-13,254	-20,500	-27,157
55p MUP	-41	-289	-653	-1,051	-1,478	-1,211	-8,088	-18,229	-28,303	-37,653
60p MUP	-52	-368	-831	-1,343	-1,895	-1,628	-10,826	-24,452	-38,091	-50,857
65p MUP	-65	-454	-1,027	-1,663	-2,354	-2,108	-13,996	-31,697	-49,520	-66,315
70p MUP	-78	-542	-1,225	-1,988	-2,820	-2,601	-17,235	-39,090	-61,181	-82,094

Estimated impact of MUP on crime outcomes

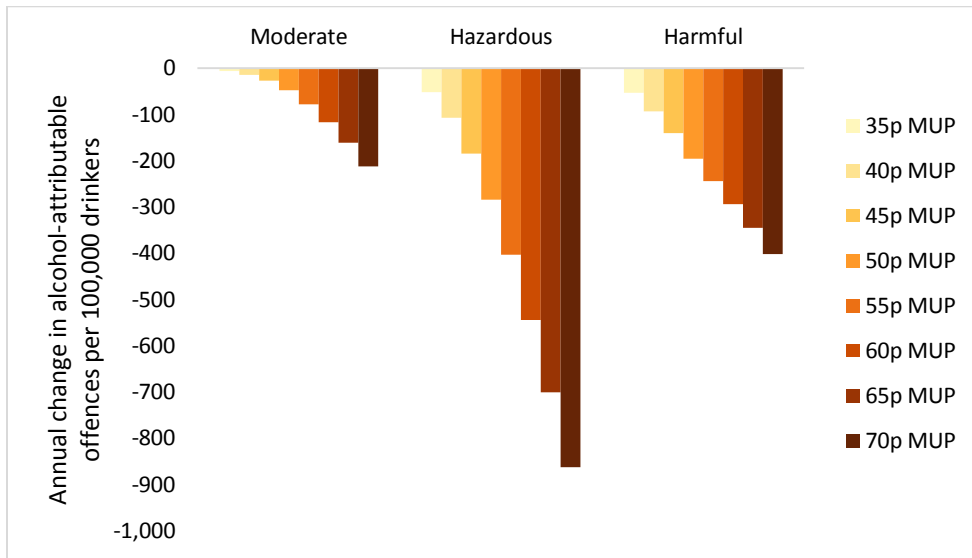
Results for the modelled impact of the range of MUP policies on alcohol-related crimes are presented in Table 30 and Figure 26. As we did not have access to baseline crime data broken down by WIMD quintile, results are presented by drinker group only. Although these results show that higher MUP thresholds lead to larger reductions in crime, they also show that the greatest estimated reductions are in hazardous, not harmful drinkers. Superficially, this may appear surprising; however this is a consequence of the fact that crime is associated with acute consumption (i.e. intoxication). Although all MUP policies modelled lead to greater reductions in mean consumption in harmful drinkers than hazardous drinkers, we model separate relationships between changes in mean consumption and changes in acute consumption for both groups. These suggest that hazardous drinkers are more sensitive to reducing their peak consumption as their mean consumption reduces, compared to harmful drinkers, meaning that we estimate the greatest falls in peak consumption, and therefore crime rates, in hazardous drinkers.

^{###} Note that the number of admissions averted per year actually falls between years 10 and 20. This reflects the fact that individuals who no longer die of alcohol-related causes are then at risk of developing alcohol-related illnesses in the future.

Table 30: Estimated impact of MUP policies on alcohol-attributable crime by drinker group

		All drinkers	Moderate	Hazardous	Harmful
Baseline annual alcohol-attributable offences		88,908	38,057	42,440	8,411
Baseline annual alcohol-attributable offences per 100,000 drinkers		4,655	2,759	9,445	10,334
Absolute change in offences per year	35p MUP	-364	-90	-231	-43
	40p MUP	-759	-201	-482	-76
	45p MUP	-1,315	-371	-830	-114
	50p MUP	-2,093	-657	-1,277	-159
	55p MUP	-3,086	-1,073	-1,815	-198
	60p MUP	-4,290	-1,603	-2,448	-239
	65p MUP	-5,652	-2,223	-3,148	-280
	70p MUP	-7,127	-2,925	-3,875	-327
Absolute change in offences per 100,000 drinkers per year	35p MUP	-19	-7	-51	-53
	40p MUP	-40	-15	-107	-94
	45p MUP	-69	-27	-185	-140
	50p MUP	-110	-48	-284	-195
	55p MUP	-162	-78	-404	-244
	60p MUP	-225	-116	-545	-293
	65p MUP	-296	-161	-701	-345
	70p MUP	-373	-212	-862	-401
Relative change	35p MUP	-0.4%	-0.2%	-0.5%	-0.5%
	40p MUP	-0.9%	-0.5%	-1.1%	-0.9%
	45p MUP	-1.5%	-1.0%	-2.0%	-1.4%
	50p MUP	-2.4%	-1.7%	-3.0%	-1.9%
	55p MUP	-3.5%	-2.8%	-4.3%	-2.4%
	60p MUP	-4.8%	-4.2%	-5.8%	-2.8%
	65p MUP	-6.4%	-5.8%	-7.4%	-3.3%
	70p MUP	-8.0%	-7.7%	-9.1%	-3.9%

Figure 26: Modelled effects of MUP policies on crime by drinker group



Estimated impact of MUP on workplace outcomes

Modelled estimates for the impact of the range of MUP policies on workplace absence are shown in Table 31 and Figure 27. As with the estimated impact on crime, these are presented by drinker group only and show larger reductions among hazardous drinkers.

Table 31: Estimated impact of MUP policies on alcohol-attributable workplace absence by drinker group

		All drinkers	Moderate	Hazardous	Harmful
Baseline annual alcohol-attributable days' absence		507,795	212,963	227,856	66,975
Baseline annual alcohol-attributable days' absence per 100,000 drinkers		26,585	15,440	50,709	82,287
Absolute change in absence days per year	35p MUP	-1,838	-457	-1,110	-272
	40p MUP	-3,737	-911	-2,330	-497
	45p MUP	-6,270	-1,519	-3,997	-754
	50p MUP	-9,808	-2,621	-6,138	-1,049
	55p MUP	-14,476	-4,359	-8,787	-1,331
	60p MUP	-20,489	-6,766	-12,076	-1,647
	65p MUP	-27,468	-9,738	-15,762	-1,968
	70p MUP	-35,086	-13,169	-19,603	-2,315
Absolute change in absence days per 100,000 drinkers per year	35p MUP	-96	-33	-247	-334
	40p MUP	-196	-66	-518	-610
	45p MUP	-328	-110	-890	-926
	50p MUP	-514	-190	-1,366	-1,289
	55p MUP	-758	-316	-1,955	-1,635
	60p MUP	-1,073	-491	-2,687	-2,024
	65p MUP	-1,438	-706	-3,508	-2,418
	70p MUP	-1,837	-955	-4,363	-2,844
Relative change	35p MUP	-0.4%	-0.2%	-0.5%	-0.4%
	40p MUP	-0.7%	-0.4%	-1.0%	-0.7%
	45p MUP	-1.2%	-0.7%	-1.8%	-1.1%
	50p MUP	-1.9%	-1.2%	-2.7%	-1.6%
	55p MUP	-2.9%	-2.0%	-3.9%	-2.0%
	60p MUP	-4.0%	-3.2%	-5.3%	-2.5%
	65p MUP	-5.4%	-4.6%	-6.9%	-2.9%
	70p MUP	-6.9%	-6.2%	-8.6%	-3.5%

Figure 27: Modelled effects of MUP policies on workplace absence by drinker group



Estimated impact of MUP policies on societal costs

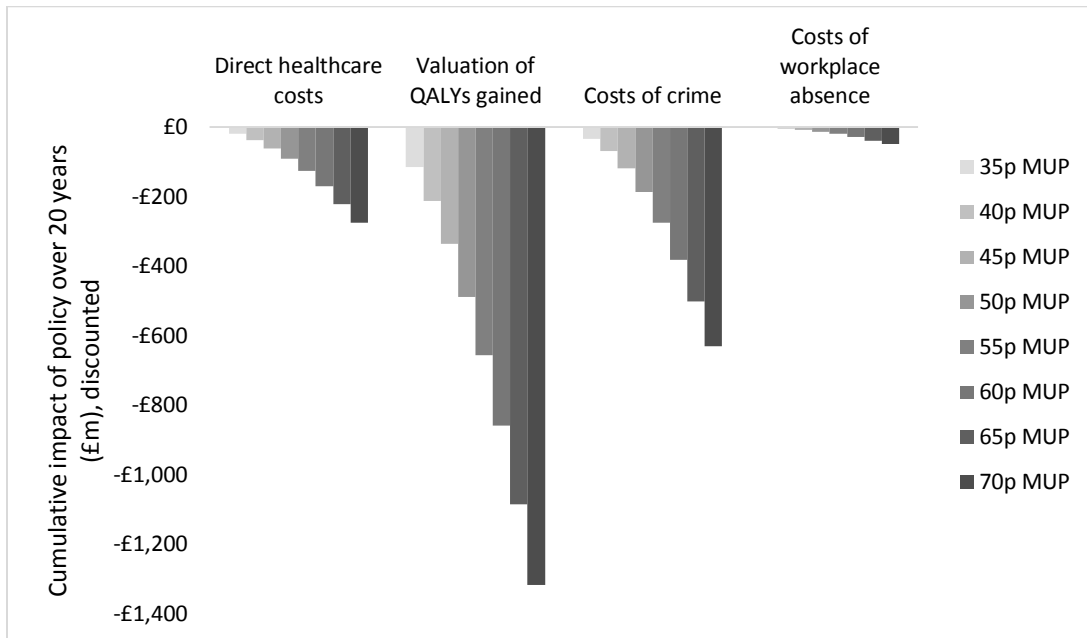
Finally, the modelled impact of each MUP policy on a range of societal costs is illustrated in Table 32 and Figure 28. These show that the valuation of the health improvements arising from the policy are the single largest estimated cost benefit to society and rise fastest as the MUP threshold increases. In contrast, the impact of the modelled policies on costs associated with workplace absence is relatively small and rises slowly as the MUP level is increased.

Table 32: Estimated impact of MUP policies on societal costs over 20 years following policy implementation

		Direct healthcare costs	Valuation of QALYs gained	Costs of crime	Costs of workplace absence	Total ^{§§§}
Baseline annual alcohol-attributable costs over 20 years, discounted		£1,992	£6,500	£7,487	£668	£16,647
Cumulative absolute change over 20 years (£m), discounted	35p MUP	-£20	-£115	-£34	-£3	-£171
	40p MUP	-£38	-£213	-£70	-£5	-£326
	45p MUP	-£62	-£336	-£119	-£9	-£526
	50p MUP	-£91	-£490	-£188	-£14	-£783
	55p MUP	-£127	-£656	-£276	-£21	-£1,079
	60p MUP	-£171	-£858	-£382	-£29	-£1,441
	65p MUP	-£222	-£1,085	-£502	-£39	-£1,849
	70p MUP	-£275	-£1,317	-£632	-£50	-£2,274
Relative change	35p MUP	-1.0%	-1.8%	-0.5%	-0.4%	-1.0%
	40p MUP	-1.9%	-3.3%	-0.9%	-0.8%	-2.0%
	45p MUP	-3.1%	-5.2%	-1.6%	-1.4%	-3.2%
	50p MUP	-4.6%	-7.5%	-2.5%	-2.1%	-4.7%
	55p MUP	-6.4%	-10.1%	-3.7%	-3.1%	-6.5%
	60p MUP	-8.6%	-13.2%	-5.1%	-4.4%	-8.7%
	65p MUP	-11.2%	-16.7%	-6.7%	-5.9%	-11.1%
	70p MUP	-13.8%	-20.3%	-8.4%	-7.5%	-13.7%

^{§§§} Note that a) this figure includes both direct costs and indirect costs accrued across different parts of society (the NHS, the broader economy, society as a whole) and b) this figure should not be interpreted as representing the full burden (or the full policy impact) of alcohol on society as there are numerous impacts which are not included in the modelling (such as harm to others, public nuisance etc.).

Figure 28: Modelled effects of MUP policies on societal costs



Comparison of MUP policies and taxation

Equivalisation of taxation rates

The results presented thus far illustrate the estimated level of impact of a range of MUP policies on various outcomes measures. In this section we identify the level of increases in alcohol taxation which would be required to achieve the same impacts as an example 50p MUP on:

- 1) Annual alcohol consumption of hazardous and harmful drinkers
- 2) Annual alcohol consumption of harmful drinkers
- 3) Annual alcohol-attributable deaths among hazardous and harmful drinkers
- 4) Annual alcohol-attributable deaths among harmful drinkers

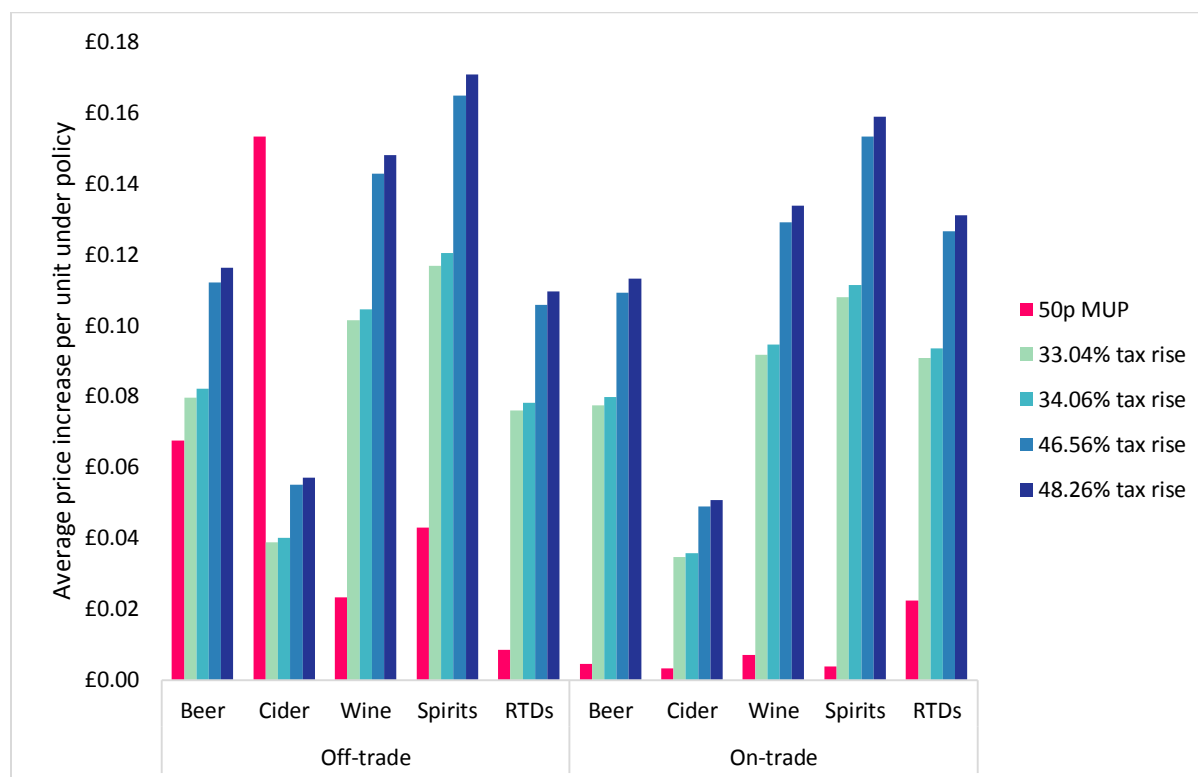
Taxation increases are modelled as flat percentage increases in current rates and include the additional VAT component payable on the increased duty. The respective duty rates are presented in Table 33. In order to match the impact of a 50p MUP on hazardous and harmful drinkers (i.e. all those drinking above the current UK guidelines), a 33.04% rise is required to equal the effect on consumption (objective 1) and a 34.06% rise is required to equal the impact on alcohol-attributable deaths (objective 3). In order to achieve the equivalent impacts to a 50p MUP in harmful drinkers only, larger increases in tax are required: 48.26% to match the impact on consumption (objective 2) and 46.56% to match the impact on deaths (objective 4). All of these increases are substantially larger than any changes in alcohol taxation in recent history.

Table 33: Equivalised duty rates

	Baseline	Change in outcome				
		50p MUP	33.04 % tax rise	34.06 % tax rise	46.56 % tax rise	48.26% tax rise
Consumption of hazardous and harmful drinkers (units per drinker per year)	1,648	73	73	75	105	109
Consumption of harmful drinkers (units per drinker per year)	3,924	269	178	184	258	269
Annual alcohol-attributable deaths among hazardous and harmful drinkers	854	-66	-64	-66	-91	-95
Annual alcohol-attributable deaths among harmful drinkers	557	-46	-32	-33	-46	-48

Whilst a 50p MUP policy acts only on the prices of alcohol which is currently sold below 50p/unit, increases in duty affect the prices of all alcohol, whatever the current price level. In particular, as illustrated by Table 8, almost no alcohol sold in the on-trade is affected by a 50p MUP, while all on-trade prices would be affected by a 33% or greater increase in alcohol taxation. The full extent of these differences in effect is illustrated in Figure 29, which highlights that tax increases would have significantly larger impacts on average prices for all beverage types except for off-trade cider, compared to a 50p MUP. These variations in the ways in which each policy affects prices means that there are marked differences in the way their effects are distributed across the population.

Figure 29: Change in mean price under MUP and taxation policies by beverage type and channel



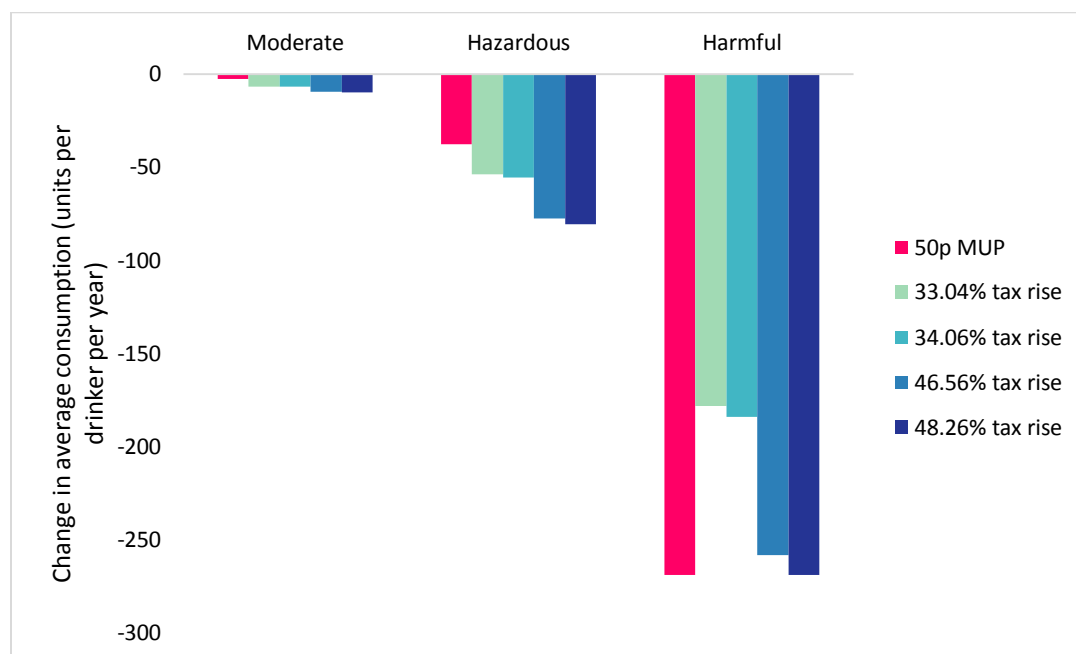
Comparative impacts on consumption and spending of MUP and tax

The modelled impact of a 50p MUP and the four equivalised tax rises on alcohol consumption, by drinker type are shown in Table 34. This shows that whilst all three policies reduce consumption across the population, a 48.26% increase in taxation has almost five times the impact on moderate drinkers as a 50p MUP, while having the same effect on harmful drinkers. This is illustrated in Figure 30.

Table 34: Estimated impact of MUP and taxation policies on consumption by drinker type

	Baseline consumption (units/year)	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
Absolute change						
All drinkers	610	-22	-25	-26	-36	-37
Moderate	211	-2	-7	-7	-9	-10
Hazardous	1236	-37	-54	-56	-77	-80
Harmful	3924	-269	-178	-184	-258	-269
Relative change						
All drinkers		-3.6%	-4.1%	-4.2%	-5.9%	-6.1%
Moderate		-1.1%	-3.1%	-3.2%	-4.5%	-4.6%
Hazardous		-3.0%	-4.4%	-4.5%	-6.3%	-6.5%
Harmful		-6.8%	-4.5%	-4.7%	-6.6%	-6.8%

Figure 30: Comparative impact of MUP and tax on consumption by drinker type

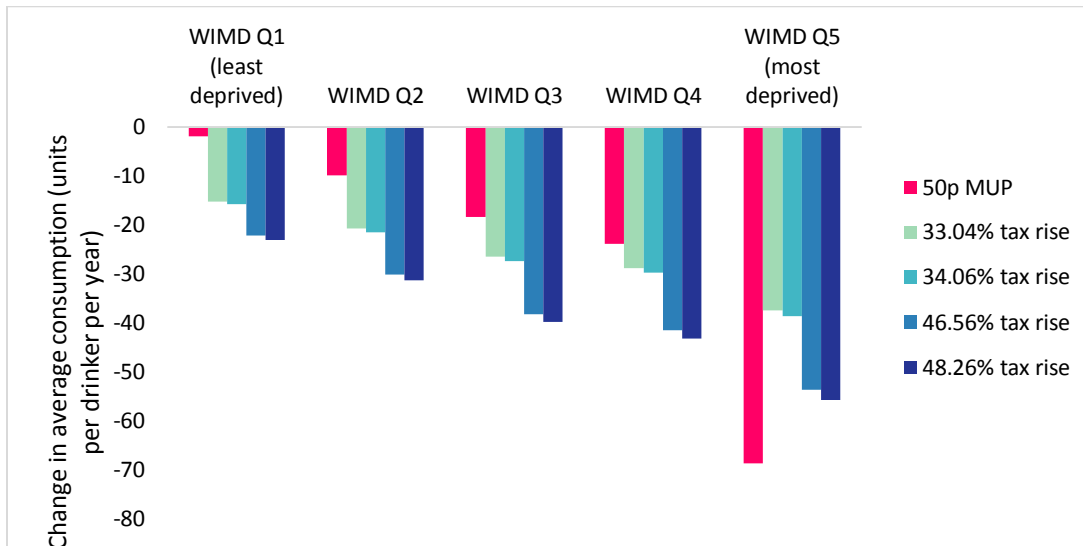


The differential impact of each policy across the socioeconomic spectrum is shown in Table 35 and Figure 31. These show a clear socioeconomic gradient in effect for both MUP and tax policies, with larger reductions in consumption in more deprived groups, although this is much more pronounced for MUP.

Table 35: Estimated impact of MUP and taxation policies on consumption by deprivation

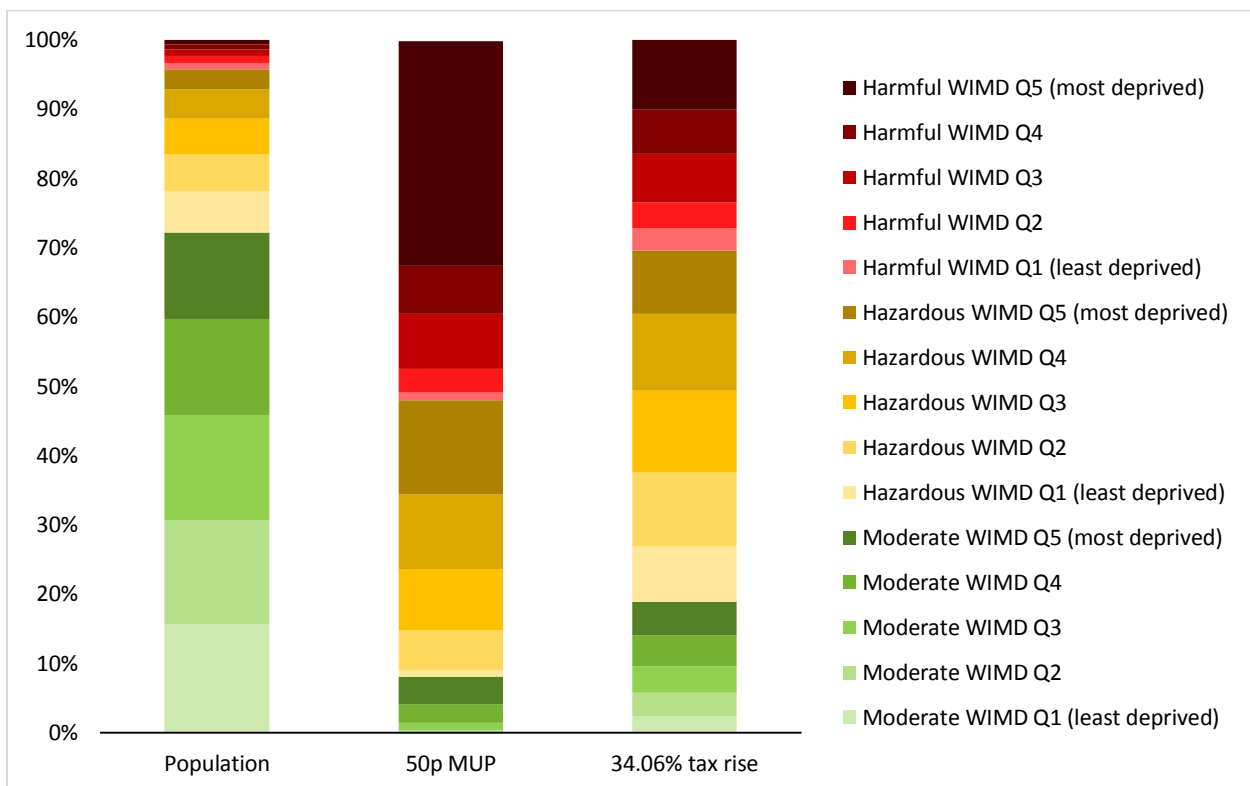
	Baseline consumption (units/year)	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
Absolute change						
WIMD Q1 (least deprived)	648	-2	-15	-16	-22	-23
WIMD Q2	649	-10	-21	-21	-30	-31
WIMD Q3	598	-18	-27	-27	-38	-40
WIMD Q4	589	-24	-29	-30	-42	-43
WIMD Q5 (most deprived)	546	-69	-37	-39	-54	-56
Relative change						
WIMD Q1 (least deprived)		-0.3%	-2.4%	-2.4%	-3.4%	-3.6%
WIMD Q2		-1.5%	-3.2%	-3.3%	-4.6%	-4.8%
WIMD Q3		-3.1%	-4.4%	-4.6%	-6.4%	-6.7%
WIMD Q4		-4.1%	-4.9%	-5.1%	-7.0%	-7.3%
WIMD Q5 (most deprived)		-12.6%	-6.9%	-7.1%	-9.8%	-10.2%

Figure 31: Comparative impact of MUP and taxation policies on consumption by deprivation



Full results by both drinker and deprivation group are in Table 55 in the Appendix. The proportion of the total reduction in consumption coming from each drinker-deprivation group under an illustrative 50p MUP and 34.06% tax rise is shown in Figure 32, alongside the distribution of these groups in the population. This shows that a greater proportion of the impact of a Minimum Unit Price is estimated to be felt in harmful drinkers, particularly those in the most deprived areas.

Figure 32: Distribution of reductions in consumption across the population under a 50p MUP and a 34.06% tax rise

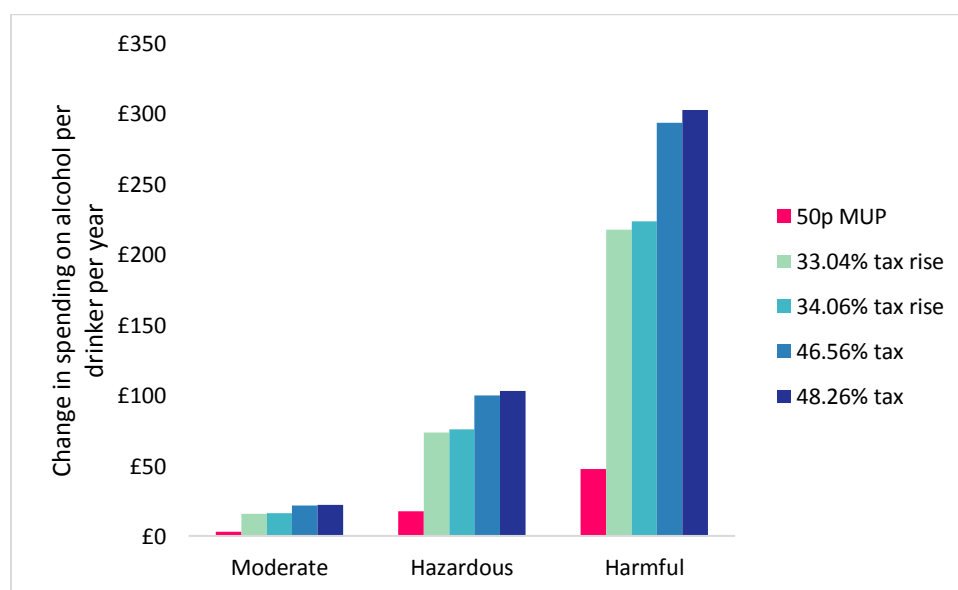


The impact of each policy on spending, in Table 36 and Figure 33 show clearly that all four taxation policies lead to a substantially larger increase in spending for all drinkers compared to MUP. Moderate drinkers are estimated to spend £22 more per year under a 48.26% tax rise compared to £3 under a 50p MUP, while for harmful drinkers the difference is larger: £303 compared to £48 each year.

Table 36: Estimated impact of MUP and taxation policies on spending by drinker type

	Baseline annual spend	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
Absolute change						
All drinkers	£607	£8	£38	£39	£52	£53
Moderate	£276	£3	£16	£16	£22	£22
Hazardous	£1,209	£18	£74	£76	£100	£103
Harmful	£2,882	£48	£218	£224	£294	£303
Relative change						
All drinkers		1.4%	6.3%	6.4%	8.5%	8.8%
Moderate		1.1%	5.7%	5.9%	7.8%	8.1%
Hazardous		1.5%	6.1%	6.3%	8.3%	8.5%
Harmful		1.7%	7.5%	7.8%	10.2%	10.5%

Figure 33: Comparative impact of MUP and taxation policies on spending by drinker type

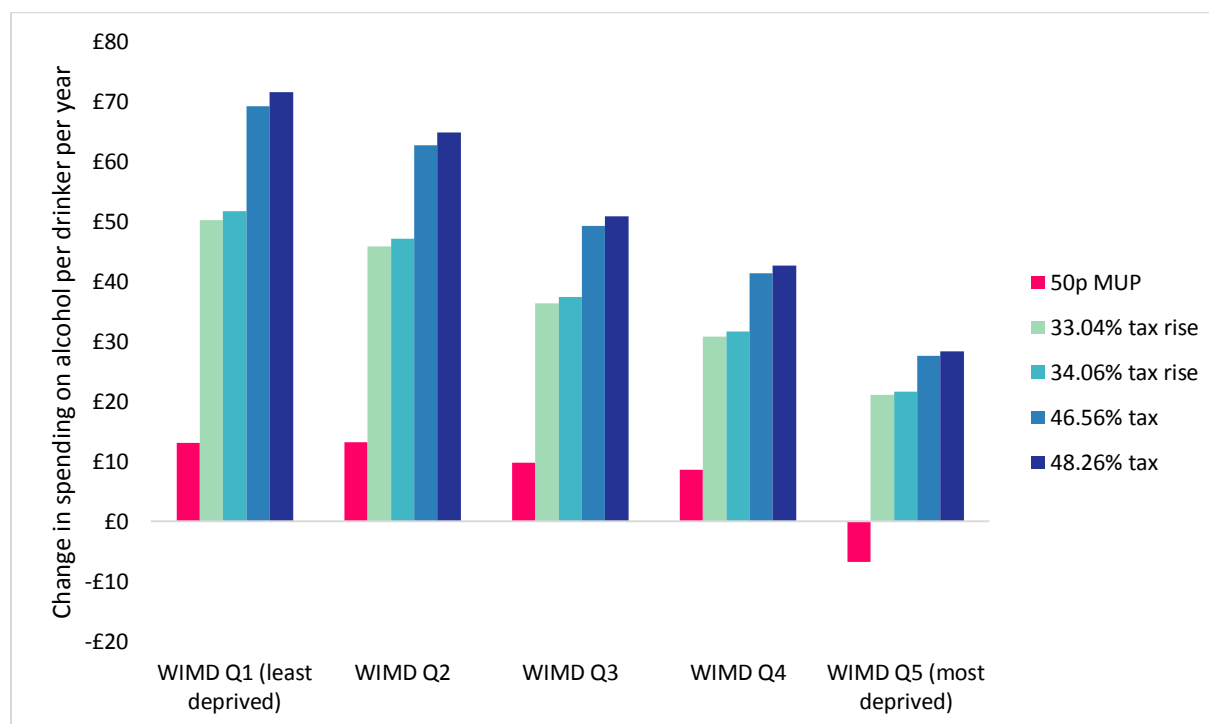


Looking across quintiles of deprivation, as shown in Table 37 and Figure 34, we see similar differences, with drinkers in all groups seeing much larger increases in annual spending under increases in tax than a 50p MUP. Of particular note is the fact that a 50p MUP is estimated to *reduce* spending on alcohol among the most deprived group, while all modelled tax policies *increase* it.

Table 37: Estimated impact of MUP and taxation policies on spending by deprivation

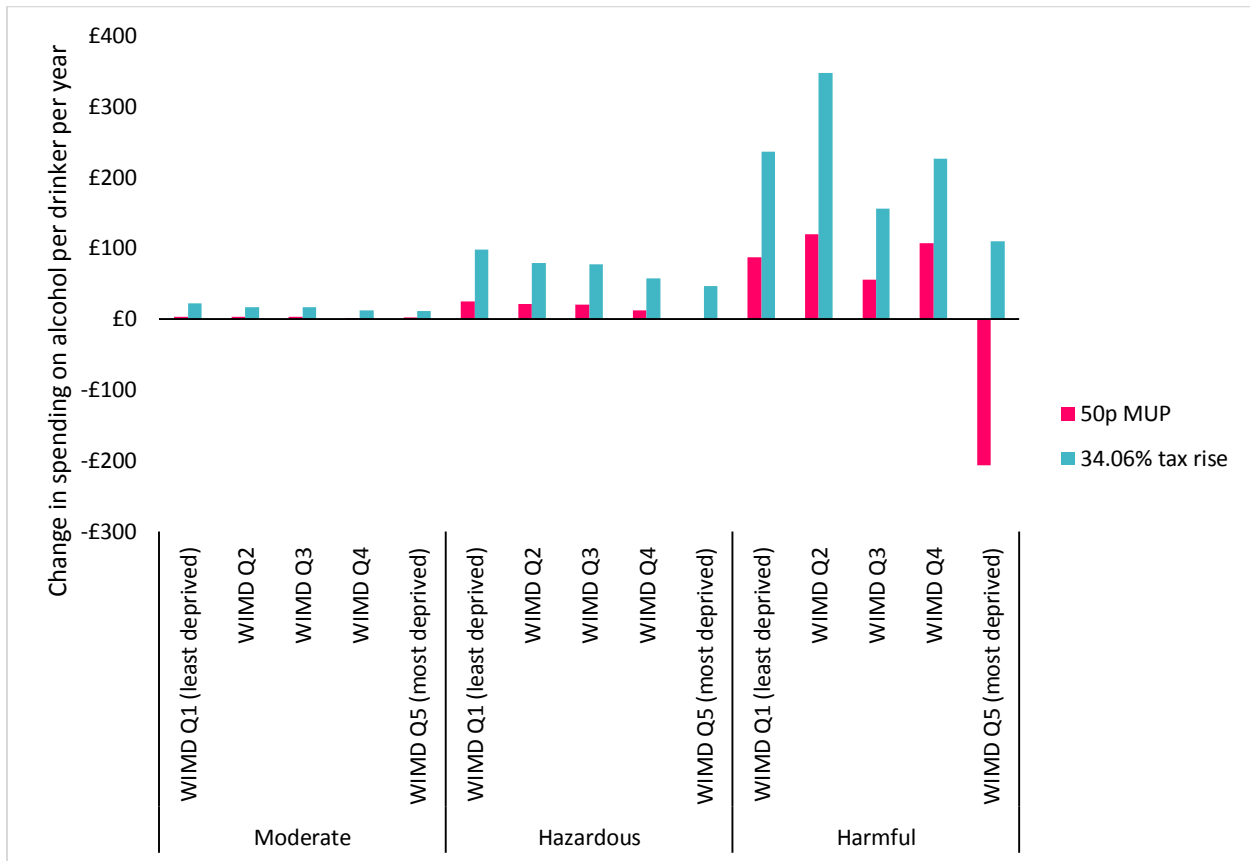
	Baseline annual spend	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
Absolute change						
WIMD Q1 (least deprived)	£780	£13	£50	£52	£69	£72
WIMD Q2	£676	£13	£46	£47	£63	£65
WIMD Q3	£563	£10	£36	£37	£49	£51
WIMD Q4	£515	£9	£31	£32	£41	£43
WIMD Q5 (most deprived)	£441	£-7	£21	£22	£28	£28
Relative change						
WIMD Q1 (least deprived)		1.7%	6.4%	6.6%	8.9%	9.2%
WIMD Q2		1.9%	6.8%	7.0%	9.3%	9.6%
WIMD Q3		1.7%	6.5%	6.6%	8.8%	9.0%
WIMD Q4		1.7%	6.0%	6.1%	8.0%	8.3%
WIMD Q5 (most deprived)		-	4.8%	4.9%	6.3%	6.4%

Figure 34: Comparative impact of MUP and taxation policies on spending by deprivation



Full results by both drinker type and deprivation are in Table 56 in the Appendix, and illustrated for a 50p MUP and 34.06% tax rise in Figure 35.

Figure 35: Comparative impact of MUP and taxation policies on spending by drinker type and deprivation



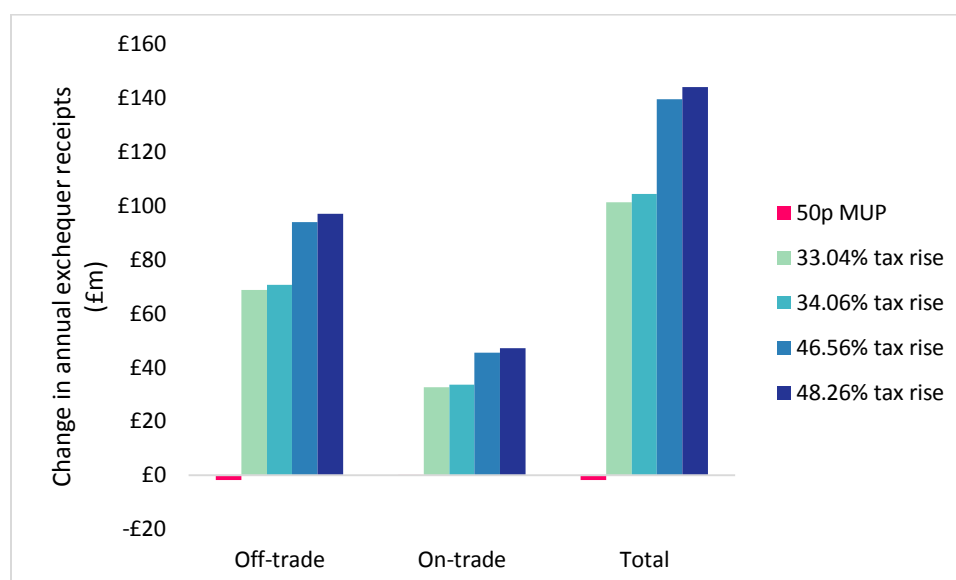
Comparative impacts of MUP and taxation policies on exchequer and retailer revenue

As we saw in Table 21, MUP policies are estimated to reduce exchequer receipts whilst increasing retailer revenues. Table 38 and Figure 36 present the comparative impact to the exchequer of the four equalised duty policies compared to 50p MUP. These clearly show that, as you would expect, tax increases are estimated to raise significant additional revenue for the exchequer. These results also emphasise the finding from Figure 29 that MUP policies only affect off-trade prices, while taxation policies are also estimated to raise substantial additional tax revenue from pubs and restaurants.

Table 38: Estimated impact of MUP and taxation policies on annual exchequer revenue

	Baseline annual receipts (£m)	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
Absolute change (£m)						
Off-trade	£262	-£1.8	£68.7	£70.7	£94.0	£97.0
On-trade	£221	£0.0	£32.6	£33.6	£45.5	£47.1
Total	£483	-£1.9	£101.3	£104.3	£139.5	£144.1
Relative change						
Off-trade		-0.7%	26.2%	27.0%	35.9%	37.1%
On-trade		0.0%	14.7%	15.2%	20.6%	21.3%
Total		-0.4%	21.0%	21.6%	28.9%	29.8%

Figure 36: Comparative impact of MUP and taxation policies on exchequer receipts

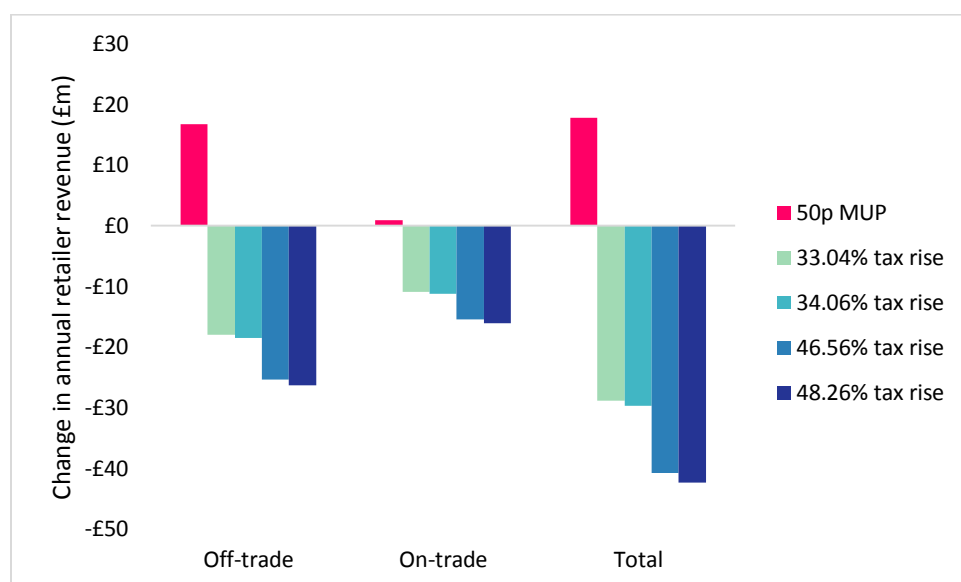


In contrast, the picture for retailer revenue presented in Table 39 and Figure 37 show that, while MUP is estimated to increase revenue for retailers, taxation policies are estimated to reduce it by a similar, or greater extent. Whilst a 50p MUP would increase revenue to off-trade retailers by £16.8million per year, a 34.06% duty increase would reduce revenue by £18.5million. In terms of impact on on-trade retailer revenues, a 50p MUP is estimated to increase revenues modestly by £1million per year, while a 34.06% duty increase would cut them by £11.2million.

Table 39: Estimated impact of MUP and taxation policies on annual retailer revenue

	Baseline annual revenue (£m)	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
		Absolute change (£m)				
Off-trade	£171	£16.8	-£18.0	-£18.5	-£25.4	-£26.3
On-trade	£506	£1.0	-£10.9	-£11.2	-£15.5	-£16.0
Total	£676	£17.8	-£28.8	-£29.7	-£40.8	-£42.3
		Relative change				
Off-trade		9.9%	-10.5%	-10.9%	-14.9%	-15.4%
On-trade		0.2%	-2.2%	-2.2%	-3.1%	-3.2%
Total		2.6%	-4.3%	-4.4%	-6.0%	-6.3%

Figure 37: Comparative impact of MUP and taxation policies on retailer revenue



Comparative impacts of MUP and taxation policies on health

The modelled estimates of the impact of the five policy options on alcohol-attributable mortality and hospital admissions, as shown in Table 40-Table 43 and Figure 38-Figure 42, are broadly similar to those for consumption. Whilst both MUP and taxation policies lead to the greatest reductions in mortality and hospital admissions in the heaviest drinkers, the health benefits of MUP are more concentrated in harmful drinkers and those in the most deprived quintiles, while the effects of taxation are spread more widely across the population. Full results by both drinker group and deprivation are given in Table 57 and Table 58 in the Appendix.

Table 40: Estimated impact of MUP and taxation policies on deaths by drinker group

	Baseline annual alcohol-attributable deaths	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
		Absolute change				
All drinkers	777	-66	-66	-69	-95	-98
Moderate	-77	0	-3	-3	-4	-4
Hazardous	297	-20	-32	-33	-45	-47
Harmful	557	-46	-32	-33	-46	-48
	Per 100,000 drinkers	Absolute change per 100,000 drinkers				
All drinkers	41	-3	-3	-4	-5	-5
Moderate	-6	0	0	0	0	0
Hazardous	66	-4	-7	-7	-10	-10
Harmful	685	-56	-39	-40	-56	-58
		Relative change				
All drinkers		-8.5%	-8.5%	-8.8%	-12.2%	-12.7%
Moderate		0.0%	3.3%	3.4%	4.8%	5.0%
Hazardous		-6.8%	-10.8%	-11.1%	-15.3%	-15.9%
Harmful		-8.2%	-5.7%	-5.9%	-8.2%	-8.5%

Figure 38: Comparative impact of MUP and taxation policies on mortality by drinker type

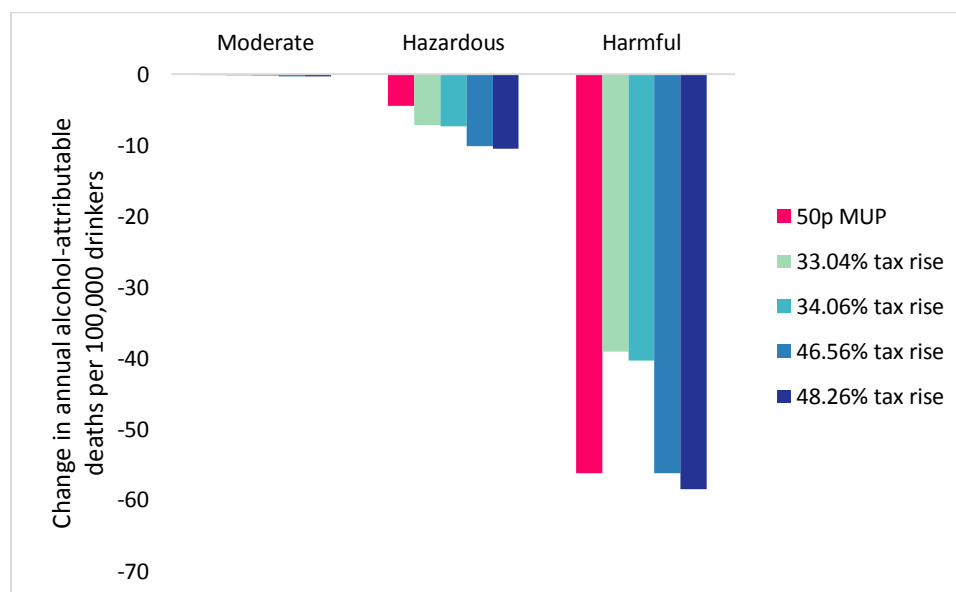


Table 41: Estimated impact of MUP and taxation policies on mortality by deprivation

	Baseline annual alcohol-attributable deaths per 100,000 drinkers	50p MUP	33.04% tax rise	34.06 % tax rise	46.56 % tax rise	48.26 % tax rise
		Absolute change				
WIMD Q1 (least deprived)	120	0	-6	-6	-9	-9
WIMD Q2	123	-4	-10	-10	-14	-14
WIMD Q3	141	-11	-15	-16	-22	-23
WIMD Q4	165	-13	-16	-17	-23	-24
WIMD Q5 (most deprived)	228	-38	-19	-20	-27	-28
	Per 100,000 drinkers	Absolute change per 100,000 drinkers				
WIMD Q1 (least deprived)	28	0	-1	-1	-2	-2
WIMD Q2	30	-1	-2	-2	-3	-4
WIMD Q3	35	-3	-4	-4	-5	-6
WIMD Q4	45	-4	-4	-5	-6	-7
WIMD Q5 (most deprived)	75	-12	-6	-7	-9	-9
		Relative change				
WIMD Q1 (least deprived)		-0.3%	-5.0%	-5.2%	-7.3%	-7.6%
WIMD Q2		-3.1%	-7.7%	-8.0%	-11.2%	-11.6%
WIMD Q3		-7.7%	-10.8%	-11.2%	-15.6%	-16.2%
WIMD Q4		-8.0%	-9.8%	-10.1%	-14.0%	-14.5%
WIMD Q5 (most deprived)		-16.5%	-8.5%	-8.8%	-12.0%	-12.4%

Figure 39: Comparative impact of MUP and taxation policies on mortality by deprivation

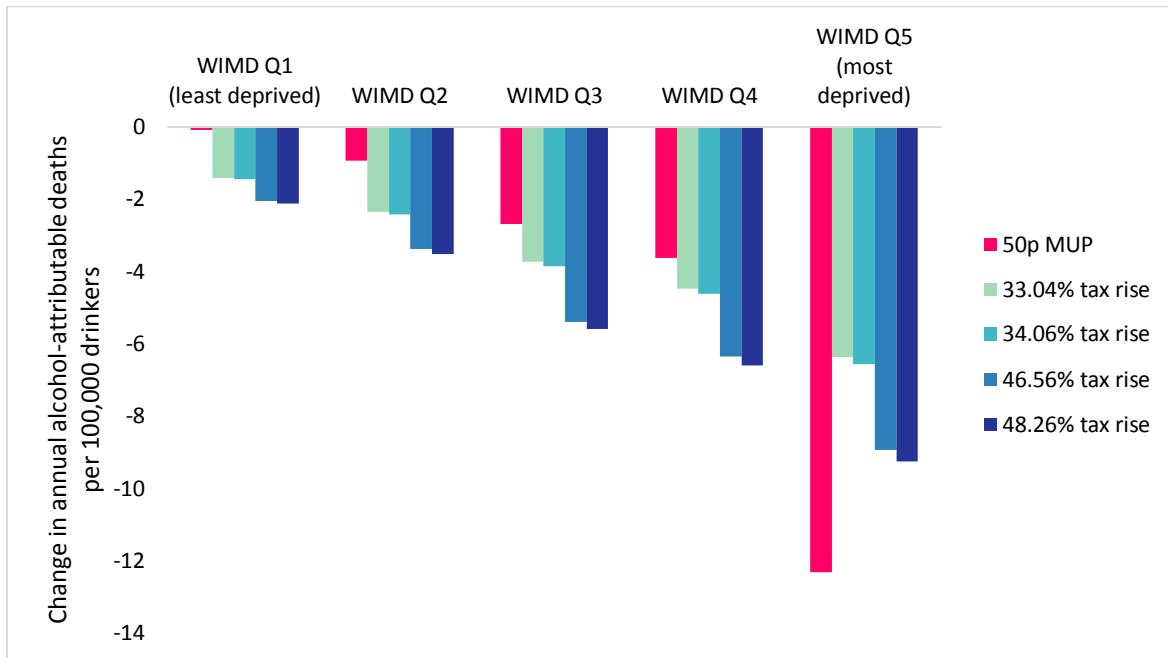


Figure 40: Distribution of reductions in alcohol-attributable deaths across the population under a 50p MUP and a 34.06% tax rise

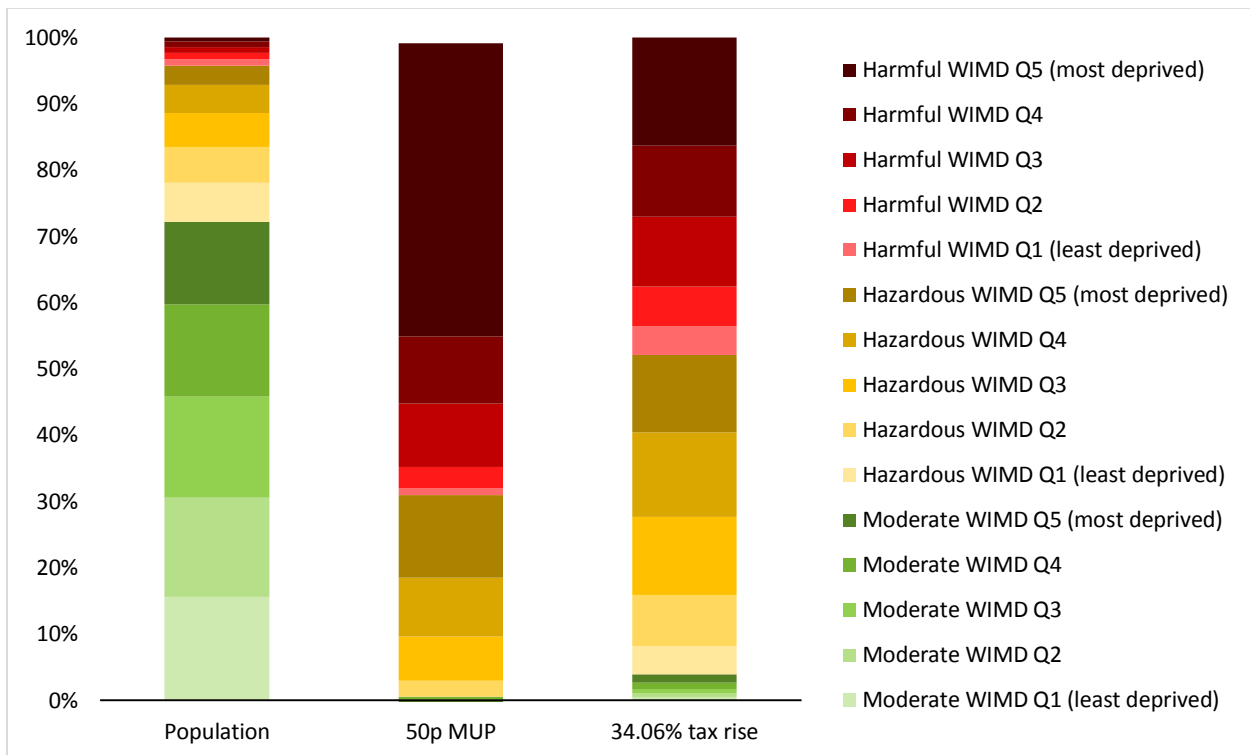


Table 42: Estimated impact of MUP and taxation policies on hospital admissions by drinker type

	Baseline annual alcohol-attributable hospital admissions	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
		Absolute change				
All drinkers	35,637	-1,281	-1,689	-1,741	-2,405	-2,498
Moderate	5,735	-131	-324	-334	-465	-483
Hazardous	17,350	-590	-889	-918	-1,277	-1,326
Harmful	12,552	-560	-476	-490	-663	-689
	Per 100,000 drinkers	Absolute change per 100,000 drinkers				
All drinkers	1866	-67	-88	-91	-126	-131
Moderate	416	-10	-23	-24	-34	-35
Hazardous	3861	-131	-198	-204	-284	-295
Harmful	15421	-688	-585	-601	-815	-846
		Relative change				
All drinkers		-3.6%	-4.7%	-4.9%	-6.7%	-7.0%
Moderate		-2.3%	-5.6%	-5.8%	-8.1%	-8.4%
Hazardous		-3.4%	-5.1%	-5.3%	-7.4%	-7.6%
Harmful		-4.5%	-3.8%	-3.9%	-5.3%	-5.5%

Figure 41: Comparative impact of MUP and taxation policies on hospital admissions by drinker type

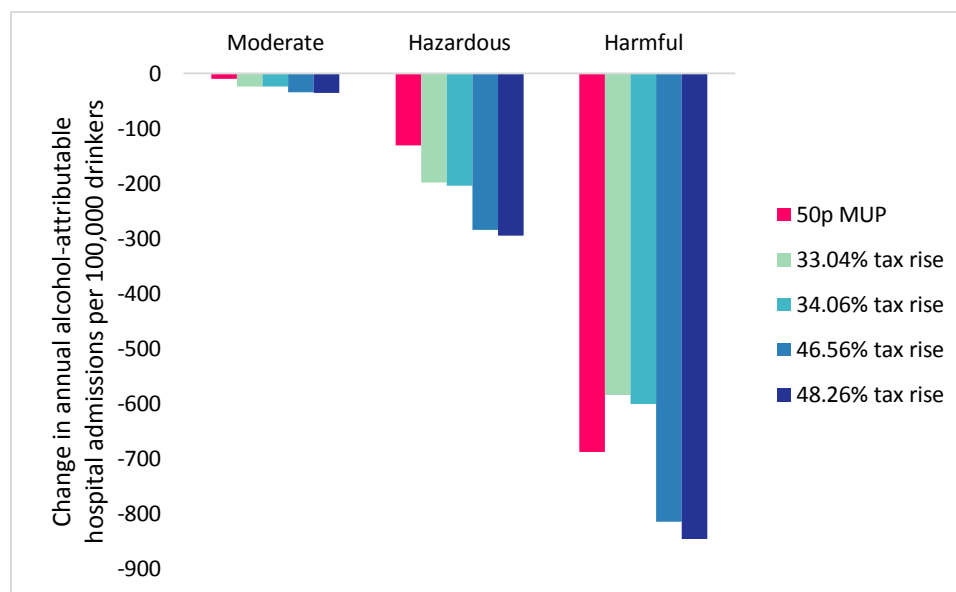


Table 43: Estimated impact of MUP and taxation policies on hospital admissions by deprivation

	Baseline annual alcohol-attributable admissions	50p MUP	33.04 % tax rise	34.06 % tax rise	46.56 % tax rise	48.26 % tax rise
		Absolute change				
WIMD Q1 (least deprived)	5,956	-8	-160	-165	-232	-241
WIMD Q2	6,270	-80	-251	-259	-364	-379
WIMD Q3	7,082	-233	-377	-388	-531	-552
WIMD Q4	7,689	-338	-434	-448	-617	-640
WIMD Q5 (most deprived)	8,639	-622	-467	-481	-661	-686
	Per 100,000 drinkers	Absolute change per 100,000 drinkers				
WIMD Q1 (least deprived)	1,390	-2	-37	-39	-54	-56
WIMD Q2	1,542	-20	-62	-64	-89	-93
WIMD Q3	1,741	-57	-93	-95	-131	-136
WIMD Q4	2,124	-93	-120	-124	-170	-177
WIMD Q5 (most deprived)	2,823	-203	-153	-157	-216	-224
		Relative change				
WIMD Q1 (least deprived)		-0.1%	-2.7%	-2.8%	-3.9%	-4.0%
WIMD Q2		-1.3%	-4.0%	-4.1%	-5.8%	-6.0%
WIMD Q3		-3.3%	-5.3%	-5.5%	-7.5%	-7.8%
WIMD Q4		-4.4%	-5.6%	-5.8%	-8.0%	-8.3%
WIMD Q5 (most deprived)		-7.2%	-5.4%	-5.6%	-7.7%	-7.9%

Figure 42: Comparative impact of MUP and taxation policies on hospital admissions by deprivation

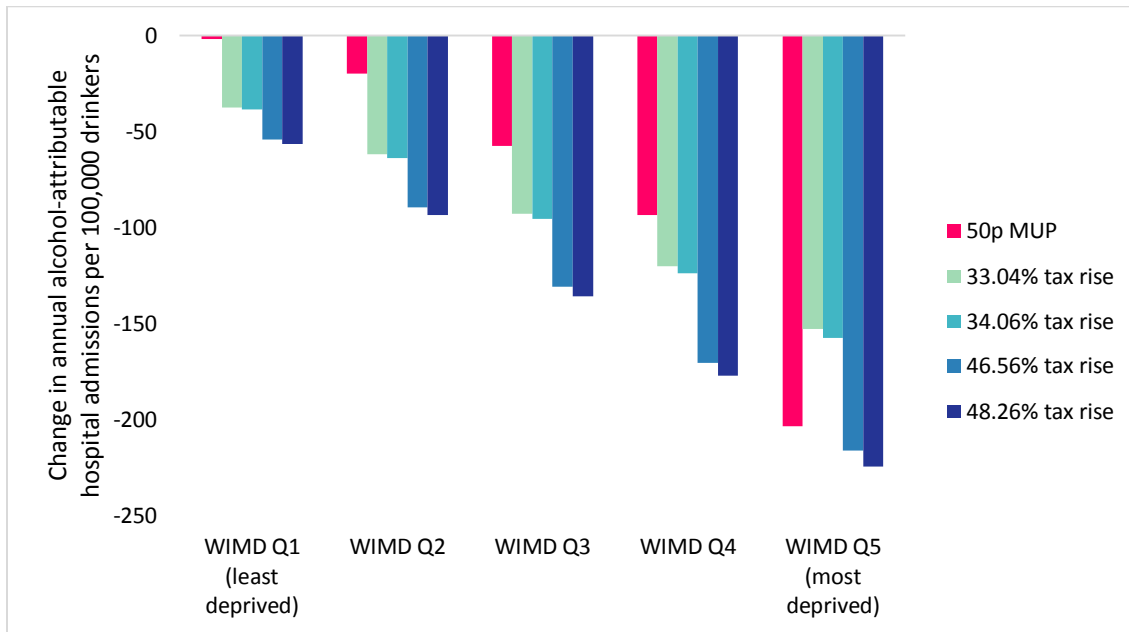
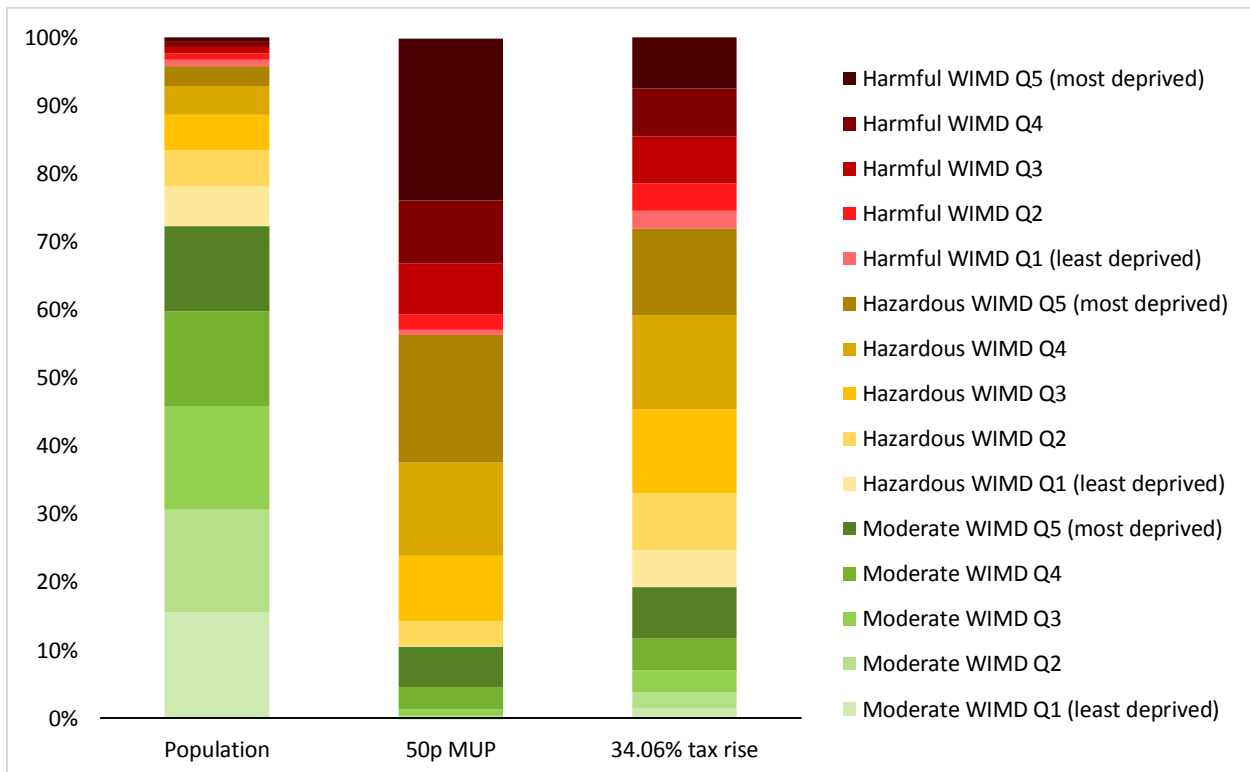


Figure 43: Distribution of reductions in alcohol-attributable hospital admissions across the population under a 50p MUP and a 34.06% tax rise



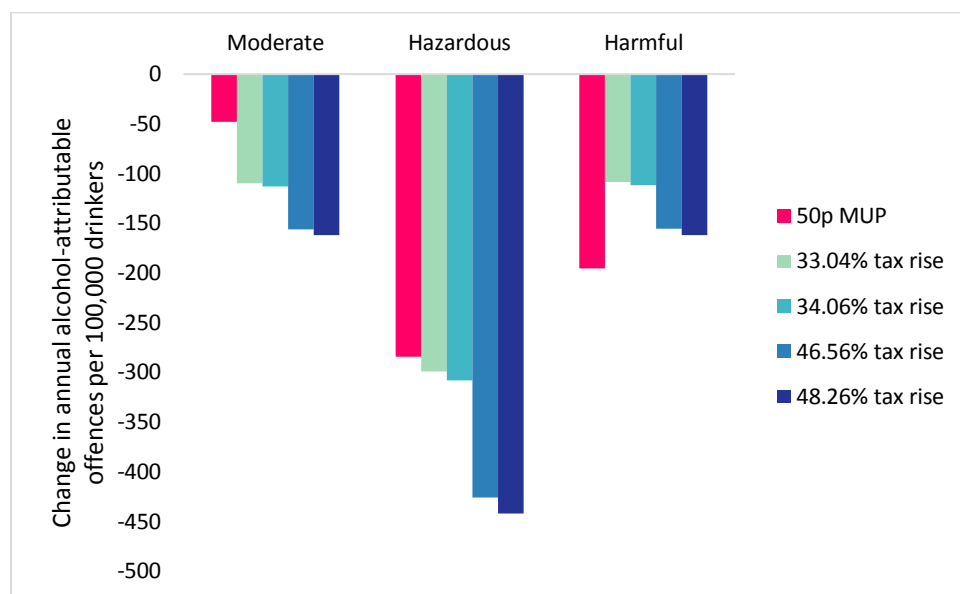
Comparative impact of MUP and taxation policies on crime

Results showing the estimated impact of MUP and taxation policies on alcohol-attributable crime volumes are shown in Table 44 and Figure 44. These suggest that taxation policies are likely to lead to greater reductions in crime among moderate and, particularly for higher duty increases, hazardous drinkers, while a 50p MUP leads to a larger reduction in offences committed by harmful drinkers. As discussed on page 54, this is due to the fact that we estimate moderate and hazardous drinkers are more responsive in terms of changing their drinking patterns than harmful drinkers, and that taxation policies have greater effects in moderate and hazardous drinkers than MUP.

Table 44: Estimated impact of MUP and taxation policies on crime

	Baseline annual alcohol-attributable crimes	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
		Absolute change				
All drinkers	88,908	-2093	-2945	-3038	-4195	-4354
Moderate	38,057	-657	-1514	-1562	-2154	-2235
Hazardous	42,440	-1277	-1343	-1385	-1914	-1987
Harmful	8,411	-159	-88	-91	-127	-132
	Per 100,000 drinkers	Absolute change per 100,000 drinkers				
All drinkers	4,655	-110	-154	-159	-220	-228
Moderate	2,759	-48	-110	-113	-156	-162
Hazardous	9,445	-284	-299	-308	-426	-442
Harmful	10,334	-195	-108	-112	-156	-162
		Relative change				
All drinkers		-2.4%	-3.3%	-3.4%	-4.7%	-4.9%
Moderate		-1.7%	-4.0%	-4.1%	-5.7%	-5.9%
Hazardous		-3.0%	-3.2%	-3.3%	-4.5%	-4.7%
Harmful		-1.9%	-1.0%	-1.1%	-1.5%	-1.6%

Figure 44: Comparative impact of MUP and taxation policies on crime

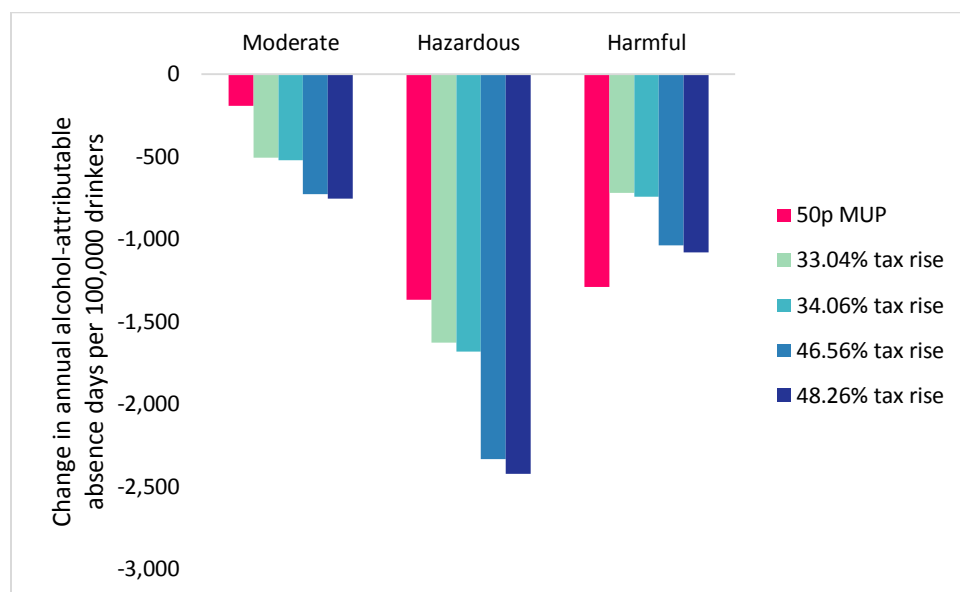


Comparative impact of MUP and taxation policies on workplace absence
 Finally, Table 45 and Figure 45 present the modelled impact of each policy on alcohol-attributable absence from work, showing very similar patterns to the estimated impact on crime. Overall tax rises are estimated to lead to greater reductions in absence, while a 50p MUP leads to the greatest reduction among harmful drinkers. These patterns appear for similar reasons to the patterns in crime impacts as discussed above.

Table 45: Estimated impact of MUP and taxation policies on workplace absence

	Baseline annual alcohol-attributable days absence	50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
		Absolute change				
All drinkers	507,795	-9,808	-14,888	-15,368	-21,355	-22,183
Moderate	212,963	-2,621	-6,988	-7,214	-10,024	-10,412
Hazardous	227,856	-6,138	-7,315	-7,551	-10,486	-10,892
Harmful	66,975	-1,049	-584	-603	-845	-879
	Per 100,000 drinkers	Absolute change per 100,000 drinkers				
All drinkers	26,585	-514	-779	-805	-1,118	-1,161
Moderate	15,440	-190	-507	-523	-727	-755
Hazardous	50,709	-1,366	-1,628	-1,680	-2,334	-2,424
Harmful	82,287	-1,289	-718	-741	-1,038	-1,079
		Relative change				
All drinkers		-1.9%	-2.9%	-3.0%	-4.2%	-4.4%
Moderate		-1.2%	-3.3%	-3.4%	-4.7%	-4.9%
Hazardous		-2.7%	-3.2%	-3.3%	-4.6%	-4.8%
Harmful		-1.6%	-0.9%	-0.9%	-1.3%	-1.3%

Figure 45: Comparative impact of MUP and taxation policies on workplace absence



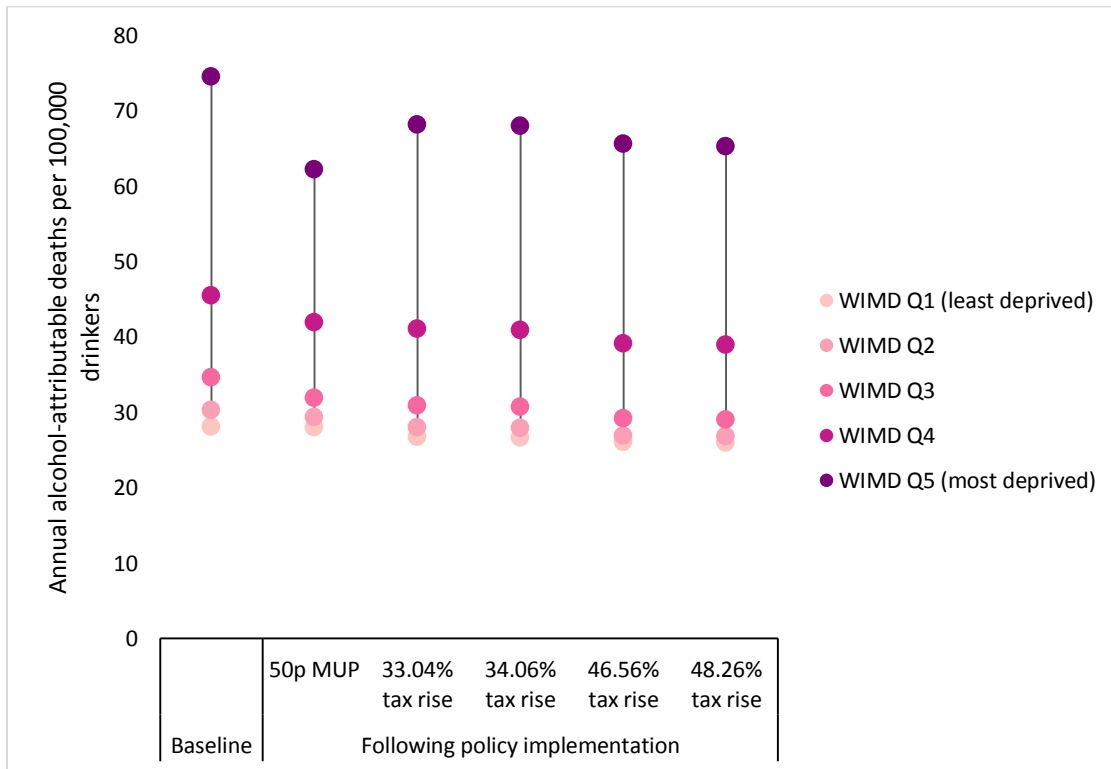
Comparative impact of MUP and taxation policies on health inequalities

As highlighted in Table 11, there are significant socioeconomic inequalities in alcohol-related health, with almost a threefold difference in alcohol-attributable mortality rates between the most and least deprived quintiles of the Welsh population. The ‘gap’ between these two groups means that there are 46 additional deaths per 100,000 drinkers in the most, compared to least deprived quintiles. Table 46 and Figure 46 show the impact of a 50p MUP and the four modelled tax policies on this inequality gap. These show that, whilst all modelled policies reduce inequality, MUP is estimated to reduce the gap by substantially more than tax increases. This is due to the greater concentration of MUP’s effects in more deprived groups.

Table 46: Estimated impact of MUP and taxation policies on health inequalities

	Baseline alcohol-attributable deaths per year	Change following policy implementation				
		50p MUP	33.04% tax rise	34.06% tax rise	46.56% tax rise	48.26% tax rise
WIMD Q1 (least deprived)	28.1	28.0	26.7	26.6	26.0	25.9
WIMD Q2	30.3	29.4	27.9	27.9	26.9	26.8
WIMD Q3	34.6	31.9	30.9	30.7	29.2	29.0
WIMD Q4	45.5	41.9	41.0	40.9	39.1	38.9
WIMD Q5 (most deprived)	74.5	62.2	68.2	68.0	65.6	65.3
Inequality 'gap'	46.4	34.2	41.5	41.3	39.6	39.3

Figure 46: Comparative impact of MUP and taxation policies on health inequalities



Discussion

Summary of key findings

The analyses presented in this report suggest that a MUP of between 35 and 70p is an effective approach to reducing alcohol consumption and alcohol-attributable harm. For a 50p MUP alcohol consumption is estimated to fall by 3.6% and there would be an estimated 66 fewer alcohol-attributable deaths per year and 1,281 fewer alcohol-attributable hospital admissions after 20 years when the policy is at full effect.

The policy is also well targeted, with all modelled MUP policies leading to substantially greater reductions in alcohol consumption in harmful drinkers compared to moderate drinkers. The largest reductions in consumption would be seen in the most deprived harmful drinkers. This is important, as these are the groups at greatest risk of experiencing harm due to their drinking. In contrast, moderate drinkers, including those in the most deprived groups, would be affected to a much lesser degree. These targeted reductions occur because MUP imposes large price increases on the lowest cost alcohol, small price increases on alcohol sold close to the relevant price threshold and no direct price increase on alcohol sold above this threshold. The highest risk drinkers buy large amounts of alcohol at low prices which are likely to be significantly affected by MUP and would face large price increases as a result. Lower risk drinkers are less likely to buy this cheap alcohol, and what they do buy is likely to be closer to the MUP threshold, meaning they would face only modest increases in price when the policy is introduced.

When looking across the range of modelled MUP thresholds from 35 to 70p, a clear pattern emerges. Higher MUP levels lead to greater overall reductions in consumption and reductions in

alcohol-related harms; however they are also less targeted, with a greater proportion of the alcohol purchased by moderate drinkers being affected and therefore a greater impact on their consumption. In other words, the higher the MUP threshold, the greater the impact, but the less concentrated these impacts on the groups in the population at the greatest risk of harm.

Large alcohol tax increases of between 33% and 48% would be required to achieve the same reductions in alcohol consumption and alcohol-attributable mortality among heavier drinkers as would be achieved by a 50p MUP. These tax increases would be less well targeted on the highest risk drinkers, would impact moderate drinkers to a greater degree and would be less effective in reducing alcohol-attributable health inequalities.

These findings are broadly in line with a large body of evidence on the effects of alcohol price increases,^{40–44} alcohol-related health risks²⁷ and other modelling and analytical exercises which have examined the potential effects of minimum pricing policies in the UK and other countries^{45–50}. Differences between the present findings and previous work tend to arise from the use of less detailed data which necessitate more problematic assumptions. A comparison of estimates from the Canadian adaptation of the Sheffield Alcohol Policy Model with evaluation evidence from Canada suggests that the model is conservative and may be under-estimating the impact of minimum unit pricing^{13,46}.

Strengths and limitations

The Sheffield Alcohol Policy Model is a world-leading alcohol policy appraisal tool and previous analyses have been published in the most prestigious scientific journals^{2,3,51,52}. It provides the most comprehensive analyses available of the potential impact of alcohol policies, spanning a wide range of outcomes and permitting analyses of key population subgroups of policy interest. An extensive body of sensitivity analyses has demonstrated that our main conclusions on MUP are robust to varying the key assumptions, datasets and analytical methods used within the model^{2,3,8,9,53}.

Important features of the model include:

- Synthesizing the best available local data with high-quality international evidence;
- Accounting for detailed patterns of switching between alcoholic products and between the on-trade and off-trade following price changes;
- Accounting for variation across product types and price points in the pass-through of alcohol tax increases to prices;
- Modelling changes in both average weekly consumption and single occasion drinking (i.e. binge drinking) and the associated changes in risk for both chronic and acute alcohol-attributable harms;
- Accounting for time lags in changes in alcohol-attributable harm following changes in alcohol consumption.

Strengths of the present modelling relative to our 2014 report on the potential impacts of MUP in Wales¹ include the use of alcohol consumption data from the newly available National Survey for Wales in place of a smaller sample of Welsh data from the 2008-2011 UK-wide General Household Surveys. The epidemiological evidence used to model alcohol-attributable cancers and ischaemic heart disease has also been updated to account for important developments in

these areas. Finally, new analyses are included comparing the potential impacts of MUP with alcohol tax increases with the tax increase modelling being selected to achieve equivalent effects to a 50p MUP.

Limitations of all versions of the Sheffield Alcohol Policy Model include not accounting for potential secondary policy effects including increased illicit alcohol trading, cross-border trade or restructuring of the alcohol market. Other limitations include the assumption for most health conditions that the relationship between consumption and risk are the same for both mortality and hospitalisation (although separate evidence is available and used for cardiovascular conditions), and the underestimation of alcohol consumption and purchasing by survey data – a problem common to all individual-level alcohol research⁵⁴.

Limitations specific to this report include the assumption that purchasing patterns in WIMD quintiles are equivalent to purchasing patterns in the same income quintiles (i.e. the most deprived WIMD quintile's purchases are similar to those in the lowest income quintile). As WIMD is an area-level measure, while income is a household-level measure, there will be some degree of variation between these two groups. However this is mitigated by the fact that household income is one of the largest components of the WIMD calculation and that there is significant correlation between income and the other domains (unemployment, health, education, access to services, community safety, the physical environment and housing)¹⁶. The effect of this assumption may be to slightly overstate the between-WIMD quintile differences in prices paid (after accounting for differences due to age, sex and the distribution of drinkers). It should however be noted that a similar assumption, equating the lowest WIMD quintile with the proportion of the population in poverty (as defined in terms of household income) was made in the 2014 report.

Another limitation which is not specific to this report is the lack of available data on any deprivation gradient in baseline criminal offending and the resulting assumption that, after accounting for age, sex and drinking level, propensity to commit crime is independent of deprivation level. In the present report we have used offending data from published police sources²⁹ and demographic data on individuals appearing in court from the Ministry of Justice. Neither source contains data on the socioeconomic status of the individuals concerned. Data for England and Wales shows that a significantly greater volume of crimes are committed in more deprived areas⁵⁵ and there is a long history of international literature suggesting offending rates are higher among lower socioeconomic groups^{56,57}. It is therefore likely that offending rates in Wales are higher among those living in more deprived areas (in general, although this may not necessarily be true for some types of offence). The potential impact of this limitation in the data used in the model is therefore likely to be an underestimate overall crime and therefore alcohol-attributable crime in the most deprived areas and overestimate it in the least deprived areas. As a consequence of the fact that all modelled policies affect consumption in more deprived groups more than less deprived groups, this also means our analysis may underestimate the true impact of pricing policies on alcohol-attributable crime. This is particularly true for MUP policies, which have the greatest impact in the most deprived groups.

Finally, there are similar limitations in the data used in the workplace modelling. This data does not include individual-level deprivation and therefore we assume that employment and absence rates are the same across all deprivation groups. As unemployment is one of the domains in the calculation of WIMD scores, there is inevitably some degree of correlation between unemployment and deprivation. For similar reasons to the crime data outlined above, this is

likely to lead to an underestimate of the impact of price policies, particularly MUP, on workplace absence. As the Quarterly Labour Force Survey from which absence rates are estimated does include income, we can look at differential rates of absence by income quintile, as shown in Table 47. These suggest that absence rates are higher in lower income groups. Unfortunately, the Welsh sample size in this data is insufficient to support stratifying this data by age, sex *and* income; however this is likely to lead our analysis to further underestimate the true impact of pricing policies on workplace outcomes.

Table 47: Annual working days and days absent by income quintile

Income band	Average working days per week	Overall absence rate
Quintile 1 (lowest)	3.73	2.1%
Quintile 2	4.53	1.7%
Quintile 3	4.70	0.6%
Quintile 4	4.75	1.1%
Quintile 5 (highest)	4.77	0.6%

Finally, our analysis of workplace outcomes does not account for the complex interrelationship between drinking behavior and unemployment. Numerous studies in the UK and internationally have shown that this relationship is bi-directional (i.e. that increased drinking may lead to unemployment or vice versa); however the nature of this relationship has yet to be fully understood^{58,59} and it is therefore difficult to be sure of the impact that excluding this relationship from our modelling has on the estimates of the impact of pricing policies on the broader economy in this report.

Acknowledgements

The authors would like to thank Maddy Henney for her work on the crime data used in this report. We would also like to thank the various data holders and suppliers: Statistics Wales, the Office for National Statistics, the Ministry of Justice, the Nielsen Company. This report represents the sole work of the authors and the data holders bear no responsibility for the analysis or interpretation of the data described.

References

1. Meng, Y., Sadler, S., Gell, L., Holmes, J. & Brennan, A. *Model-based appraisal of minimum unit pricing for Wales: an adaptation of the Sheffield Alcohol Policy Model version 3*. (2014).
2. Holmes, J. *et al.* Effects of minimum unit pricing for alcohol on different income and socioeconomic groups: A modelling study. *Lancet* **383**, (2014).
3. Meier, P. S. *et al.* Estimated Effects of Different Alcohol Taxation and Price Policies on Health Inequalities: A Mathematical Modelling Study. *PLoS Med.* **13**, (2016).
4. Purshouse, R. *et al.* *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* (2009).
5. Purshouse, R. C. *et al.* Modelling the cost-effectiveness of alcohol screening and brief interventions in primary care in England. *Alcohol Alcohol.* **48**, (2013).
6. Angus, C., Thomas, C., Anderson, P., Meier, P. S. & Brennan, A. Estimating the cost-effectiveness of brief interventions for heavy drinking in primary health care across Europe. *Eur. J. Public Health* **27**, (2017).
7. Angus, C., Gillespie, D., Ally, A. K. & Brennan, A. *Modelling the impact of Minimum Unit Price and Identification and Brief Advice policies using the Sheffield Alcohol Policy Model Version 3*. (2015).
8. Meng, Y. *et al.* *Modelled income group-specific impacts of alcohol minimum unit pricing in England 2014/15: Policy appraisals using new developments to the Sheffield Alcohol Policy Model (v2.5)*. (2013).
9. Purshouse, R., Meng, Y., Rafia, R., Brennan, A. & Meier, P. S. *Model-based appraisal of alcohol minimum pricing and off-licensed trade discount bans in Scotland: a Scottish adaptation of the Sheffield Alcohol Policy Model version 2*. (2009).
10. Angus, C., Holmes, J., Pryce, R., Meier, P. & Brennan, A. *Model-based appraisal of the comparative impact of Minimum Unit Pricing and taxation policies in Scotland*. (2016).
11. Angus, C., Meng, Y., Ally, A. K., Holmes, J. & Brennan, A. *Model-based appraisal of minimum unit pricing for alcohol in Northern Ireland*. (2014).
12. Angus, C., Meng, Y., Ally, A. K., Holmes, J. & Brennan, A. *Model-based appraisal of minimum unit pricing for alcohol in the Republic of Ireland*. (2014).
13. Hill-McManus, D. *et al.* *Model-Based Appraisal Of Alcohol Minimum Pricing In Ontario And British Columbia: A Canadian adaptation of the Sheffield Alcohol Policy Model Version 2*. (2012).
14. Angus, C. *et al.* Cost-effectiveness of a programme of screening and brief interventions for alcohol in primary care in Italy. *BMC Fam. Pract.* **15**, (2014).
15. Angus, C., Holmes, J., Brennan, A. & Meier, P. S. *Model-based appraisal of the comparative impact of Minimum Unit Pricing and taxation policies in Wales: Interim report An update to the 50p MUP example*. (2017).
16. Statistics for Wales. *Welsh Index of Multiple Deprivation (WIMD) 2014*. (2014).

17. Brennan, A. *et al.* The Sheffield alcohol policy model - A mathematical description. *Heal. Econ. (United Kingdom)* **24**, (2015).
18. Office for National Statistics. *Mid-year population estimates 2015*. (2016).
19. StatsWales. Welsh Index of Multiple Deprivation 2014 by rank and lower super output area. Available at: <https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation/WIMD-2014/wimd2014>. (Accessed: 4th January 2018)
20. Office for National Statistics. Consumer Price Inflation time series dataset. (2017). Available at: <https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceindices>. (Accessed: 4th January 2018)
21. Meng, Y. *et al.* Estimation of own and cross price elasticities of alcohol demand in the UK-A pseudo-panel approach using the Living Costs and Food Survey 2001-2009. *J. Health Econ.* **34**, (2014).
22. Ally, A. K. *et al.* Alcohol tax pass-through across the product and price range: do retailers treat cheap alcohol differently? *Addiction* (2014). doi:10.1111/add.12590
23. Rabinovich, L. *et al.* *Further study on the affordability of alcohol beverages in the EU*. (2012).
24. Office for National Statistics. Deaths by selected underlying cause, split by sex, Welsh Index of Multiple Deprivation (WIMD), and age group for deaths registered in Wales between 2014 and 2016 - Office for National Statistics. (2017). Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/adhocs/007469deathsbyselectedunderlyingcausesplitbysexwelshindexofmultipledeprivationwimdandagegroupfordeathsregisteredinwalesbetween2014and2016>. (Accessed: 4th January 2018)
25. Curtis, L. & Burns, A. *Unit Costs of Health and Social Care 2016*. (2016).
26. Cardiff Research Consortium. *Health Outcomes Data Repository*. (2011).
27. Rehm, J. *et al.* The relationship between different dimensions of alcohol use and the burden of disease-an update. *Addiction* **112**, 968–1001 (2017).
28. Rehm, J., A. S., Shield, K. D. & Gmel, G. Risk relations between alcohol use and non-injury causes of death. (2017).
29. Home Office. Police recorded crime and outcomes open data tables. (2017). Available at: <https://www.gov.uk/government/statistics/police-recorded-crime-open-data-tables>. (Accessed: 4th January 2018)
30. Home Office. *Integrated Offender Management efficiency toolkit phase 2: revised unit costs of crime and multipliers*. (2011).
31. Bagnardi, V. *et al.* Alcohol consumption and site-specific cancer risk: a comprehensive dose–response meta-analysis. *Br. J. Cancer* **112**, 580–593 (2015).
32. Roerecke, M. & Rehm, J. Irregular heavy drinking occasions and risk of ischemic heart disease: a systematic review and meta-analysis. *Am. J. Epidemiol.* **171**, 633–44 (2010).
33. Roerecke, M. & Rehm, J. Alcohol consumption, drinking patterns, and ischemic heart

- disease: a narrative review of meta-analyses and a systematic review and meta-analysis of the impact of heavy drinking occasions on risk for moderate drinkers. *BMC Med.* **12**, 182 (2014).
34. Smith, K. & Foster, J. *Alcohol, health inequalities and the alcohol harm paradox.* (2014).
 35. Bellis, M. A. *et al.* The alcohol harm paradox: using a national survey to explore how alcohol may disproportionately impact health in deprived individuals. *BMC Public Health* **16**, 111 (2016).
 36. Sadler, S. *et al.* Understanding the alcohol harm paradox: an analysis of sex- and condition-specific hospital admissions by socio-economic group for alcohol-associated conditions in England. *Addiction* **112**, 808–817 (2017).
 37. Beard, E. *et al.* Deconstructing the Alcohol Harm Paradox: A population based survey of adults in England. *PLoS One* **11**, e0160666 (2016).
 38. Glover, D. & Henderson, J. *Quantifying health impacts of government policies.* (2010).
 39. Holmes, J., Meier, P. S., Booth, A., Guo, Y. & Brennan, A. The temporal relationship between per capita alcohol consumption and harm: a systematic review of time lag specifications in aggregate time series analyses. *Drug Alcohol Depend.* **123**, 7–14 (2012).
 40. Wagenaar, A. C., Salois, M. J. & Komro, K. A. Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. *Addiction* **104**, 179–90 (2009).
 41. Gallet, C. A. The demand for alcohol: a meta-analysis of elasticities. *Aust. J. Agric. Resour. Econ.* **51**, 121–135 (2007).
 42. Fogarty, J. The demand for beer, wine and spirits: A survey of the literature. *J. Econ. Surv.* **24**, 428–478 (2010).
 43. Nelson, J. P. Meta-analysis of alcohol price and income elasticities – with corrections for publication bias. *Health Econ. Rev.* **3**, 17 (2013).
 44. Wagenaar, A. C., Tobler, A. L. & Komro, K. A. Effects of Alcohol Tax and Price Policies on Morbidity and Mortality: A Systematic Review. *Am. J. Public Health* **100**, 2270–2278 (2010).
 45. Sharma, A., Vandenberg, B. & Hollingsworth, B. Minimum Pricing of Alcohol versus Volumetric Taxation: Which Policy Will Reduce Heavy Consumption without Adversely Affecting Light and Moderate Consumers? *PLoS One* **9**, e80936 (2014).
 46. Zhao, J. *et al.* The relationship between minimum alcohol prices, outlet densities and alcohol-attributable deaths in British Columbia, 2002–09. *Addiction* **108**, 1059–1069 (2013).
 47. Vandenberg, B. *et al.* Are Alcohol Taxation and Pricing Policies Regressive? Product-Level Effects of a Specific Tax and a Minimum Unit Price for Alcohol. *Alcohol Alcohol* **51**, 493–502 (2016).
 48. Zhao, J. & Stockwell, T. The impacts of minimum alcohol pricing on alcohol attributable morbidity in regions of British Colombia, Canada with low, medium and high mean family income. *Addiction* **112**, 1942–1951 (2017).

49. Ludbrook, A., Petrie, D., McKenzie, L. & Farrar, S. Tackling Alcohol Misuse. *Appl. Health Econ. Health Policy* **10**, 51–63 (2012).
50. O'Connell, M., Griffith, R. & Leicester, A. *Price-based measures to reduce alcohol consumption*. (Institute for Fiscal Studies, 2013). doi:10.1920/BN.IFS.2012.00138
51. Purshouse, R., Meier, P., Brennan, A., Taylor, K. & Rafia, R. Estimated effect of alcohol pricing policies on health and health economic outcomes in England: an epidemiological model. *Lancet* **375**, 1355–1364 (2010).
52. Brennan, A., Meng, Y., Holmes, J., Hill-McManus, D. & Meier, P. S. Potential benefits of minimum unit pricing for alcohol versus a ban on below cost selling in England 2014: modelling study. *BMJ* **349**, g5452 (2014).
53. Meng, Y., Purshouse, R., Brennan, A. & Meier, P. *Model-based appraisal of alcohol minimum pricing and off-licensed trade discount bans in Scotland using the Sheffield Alcohol Policy Model version 2: an update based on newly available data*. (2010).
54. Gmel, G. & Rehm, J. Measuring Alcohol Consumption. *Contemp. Drug Probl.* **31**, (2004).
55. Office for National Statistics. Crime in England and Wales: year ending September 2017. (2017). Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/crimeinenglandandwales/yearendingseptember2017>.
56. Becker, G. S. Crime and Punishment: An Economic Approach. *J. Polit. Econ.* **76**, 169–217 (1968).
57. Ehrlich, I. Participation in Illegitimate Activities: A Theoretical and Empirical Investigation. *Journal of Political Economy* **81**, 521–565
58. Jones, L. & Sumnall, H. *Understanding the relationship between poverty and alcohol misuse*. (2016).
59. Bauld, L. *et al. Alcohol misusers' experiences of employment and the benefit system: Research Report No. 718*. (2010).
60. Office for National Statistics. *Response to consultation on the National Statistics definition of alcohol-related deaths*. (2017).

Appendix

Table 48: Estimated annual deaths and hospital admissions caused by alcohol by drinker group and deprivation quintile

	Moderate					Hazardous					Harmful				
	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Baseline alcohol-attributable deaths per year	-12	-17	-19	-20	-9	52	59	72	61	54	81	82	88	123	184
Baseline alcohol-attributable deaths per 100,000 drinkers per year	-4	-6	-7	-7	-4	46	57	72	77	97	444	444	512	804	1,502
Baseline alcohol-attributable hospital admissions per year	810	942	1,106	1,304	1,575	3,133	3,321	3,848	3,612	3,437	2,013	2,008	2,129	2,774	3,628
Baseline alcohol-attributable hospital admissions per 100,000 drinkers per year	272	329	381	489	661	2,787	3,255	3,879	4,505	6,192	11,042	10,932	12,330	18,127	29,683

Table 49: Estimated impact of MUP policies on consumption by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population	Baseline	297,937	286,322	290,248	266,503	238,332	112,441	102,031	99,177	80,181	55,509	18,234	18,365	17,267	15,304	12,221
	consumption per drinker per year	231	211	213	200	194	1,228	1,245	1,262	1,219	1,216	3,892	4,168	3,244	4,081	4,367
Absolute change (units per drinker per year)	35p MUP	0.0	0.0	-0.2	-0.8	-1.3	0.5	-3.0	-5.7	-9.8	-24.4	-6.5	-22.1	-30.2	-34.4	-350.2
	40p MUP	0.0	-0.1	-0.4	-1.5	-2.5	-0.3	-7.7	-12.6	-21.4	-44.6	-11.9	-38.9	-72.1	-77.5	-581.6
	45p MUP	0.2	-0.2	-0.8	-2.6	-4.2	-1.6	-14.6	-22.5	-36.9	-70.7	-16.8	-56.3	-124.6	-127.0	-841.1
	50p MUP	0.3	-0.5	-1.5	-4.3	-6.9	-3.6	-24.0	-37.2	-56.9	-102.7	-26.4	-78.0	-193.7	-191.8	-1,118.9
	55p MUP	0.2	-1.3	-2.9	-6.8	-10.8	-7.7	-37.2	-56.5	-82.6	-141.1	-41.9	-110.5	-282.4	-280.8	-1,280.8
	60p MUP	-0.1	-2.7	-4.9	-10.0	-15.6	-15.0	-55.4	-82.0	-113.6	-186.2	-68.4	-152.5	-383.0	-369.4	-1,458.6
	65p MUP	-0.8	-4.6	-7.5	-13.8	-21.2	-24.9	-77.5	-112.0	-148.2	-234.3	-99.6	-200.8	-483.2	-472.7	-1,639.9
	70p MUP	-1.9	-6.9	-10.7	-18.2	-27.1	-37.5	-101.3	-144.6	-186.4	-276.2	-133.4	-259.2	-590.7	-583.0	-1,837.2
Relative change	35p MUP	0.0%	0.0%	-0.1%	-0.4%	-0.6%	0.0%	-0.2%	-0.4%	-0.8%	-2.0%	-0.2%	-0.5%	-0.9%	-0.8%	-8.0%
	40p MUP	0.0%	0.0%	-0.2%	-0.8%	-1.3%	0.0%	-0.6%	-1.0%	-1.8%	-3.7%	-0.3%	-0.9%	-2.2%	-1.9%	-13.3%
	45p MUP	0.1%	-0.1%	-0.4%	-1.3%	-2.2%	-0.1%	-1.2%	-1.8%	-3.0%	-5.8%	-0.4%	-1.4%	-3.8%	-3.1%	-19.3%
	50p MUP	0.1%	-0.2%	-0.7%	-2.2%	-3.6%	-0.3%	-1.9%	-2.9%	-4.7%	-8.4%	-0.7%	-1.9%	-6.0%	-4.7%	-25.6%
	55p MUP	0.1%	-0.6%	-1.3%	-3.4%	-5.5%	-0.6%	-3.0%	-4.5%	-6.8%	-11.6%	-1.1%	-2.7%	-8.7%	-6.9%	-29.3%
	60p MUP	-0.1%	-1.3%	-2.3%	-5.0%	-8.0%	-1.2%	-4.5%	-6.5%	-9.3%	-15.3%	-1.8%	-3.7%	-11.8%	-9.1%	-33.4%
	65p MUP	-0.4%	-2.2%	-3.5%	-6.9%	-10.9%	-2.0%	-6.2%	-8.9%	-12.2%	-19.3%	-2.6%	-4.8%	-14.9%	-11.6%	-37.6%
	70p MUP	-0.8%	-3.3%	-5.0%	-9.1%	-14.0%	-3.1%	-8.1%	-11.5%	-15.3%	-22.7%	-3.4%	-6.2%	-18.2%	-14.3%	-42.1%

Table 50: Proportion of total reduction in consumption under MUP policies accounted for by population subgroups

		Population	Reduction in consumption							
			35p MUP	40p MUP	45p MUP	50p MUP	55p MUP	60p MUP	65p MUP	70p MUP
Population		100%	100%	100%	100%	100%	100%	100%	100%	100%
Moderate		72%	6%	6%	7%	8%	10%	11%	12%	14%
Hazardous		24%	31%	35%	38%	40%	43%	45%	47%	47%
Harmful		4%	62%	59%	55%	52%	48%	44%	41%	39%
WIMD Q1 (least deprived)		22%	1%	1%	2%	2%	3%	4%	5%	6%
WIMD Q2		21%	7%	9%	9%	10%	11%	12%	13%	14%
WIMD Q3		21%	12%	15%	16%	18%	20%	21%	22%	22%
WIMD Q4		19%	16%	19%	20%	21%	22%	22%	23%	23%
WIMD Q5 (most deprived)		16%	63%	57%	53%	50%	45%	41%	38%	35%
Moderate	WIMD Q1 (least deprived)	16%	0%	0%	0%	0%	0%	0%	0%	0%
	WIMD Q2	15%	0%	0%	0%	0%	1%	1%	1%	2%
	WIMD Q3	15%	1%	1%	1%	1%	1%	2%	2%	2%
	WIMD Q4	14%	2%	2%	2%	3%	3%	3%	4%	4%
	WIMD Q5 (most deprived)	12%	3%	3%	4%	4%	4%	5%	5%	5%
Hazardous	WIMD Q1 (least deprived)	6%	-1%	0%	1%	1%	1%	2%	3%	3%
	WIMD Q2	5%	3%	4%	5%	6%	7%	7%	8%	8%
	WIMD Q3	5%	6%	7%	8%	9%	10%	10%	11%	11%
	WIMD Q4	4%	8%	10%	10%	11%	11%	12%	12%	12%
	WIMD Q5 (most deprived)	3%	14%	14%	14%	14%	14%	13%	13%	12%
Harmful	WIMD Q1 (least deprived)	1%	1%	1%	1%	1%	1%	2%	2%	2%
	WIMD Q2	1%	4%	4%	4%	3%	4%	4%	4%	4%
	WIMD Q3	1%	6%	7%	8%	8%	8%	9%	8%	8%
	WIMD Q4	1%	6%	7%	7%	7%	7%	7%	7%	7%
	WIMD Q5 (most deprived)	1%	46%	40%	36%	33%	27%	23%	20%	18%

Table 51: Estimated impact of MUP policies on consumer spending by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population		297,937	286,322	290,248	266,503	238,332	112,441	102,031	99,177	80,181	55,509	18,234	18,365	17,267	15,304	12,221
Baseline spending per drinker per year		£375	£296	£265	£228	£198	£1,483	£1,209	£1,117	£1,099	£981	£3,060	£3,646	£2,380	£2,455	£2,715
Absolute change in annual spending per drinker	35p MUP	£0	£0	£0	£0	£0	£3	£2	£1	£-1	£-3	£14	£15	£9	£19	£-41
	40p MUP	£1	£1	£1	£0	£0	£6	£5	£3	£0	£-4	£27	£32	£16	£33	£-86
	45p MUP	£2	£2	£2	£1	£1	£13	£11	£9	£4	£-4	£51	£68	£32	£63	£-141
	50p MUP	£4	£4	£3	£2	£2	£25	£21	£20	£12	£-1	£88	£120	£56	£107	£-206
	55p MUP	£7	£6	£6	£3	£3	£42	£35	£35	£22	£1	£137	£187	£82	£158	£-214
	60p MUP	£10	£8	£8	£5	£5	£62	£50	£50	£30	£0	£193	£259	£106	£221	£-235
	65p MUP	£14	£11	£11	£7	£5	£83	£66	£63	£36	£-4	£255	£340	£129	£280	£-267
	70p MUP	£18	£14	£13	£8	£6	£105	£81	£75	£38	£-7	£321	£417	£143	£332	£-320
Relative change	35p MUP	0.1%	0.1%	0.1%	-0.1%	0.0%	0.2%	0.2%	0.1%	-0.1%	-0.3%	0.5%	0.4%	0.4%	0.8%	-1.5%
	40p MUP	0.2%	0.3%	0.3%	0.0%	0.1%	0.4%	0.4%	0.3%	0.0%	-0.4%	0.9%	0.9%	0.7%	1.3%	-3.2%
	45p MUP	0.5%	0.7%	0.7%	0.4%	0.5%	0.9%	0.9%	0.8%	0.4%	-0.4%	1.7%	1.9%	1.3%	2.6%	-5.2%
	50p MUP	1.0%	1.2%	1.3%	0.8%	1.1%	1.7%	1.7%	1.8%	1.1%	-0.1%	2.9%	3.3%	2.4%	4.4%	-7.6%
	55p MUP	1.7%	1.9%	2.1%	1.5%	1.7%	2.8%	2.9%	3.1%	2.0%	0.1%	4.5%	5.1%	3.4%	6.4%	-7.9%
	60p MUP	2.6%	2.8%	3.0%	2.3%	2.3%	4.2%	4.1%	4.4%	2.7%	0.0%	6.3%	7.1%	4.4%	9.0%	-8.7%
	65p MUP	3.7%	3.7%	4.0%	3.0%	2.7%	5.6%	5.4%	5.6%	3.3%	-0.4%	8.3%	9.3%	5.4%	11.4%	-9.8%
	70p MUP	4.8%	4.7%	4.9%	3.5%	2.9%	7.1%	6.7%	6.7%	3.5%	-0.7%	10.5%	11.4%	6.0%	13.5%	-11.8%

Table 52: Estimated impact of MUP policies on alcohol-attributable deaths by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Baseline annual alcohol-attributable mortality per 100,000 drinkers		-4	-6	-7	-7	-4	46	57	72	77	97	444	444	512	804	1,502
Absolute change in deaths per 100,000 drinkers per year	35p MUP	0	0	0	0	0	0	0	-1	-1	-4	-2	-2	-4	-8	-76
	40p MUP	0	0	0	0	0	0	-1	-2	-3	-7	-2	-5	-11	-18	-121
	45p MUP	0	0	0	0	0	0	-1	-3	-5	-11	-3	-7	-22	-30	-174
	50p MUP	0	0	0	0	0	0	-2	-4	-8	-15	-4	-12	-37	-45	-243
	55p MUP	0	0	0	0	0	0	-2	-7	-11	-20	-6	-18	-56	-63	-277
	60p MUP	0	0	0	0	0	0	-4	-9	-15	-26	-10	-25	-77	-85	-318
	65p MUP	0	0	0	0	0	-1	-6	-13	-19	-32	-15	-33	-99	-109	-364
	70p MUP	0	0	0	0	0	-1	-7	-16	-23	-36	-19	-45	-120	-132	-413
Relative change	35p MUP	0.0%	-0.1%	0.0%	0.2%	-1.4%	0.3%	-0.4%	-1.0%	-1.7%	-3.9%	-0.3%	-0.5%	-0.8%	-1.0%	-5.1%
	40p MUP	-0.1%	-0.1%	0.1%	0.5%	-2.1%	0.4%	-1.0%	-2.3%	-3.7%	-7.1%	-0.5%	-1.0%	-2.1%	-2.3%	-8.1%
	45p MUP	-0.2%	-0.1%	0.2%	0.8%	-2.7%	0.5%	-1.8%	-3.9%	-6.4%	-11.0%	-0.6%	-1.7%	-4.3%	-3.7%	-11.6%
	50p MUP	-0.4%	0.0%	0.4%	1.4%	-3.4%	0.5%	-2.8%	-6.2%	-9.8%	-15.6%	-0.9%	-2.6%	-7.2%	-5.6%	-16.2%
	55p MUP	-0.5%	0.4%	0.8%	2.3%	-0.8%	0.3%	-4.3%	-9.1%	14.0%	-20.8%	-1.4%	-4.1%	-10.9%	-7.9%	-18.5%
	60p MUP	-0.3%	1.0%	1.6%	3.6%	2.9%	-0.5%	-6.8%	-12.9%	19.1%	-26.8%	-2.3%	-5.7%	-15.0%	10.6%	-21.1%
	65p MUP	0.0%	1.8%	2.6%	5.1%	7.4%	-1.6%	-9.9%	-17.3%	24.7%	-32.7%	-3.3%	-7.5%	-19.3%	13.6%	-24.2%
	70p MUP	0.6%	2.8%	3.8%	6.7%	11.4%	-3.2%	-13.0%	-21.8%	30.6%	-37.4%	-4.4%	-10.0%	-23.4%	16.5%	-27.5%

Table 53: Proportion of total reduction in alcohol-attributable deaths under MUP policies accounted for by population subgroups

		Population	Reduction in alcohol-attributable deaths							
			35p MUP	40p MUP	45p MUP	50p MUP	55p MUP	60p MUP	65p MUP	70p MUP
Population		100%	100%	100%	100%	100%	100%	100%	100%	100%
Moderate		72%	-1%	0%	0%	0%	1%	1%	2%	2%
Hazardous		24%	25%	28%	30%	31%	33%	35%	37%	37%
Harmful		4%	76%	72%	70%	69%	66%	64%	62%	60%
WIMD Q1 (least deprived)		22%	1%	1%	1%	1%	1%	2%	2%	3%
WIMD Q2		21%	4%	5%	5%	6%	7%	8%	9%	10%
WIMD Q3		21%	9%	12%	15%	17%	19%	20%	21%	22%
WIMD Q4		19%	15%	18%	19%	20%	22%	23%	23%	24%
WIMD Q5 (most deprived)		16%	71%	64%	60%	57%	52%	47%	44%	42%
Moderate	WIMD Q1 (least deprived)	16%	0%	0%	0%	0%	0%	0%	0%	0%
	WIMD Q2	15%	0%	0%	0%	0%	0%	0%	0%	0%
	WIMD Q3	15%	0%	0%	0%	0%	0%	0%	0%	0%
	WIMD Q4	14%	0%	0%	0%	0%	1%	1%	1%	1%
	WIMD Q5 (most deprived)	12%	-1%	-1%	-1%	0%	0%	0%	0%	1%
Hazardous	WIMD Q1 (least deprived)	6%	-1%	-1%	-1%	0%	0%	0%	1%	1%
	WIMD Q2	5%	2%	2%	2%	2%	3%	4%	4%	4%
	WIMD Q3	5%	5%	6%	6%	7%	7%	8%	9%	9%
	WIMD Q4	4%	7%	8%	9%	9%	10%	10%	11%	11%
	WIMD Q5 (most deprived)	3%	13%	13%	13%	13%	13%	13%	12%	12%
Harmful	WIMD Q1 (least deprived)	1%	2%	1%	1%	1%	1%	2%	2%	2%
	WIMD Q2	1%	3%	3%	3%	3%	4%	4%	4%	5%
	WIMD Q3	1%	4%	7%	8%	10%	11%	12%	12%	12%
	WIMD Q4	1%	8%	10%	10%	10%	11%	12%	12%	12%
	WIMD Q5 (most deprived)	1%	59%	52%	47%	45%	39%	34%	31%	30%

Table 54: Estimated impact of MUP policies on alcohol-attributable admissions by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Baseline annual alcohol-attributable hospital admissions per 100,000 drinkers		810	942	1,106	1,304	1,575	3,133	3,321	3,848	3,612	3,437	2,013	2,008	2,129	2,774	3,628
Absolute change in admission per 100,000 drinkers per year	35p MUP	-0.3	0.0	-1.6	-9.1	-13.3	4.0	-6.3	-19.8	-30.3	-55.6	-1.8	-4.3	-9.4	-17.7	-96.3
	40p MUP	0.2	-0.5	-3.4	-15.9	-26.7	3.4	-16.2	-43.8	-65.3	-103.7	-2.7	-11.6	-35.2	-42.0	-153.3
	45p MUP	1.8	-1.4	-6.8	-26.3	-45.9	1.3	-29.0	-75.9	-113.7	-165.8	-6.9	-16.2	-68.5	-78.8	-225.4
	50p MUP	3.2	-3.8	-12.9	-42.2	-75.6	-1.7	-47.3	-123.7	-176.0	-241.5	-9.2	-29.0	-96.8	-119.7	-305.1
	55p MUP	4.5	-9.1	-23.0	-65.7	-122.9	-10.2	-74.6	-186.9	-254.1	-331.9	-16.7	-51.6	-140.0	-167.5	-357.5
	60p MUP	4.0	-17.9	-38.6	-96.6	-183.6	-27.3	-118.5	-273.1	-348.4	-440.8	-26.1	-72.7	-190.3	-230.5	-415.7
	65p MUP	1.4	-30.3	-59.1	-133.4	-253.1	-51.3	-174.5	-371.0	-451.8	-553.6	-43.2	-96.8	-248.6	-310.5	-490.8
	70p MUP	-3.5	-45.2	-83.2	-174.8	-322.4	-82.0	-232.0	-473.2	-563.7	-650.9	-61.2	-133.0	-318.0	-366.3	-565.5
Relative change	35p MUP	0.0%	0.0%	-0.1%	-0.7%	-0.8%	0.1%	-0.2%	-0.5%	-0.8%	-1.6%	-0.1%	-0.2%	-0.4%	-0.6%	-2.7%
	40p MUP	0.0%	-0.1%	-0.3%	-1.2%	-1.7%	0.1%	-0.5%	-1.1%	-1.8%	-3.0%	-0.1%	-0.6%	-1.7%	-1.5%	-4.2%
	45p MUP	0.2%	-0.2%	-0.6%	-2.0%	-2.9%	0.0%	-0.9%	-2.0%	-3.1%	-4.8%	-0.3%	-0.8%	-3.2%	-2.8%	-6.2%
	50p MUP	0.4%	-0.4%	-1.2%	-3.2%	-4.8%	-0.1%	-1.4%	-3.2%	-4.9%	-7.0%	-0.5%	-1.4%	-4.5%	-4.3%	-8.4%
	55p MUP	0.6%	-1.0%	-2.1%	-5.0%	-7.8%	-0.3%	-2.2%	-4.9%	-7.0%	-9.7%	-0.8%	-2.6%	-6.6%	-6.0%	-9.9%
	60p MUP	0.5%	-1.9%	-3.5%	-7.4%	-11.7%	-0.9%	-3.6%	-7.1%	-9.6%	-12.8%	-1.3%	-3.6%	-8.9%	-8.3%	-11.5%
	65p MUP	0.2%	-3.2%	-5.3%	-10.2%	-16.1%	-1.6%	-5.3%	-9.6%	-12.5%	-16.1%	-2.1%	-4.8%	-11.7%	-11.2%	-13.5%
	70p MUP	-0.4%	-4.8%	-7.5%	-13.4%	-20.5%	-2.6%	-7.0%	-12.3%	-15.6%	-18.9%	-3.0%	-6.6%	-14.9%	-13.2%	-15.6%

Table 55: Estimated impact of MUP and taxation policies on consumption by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population		297,937	286,322	290,248	266,503	238,332	112,441	102,031	99,177	80,181	55,509	18,234	18,365	17,267	15,304	12,221
Baseline consumption per drinker per year		231	211	213	200	194	1,228	1,245	1,262	1,219	1,216	3,892	4,168	3,244	4,081	4,367
Absolute change (units per drinker per year)	50p MUP	0	-1	-2	-4	-7	-4	-24	-37	-57	-103	-26	-78	-194	-192	-1119
	33.04% tax rise	-4	-6	-6	-8	-10	-34	-50	-57	-66	-78	-87	-94	-195	-196	-395
	34.06% tax rise	-4	-6	-6	-8	-10	-35	-52	-58	-68	-81	-90	-97	-202	-203	-408
	46.56% tax rise	-6	-8	-9	-12	-14	-49	-72	-82	-95	-112	-127	-139	-281	-285	-567
	48.26% tax rise	-6	-8	-9	-12	-14	-51	-75	-85	-98	-116	-132	-145	-292	-297	-589
Relative change	50p MUP	0%	0%	-1%	-2%	-4%	0%	-2%	-3%	-5%	-8%	-1%	-2%	-6%	-5%	-26%
	33.04% tax rise	-2%	-3%	-3%	-4%	-5%	-3%	-4%	-4%	-5%	-6%	-2%	-2%	-6%	-5%	-9%
	34.06% tax rise	-2%	-3%	-3%	-4%	-5%	-3%	-4%	-5%	-6%	-7%	-2%	-2%	-6%	-5%	-9%
	46.56% tax rise	-2%	-4%	-4%	-6%	-7%	-4%	-6%	-6%	-8%	-9%	-3%	-3%	-9%	-7%	-13%
	48.26% tax rise	-2%	-4%	-4%	-6%	-7%	-4%	-6%	-7%	-8%	-10%	-3%	-3%	-9%	-7%	-13%

Table 56: Estimated impact of MUP and taxation policies on spending by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population		297,937	286,322	290,248	266,503	238,332	112,441	102,031	99,177	80,181	55,509	18,234	18,365	17,267	15,304	12,221
Baseline spending per drinker per year		£375	£296	£265	£228	£198	£1,483	£1,209	£1,117	£1,099	£981	£3,060	£3,646	£2,380	£2,455	£2,715
Absolute change per drinker per year	50p MUP	£4	£4	£3	£2	£2	£25	£21	£20	£12	£-1	£88	£120	£56	£107	£-206
	33.04% tax rise	£22	£16	£16	£12	£11	£95	£77	£75	£56	£45	£230	£338	£152	£220	£108
	34.06% tax rise	£23	£16	£17	£13	£11	£98	£79	£77	£58	£46	£236	£348	£156	£226	£110
	46.56% tax rise	£31	£22	£22	£17	£15	£132	£105	£102	£75	£59	£315	£465	£202	£296	£131
	48.26% tax rise	£32	£23	£23	£17	£15	£136	£108	£105	£77	£61	£325	£480	£208	£305	£133
Relative change	50p MUP	1%	1%	1%	1%	1%	2%	2%	2%	1%	0%	3%	3%	2%	4%	-8%
	33.04% tax rise	6%	5%	6%	5%	6%	6%	6%	7%	5%	5%	8%	9%	6%	9%	4%
	34.06% tax rise	6%	6%	6%	5%	6%	7%	7%	7%	5%	5%	8%	10%	7%	9%	4%
	46.56% tax rise	8%	7%	8%	7%	7%	9%	9%	9%	7%	6%	10%	13%	8%	12%	5%
	48.26% tax rise	8%	8%	9%	8%	8%	9%	9%	9%	7%	6%	11%	13%	9%	12%	5%

Table 57: Estimated impact of MUP and taxation policies on alcohol-attributable mortality by drinker group and deprivation

	WIMD Q1 (least deprived)	Moderate				WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	Hazardous				WIMD Q5 (most deprived)	Harmful				WIMD Q5 (most deprived)
		WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q2			WIMD Q3	WIMD Q4	WIMD Q2	WIMD Q3		WIMD Q4	WIMD Q2	WIMD Q3	WIMD Q4	
Drinker population	297,937	286,322	290,248	266,503	238,332	112,441	102,031	99,177	80,181	55,509	18,234	18,365	17,267	15,304	12,221		
Baseline alcohol-attributable deaths per year	-12	-17	-19	-20	-9	52	59	72	61	54	81	82	88	123	184		
Baseline alcohol-attributable deaths per 100,00 drinkers per year	-4	-6	-7	-7	-4	46	57	72	77	97	444	444	512	804	1,502		
Absolute change in alcohol-attributable deaths																	
	50p MUP	0	0	0	0	0	0	-2	-4	-6	-8	-1	-2	-6	-7	-30	
	33.04% tax rise	0	0	0	-1	-1	-3	-5	-8	-8	-8	-3	-4	-7	-7	-11	
	34.06% tax rise	0	0	0	-1	-1	-3	-5	-8	-9	-8	-3	-4	-7	-7	-11	
	46.56% tax rise	0	-1	-1	-1	-1	-4	-7	-11	-12	-11	-4	-6	-10	-10	-15	
	48.26% tax rise	0	-1	-1	-1	-1	-4	-8	-11	-12	-11	-4	-6	-11	-11	-16	
Absolute change in alcohol-attributable deaths per 100,000 drinkers																	
	50p MUP	0	0	0	0	0	0	-2	-4	-8	-15	-4	-12	-37	-45	-243	
	33.04% tax rise	0	0	0	0	0	-3	-5	-8	-11	-14	-16	-22	-40	-46	-89	
	34.06% tax rise	0	0	0	0	0	-3	-5	-8	-11	-14	-16	-23	-42	-48	-92	
	46.56% tax rise	0	0	0	0	0	-4	-7	-11	-15	-20	-23	-32	-59	-66	-125	
	48.26% tax rise	0	0	0	0	-1	-4	-7	-12	-16	-20	-24	-33	-61	-69	-130	
Relative change																	
	50p MUP	0%	0%	0%	1%	-3%	1%	-3%	-6%	-10%	-16%	-1%	-3%	-7%	-6%	-16%	
	33.04% tax rise	2%	2%	2%	3%	9%	-6%	-9%	-11%	-14%	-14%	-4%	-5%	-8%	-6%	-6%	
	34.06% tax rise	2%	3%	3%	3%	9%	-6%	-9%	-11%	-14%	-15%	-4%	-5%	-8%	-6%	-6%	
	46.56% tax rise	3%	4%	4%	4%	13%	-8%	-13%	-15%	-20%	-20%	-5%	-7%	-12%	-8%	-8%	
	48.26% tax rise	3%	4%	4%	4%	13%	-8%	-13%	-16%	-20%	-21%	-5%	-7%	-12%	-9%	-9%	

Table 58: Estimated impact of MUP and taxation policies on alcohol-attributable hospital admissions by drinker group and deprivation

		Moderate					Hazardous					Harmful				
		WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)	WIMD Q1 (least deprived)	WIMD Q2	WIMD Q3	WIMD Q4	WIMD Q5 (most deprived)
Drinker population		297,937	286,322	290,248	266,503	238,332	112,441	102,031	99,177	80,181	55,509	18,234	18,365	17,267	15,304	
Baseline alcohol-attributable admissions per year		810	942	1,106	1,304	1,575	3,133	3,321	3,848	3,612	3,437	2,013	2,008	2,129	2,774	
Baseline alcohol-attributable admissions per 100,00 drinkers per year		272	329	381	489	661	2,787	3,255	3,879	4,505	6,192	11,042	10,932	12,330	18,127	
Absolute change in alcohol-attributable admissions	50p MUP	3	-4	-13	-42	-76	-2	-47	-124	-176	-241	-9	-29	-97	-120	-305
	33.04% tax rise	-23	-42	-53	-80	-126	-93	-141	-208	-234	-214	-45	-68	-116	-120	-127
	34.06% tax rise	-23	-44	-55	-82	-130	-96	-145	-214	-242	-221	-46	-70	-119	-124	-130
	46.56% tax rise	-33	-61	-76	-114	-180	-135	-204	-298	-335	-305	-64	-99	-157	-167	-176
	48.26% tax rise	-35	-63	-79	-119	-187	-140	-212	-310	-348	-316	-66	-104	-162	-173	-183
Absolute change in alcohol-attributable admissions per 100,000 drinkers	50p MUP	1	-1	-4	-16	-32	-2	-46	-125	-219	-435	-51	-158	-560	-782	-2,497
	33.04% tax rise	-8	-15	-18	-30	-53	-82	-138	-209	-292	-385	-245	-371	-672	-787	-1,038
	34.06% tax rise	-8	-15	-19	-31	-55	-85	-142	-216	-301	-398	-253	-382	-689	-809	-1,067
	46.56% tax rise	-11	-21	-26	-43	-76	-120	-200	-301	-418	-549	-350	-539	-909	-1,094	-1,443
	48.26% tax rise	-12	-22	-27	-45	-79	-125	-208	-312	-434	-570	-363	-566	-941	-1,134	-1,495
Relative change	50p MUP	0%	0%	-1%	-3%	-5%	0%	-1%	-3%	-5%	-7%	0%	-1%	-5%	-4%	-8%
	33.04% tax rise	-3%	-4%	-5%	-6%	-8%	-3%	-4%	-5%	-6%	-6%	-2%	-3%	-5%	-4%	-3%
	34.06% tax rise	-3%	-5%	-5%	-6%	-8%	-3%	-4%	-6%	-7%	-6%	-2%	-3%	-6%	-4%	-4%
	46.56% tax rise	-4%	-6%	-7%	-9%	-11%	-4%	-6%	-8%	-9%	-9%	-3%	-5%	-7%	-6%	-5%
	48.26% tax rise	-4%	-7%	-7%	-9%	-12%	-4%	-6%	-8%	-10%	-9%	-3%	-5%	-8%	-6%	-5%