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Synopsis

Appraisal of joint tobacco and alcohol tax interventions for harm reduction in the UK: the SYNTAX integrated evidence synthesis project

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Abstract

Background: Alcohol and tobacco are risk factors for non-communicable disease and deaths in England. People using both substances have increased health risks. While increasing tax on each product has been shown to reduce consumption and harm, little research has examined effects of changing both taxes together.

Objectives: Work package 1: describe potential tobacco and alcohol tax policies; work package 2: analyse purchasing patterns across population subgroups; work package 3: estimate industry tax-pass-through; consumer response to price changes for 12 products; work package 4: simulate impact of 33 policy options, United Kingdom Government 2021 proposals to restructure alcohol duty and (after project end date) 2023 alcohol duty reform.

Design: Work package 1 reviewed literature and interviewed stakeholders to identify policy options. Work package 2 analysed repeat cross-sectional survey data on purchasing. Work package 3 used quantile regression on market research data to estimate tax pass-through and a two-stage Tobit model to estimate consumer responses (own-price and cross-price elasticities) for 12 products (beer, cider, wine, spirits and ready-to-drinks, split off-trade/on-trade; cigarettes, roll-your-own tobacco). Work package 4 developed tax modelling for the Sheffield Tobacco and Alcohol Policy Model (v2.1.0) to analyse work package 1 policy options. Later, version v2.4.2 was used to analyse emerging policy on alcohol duty reforms.

Setting: Effects of United Kingdom tax policies in England, covering 2017–50.

Participants: Life course simulation of individuals aged 18–89; 2017–50.

Interventions: Tax policies changes: (1) specific duty per product, (2) duty escalators for alcohol and tobacco, and Minimum Excise Tax on tobacco, (3) hypothetical strength-based alcohol taxes, (4) United Kingdom Government's 2021 proposals for alcohol duty reform and (5) analysis of United Kingdom Government's implemented Alcohol Duty Reform 2023.

Outcome measures: Changes in participation in drinking or smoking, amounts consumed, expenditures, Government tax revenues, retailer revenues, risks of hospitalisation and death from over 60 clinical conditions, National Health Service secondary costs, quality-adjusted life-years, mortality and health inequalities.

Results: Work package 1 identified policy options. Work package 2 showed variations in expenditure by subgroup. Work package 3 showed that retailers increased prices of expensive products by more than expected after tax

risks, keeping cheap product prices lower. Work package 3 showed statistically significant participation and consumption price responsiveness for all 12 products. Work package 4 compared 33 policies, showing that higher tax increases, especially for cider and hand-rolled tobacco, are effective at reducing smoking rates, drinking and deaths over 20 years. Effects were largest for people living in more deprived areas. Tailored modelling (after project end date) examined United Kingdom Government's 2023 implemented alcohol duty reform, estimating a small reduction in alcohol consumption and deaths. In contrast, a policy to increase cider taxes to be in line with beer could result in a 30 times larger reduction in deaths.

Limitations: Uncertainty in estimates remains. Data used were collected pre-coronavirus disease discovered in 2019. Sales data were from legal retailers; illicit tobacco was not examined. Each sub-study has its own data limitations.

Conclusions: Combined increases in tax on tobacco and alcohol could potentially be more effective at reducing disease, National Health Service costs, deaths and health inequalities than raising tax on only one product. Potential trade-offs could exist between health benefits and effects of tobacco and alcohol tax increases on financial burden for those who continue consuming both products. Future tobacco or alcohol tax analyses should factor in inter-linkages between both commodities.

Future work: We are adapting modelling infrastructure to deliver responsive within-days modelling for new government proposals and budgets. Further work on price elasticities in other countries would be useful. Future analyses will incorporate post-coronavirus disease discovered in 2019 data. We are extending modelling to other United Kingdom countries, and pricing policies beyond tax (e.g. minimum pricing). We are extending analyses to no and low alcohol products and to evaluate observed impacts of the government's alcohol duty reforms.

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A plain language summary of this synopsis is available on the NIHR Journals Library Website <https://doi.org/10.3310/PLFR8463>.

Introduction

Rationale for research and background

Tobacco and alcohol are significant risk factors for cancers, respiratory and cardiovascular diseases, leading to substantial hospital admissions, mortality and around £6B annually in NHS costs in England.¹⁻⁴ Smoking and drinking are correlated behaviours that together increase risks, particularly for head, neck and oesophageal cancers.⁵⁻⁷

Taxation interventions are among the most effective for altering behaviour, especially in economically disadvantaged groups.⁸⁻¹⁹ However, UK impact assessments often overlook the combined effects of tobacco and alcohol taxes on health outcomes and inequalities. With over a million hospital admissions yearly due to tobacco and alcohol,^{3,4} the NHS has emphasised the need for a 'radical upgrade' in population prevention,²⁰ and WHO advocate tax interventions as a 'best buy' action.¹⁵

The growing disparity between affluent and disadvantaged populations in the UK exacerbates health inequalities, with smoking and alcohol-related harm more prevalent in disadvantaged groups.²¹ The only tobacco control strategy to which disadvantaged people are more responsive is price increases through taxation. Yet, low-priced products

persist, partly due to industry tactics. Addressing these issues may involve new tax strategies for both tobacco and alcohol, which have historically been studied in isolation.

Before this research programme, there was already clear potential for UK tax policy to evolve for public health benefit, as evidenced by the government's actions following the 2015 spending review.²² After this review, the government acted to raise the price of cheap tobacco. Research on the joint impact of tobacco and alcohol tax options, whether to duty or value-added tax (VAT) levels within existing structures (e.g. 'duty escalators'), or to structures themselves [e.g. Minimum Excise Tax (MET)] could therefore be of substantial impact. However, the effects of combined tobacco and alcohol taxes on population health and health inequalities were unclear; the need for this research project was underpinned by four main areas of evidence gap.

First, there was a need to define taxation options in terms of level and structure of alcohol and tobacco tax (separately and in combination) and to understand which options do UK experts view as achievable and why. The qualitative findings from stakeholder interviews aimed to ensure the relevance of tax interventions to be modelled. This understanding is vital to addressing persistent low-priced products and understanding industry strategies to maintain low prices.²³⁻²⁵

Second, while evidence suggests individuals with lower socioeconomic status tend to buy cheaper products,²⁴ and those with higher tobacco and alcohol consumption also tend to buy cheaper products,²⁶ there remains no integrated understanding of spending patterns on tobacco and alcohol, nor studies on how tax changes might differently impact various socioeconomic groups or those with varying consumption levels.

Third, there is limited evidence on how the alcohol and tobacco industries adjust the pass-through of tax changes to prices,²³ or how consumers respond to price increases in tobacco versus alcohol, hindering informed assessments of joint tax impacts. For alcohol, the most commonly used price elasticities are those published by Meng *et al.*,²⁷ and those published by Sousa in the His Majesty's Revenue and Customs (HMRC) Working Paper 2014.²⁸ In addition, recent work by WHO-Europe has been using elasticities based on meta-analyses.²⁹ For tobacco, previous estimates of price elasticities vary widely and there are estimates from HM Revenue and Customs (HMRC) using quarterly aggregate time series analysis in 2010,³⁰ with updated analysis in HMRC paper by Czubek and Johal,³¹ which provide short-run and long-run estimated effects of price changes on total sales of tobacco products but do not distinguish between effects on reducing participation (quitting smoking) and reducing consumption for people still smoking. These HMRC estimates also differ from international estimates.³²

Fourth, no population models exist to explore how joint tobacco and alcohol taxes might influence inequalities between population groups and outcomes such as deaths, hospitalisations, consumer spending, NHS costs, tax revenues to the UK Government, life expectancy and quality-adjusted life-years. Previous UK models have separately analysed tobacco and alcohol. There have been analyses for tobacco for example by Action on Smoking and Health (ASH) and by Cancer Research UK (CRUK),^{33,34} and, there have been analyses for alcohol using the Sheffield Alcohol Policy Model (SAPM),^{26,35} but methods differ between tobacco and alcohol and so the relationships among alcohol and tobacco use and socioeconomic status cannot be considered.^{4,35,36} Prior to this research study, it was unclear how to best use tax on tobacco and alcohol to meet public health goals, which has been the purpose of work package (WP) 4 policy appraisal analyses.^{26,35} This project builds on previous research that developed the initial version of the Sheffield Tobacco and Alcohol Policy Model (STAPM) by adding mechanisms to the model that provide estimates of the potential

effects of changes to pricing policies across demographic subgroups.^{21,22,25,26}

These gaps have generated the project design and its four WPs.

Objectives

Overall aim

To provide evidence and a legacy of a version-controlled modelling platform to inform the potential scale of effects of taxation across tobacco and alcohol as an intervention to improve public health and reduce health inequalities in the UK.

Specific objectives and research questions

We proposed four WPs (see [Figure 1](#)).

Work package 1: qualitative investigation of published evidence and expert knowledge on tax interventions

Aim: To define alcohol and tobacco taxation options that were currently considered relevant for the UK.

Research question 1 (RQ1): What are the options for changing the level and structure of alcohol and tobacco tax (separately and in combination); which options do UK experts view as achievable; and why?

Work package 2: analysis of social patterns in alcohol and tobacco spending

Aim: To conduct descriptive and statistical analyses examining how patterns of alcohol and tobacco spending vary across product types and price points for socio-demographic groups defined by age, sex, family status and socioeconomic status and for different smoker and drinker groups.

RQ2: How does the proportion of household expenditure allocated to alcohol and tobacco vary by socio-demographics?

RQ3: How does price paid for each product category vary by socio-demographics and by level of smoking and drinking?

Work package 3: analysis of industry and consumer responses to tax changes

Aim: To estimate industry and consumer responses to tax changes via statistical analyses of retail price and consumer spending data.

RQ4: To what extent are alcohol and tobacco tax changes passed on to retail prices and how does this vary by product category and price point?

RQ5: How does consumer demand respond to retail price changes for different alcohol and tobacco products?

Work package 4: population modelling to appraise the health and economic outcomes of tax interventions

Aim: To appraise quantitatively the health and economic effects of tax changes identified in WP1.

RQ6: What effects do identified tax changes have on consumer spending, consumption; health outcomes and inequalities, NHS treatment costs, and Government tax revenue. We will investigate subgroup differentials by socioeconomics and by baseline levels of tobacco and alcohol use.

Methods for data collection and analysis

Research protocol, schematic and list of publications

The full study protocol registered on Research Registry [researchregistry3814], also available from www.fundingawards.nihr.ac.uk/award/16/105/26, and directly downloadable from <https://njl-admin.nihr.ac.uk/document/download/2030374>. Some further work occurred after the original project end date to estimate the impact of the UK Government's reforms for alcohol tax which were proposed (2021) and implemented (2023). This remains under the broad principles and objectives of the protocol but is not directly mentioned within the protocol document.

In addition, a further paper arising out of the project work has been published by Chen *et al.*³⁷ This covers modelling tobacco duty escalators and has the title 'Reducing the exceptional affordability of hand-rolling tobacco using tax escalators: A health and economic impact modelling study for England'.

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Methods for work package 1 on tax policies

Work package 1 focuses on understanding the options for tax policies with two sub-studies. WP1 study 1 undertook a rapid literature review which identifies and categorises tax policy options and the underlying objectives they are intended to achieve.⁴² The review focused on peer-reviewed and grey literature, published 1997–2018, English language studies, that were UK-focused analyses of taxation interventions for alcohol, tobacco, or both. The methods of the review are detailed in the main published paper,⁴² with supplementary information including the protocol for the rapid review, the searches undertaken, detailed characteristics of all sources included in the study, description of the policy options in detail and a Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist.⁴³ The findings of the rapid review were used to produce a briefing document that was given to stakeholders ahead of the interviews in sub-study 2.⁴⁴

Work package 1 study 2 was a cross-sectional qualitative study interviewing 10 alcohol and tobacco tax policy experts.³⁵ The study recruited experts from government, other public bodies and advocacy groups in England and Scotland (four alcohol, four tobacco, two alcohol and tobacco). Alcohol and tobacco experts were interviewed in pairs, using a semistructured topic guide covering the technical specification of alcohol and tobacco tax options, their policy objectives, and the factors affecting their development, implementation, co-ordination and outcomes. Interviews were audio-recorded, transcribed and then analysed deductively using framework analysis.⁴⁵ To guide the process of interpreting the findings, three public panels were involved: the Sheffield Addiction Recovery Research Panel, the Tobacco and Nicotine Discussion Group in Nottingham, and the Alcohol and Food Discussion Group in Stirling (appendix D of the supplementary material to WP1, study 2).³⁵

Methods for work package 2 on purchasing patterns

Work package 2 focuses on understanding the patterns of purchasing and consumption of alcohol and tobacco products by different subgroups in the population. It examines population repeat cross-sectional survey data from the Health Survey for England (HSE) and the UK Living Costs and Food Survey (LCFS). Two papers were constructed and one has been published at the time of this synopsis. WP2 paper 1 focuses on household spending for dual purchasers of alcohol and tobacco, how this varies between

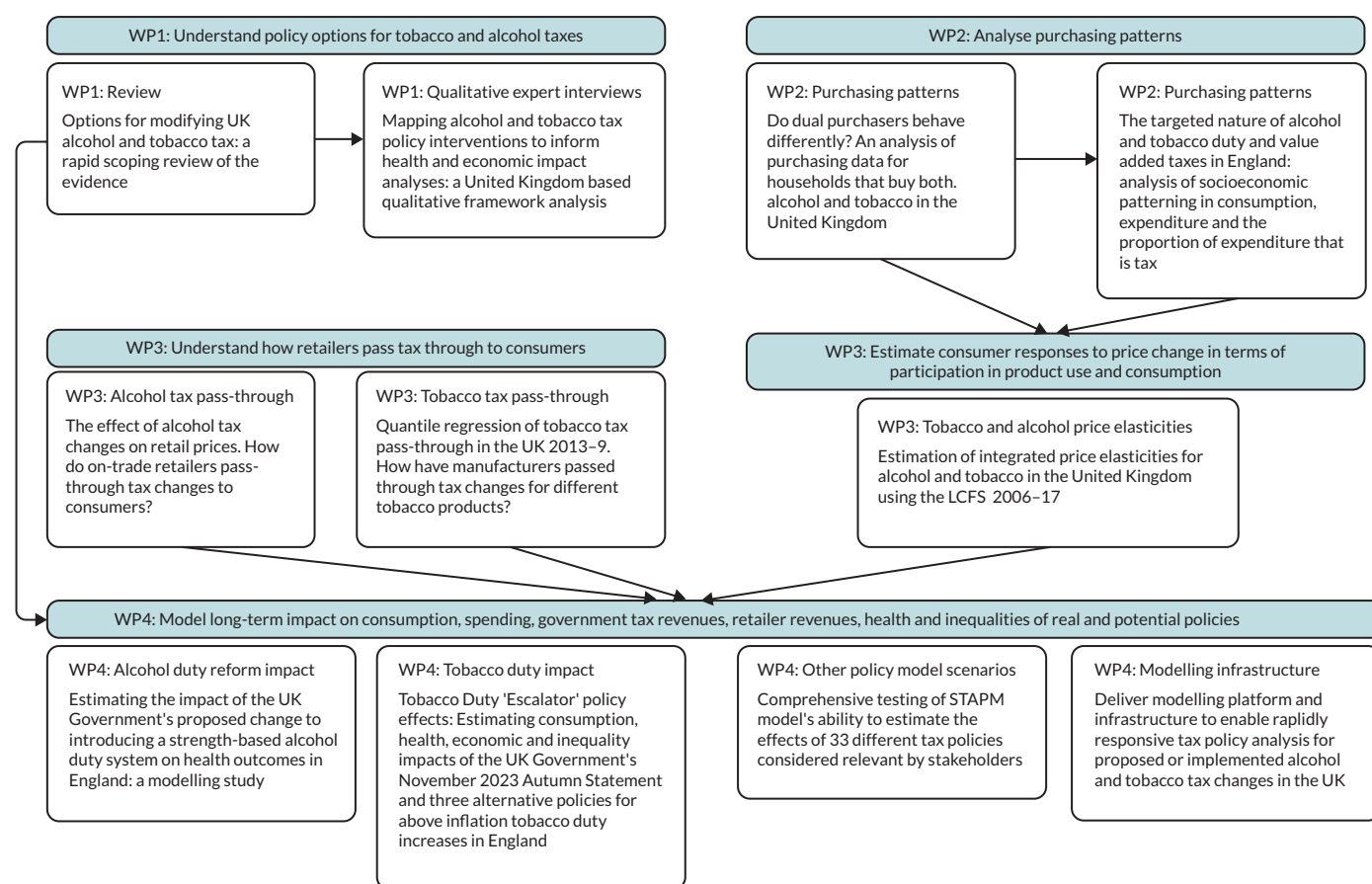


FIGURE 1 Study schematic showing how each element of the research links together.

socioeconomic groups and how it compares with households which purchase only tobacco or only alcohol.³⁶ We undertook a household-level cross-sectional analysis of alcohol and tobacco purchasing data using transaction-level data from 14-days spending diaries in the United Kingdom Living Cost and Food Survey (LCFS) for 26,021 households over the years 2012–7. These data were used to calculate total household expenditure, volumes of alcohol and tobacco purchased, and the price paid per unit of alcohol (1 unit = 8 g) and per stick of tobacco (for hand-rolling tobacco assuming 1 stick = 0.5 g tobacco). We corrected for reporting bias in the LCFS by calibrating prices and imputing pack sizes to match aggregated sales data from both Nielsen and CGA (Consumer Growth Associates, now known as CGA by Nielsen IQ). The descriptive analysis examines differences between lower and higher-income groups using total household expenditure and quintiles of household income, both equivalised to account for household size and composition. WP2 paper 2 (not yet published) examined how the burden of tax faced by consumers of alcohol and tobacco in England varies across key population subgroups. We mapped

household purchasing diary data from LCFS onto individual consumption data in HSE to provide individual-level estimates of spending. We then undertook cross-sectional analysis of this individual-level alcohol and tobacco consumption data in England, 2014–7, for 31,012 individuals. These data were used to estimate mean weekly volume of alcohol and tobacco consumed, as well as prices paid by alcohol beverage type and type of tobacco, and hence to generate estimates for different population subgroups of the annual spend on each of these products, the burden of tax (split by specific duties, tobacco ad valorem tax and VAT), and the net revenue after tax accruing to retailers.

Methods for work package 3 on tax pass-through and price elasticities

Work package 3 focuses on responses to tax and price changes. First, it examines the responses of retailers/industry to tax changes for different products. A published study by Ally *et al.*²³ already existed for off-trade (shops and supermarket) alcohol tax pass-through (we use estimates from their supplementary table S1). WP3 develops new evidence on the extent of tax pass-through in two

substudies. The first study focuses on on-trade (pubs, bars and restaurants) alcohol products, examining differential pass-through for cheaper versus more expensive products.³⁸ The second study took a similar approach to examine cheaper versus more expensive tobacco products.³⁹

For on-trade alcohol tax pass-through,³⁸ our study uses quarterly sales data for a longitudinal panel of 777 alcoholic products sold by on-premise retailers in England obtained from a market research company. The method involves calculating the expected price per unit of alcohol for a product given the tax change (assuming tax is 100% passed through to product sales prices) and then comparing this with the observed actual price of that product over time. Panel data quantile regression analysis is used to estimate the impact of tax changes on inflation (UK Retail Prices Index) adjusted prices faced by consumers based on 12 excise duty changes and 3 sales tax changes between 2007 and 2017 on prices. The regression analysis was undertaken for seven broad beverage categories separately [beer, cider, ready-to-drink (RTD) alcohol, spirits, wine, sparkling wine, and fortified wine]. Subsequent sensitivity analyses further disaggregated into seven outlet types.

To examine tobacco tax pass-through,³⁹ including whether this varies across cheaper and more expensive products, our study uses longitudinal retail sales data from Nielsen on tobacco price and sales in the UK from January 2013 to March 2019 combined with official UK tax rates and inflation. Again, we use panel data quantile regression analysis to estimate the rate of tax pass-through for factory-made cigarettes (FM) and roll-your-own tobacco (RYO). Analysis was also undertaken to examine whether tax pass-through was different before and after the introduction of standardised tobacco packaging in May 2017.

Finally in WP3, the research team has developed new evidence on price elasticities for 10 alcohol product categories and 2 tobacco products in an integrated way.⁴⁰ The study enables an understanding of participation elasticities (the percentage change in participation in purchasing of a product given a 1% price increase in that product), conditional consumption price elasticities (percentage change in consumption of a product giving a person continues to come to consume that product after a 1% price increase) and the cross-price elasticities (change in the participation and change in consumption of a product given a 1% price change in any of the other products). This study uses data from the UK LCFS 2006–17. Four econometric models

were investigated, a conditional ordinary least squares model, a Heckman model, a Tobit model, and a generalised two-stage Tobit model. The published paper focuses in detail on the generalised two-stage Tobit model which had the best statistical fit. We compared the resulting elasticities with the existing literature – using the latest elasticities used by the HMRC in the UK Government for impact assessment of alcohol price changes,²⁸ and for tobacco price changes,^{30,31} as well as alcohol price elasticities developed by our own research team and used in our previous pricing policy analyses.²⁷

Methods for work package 4: the Sheffield Tobacco and Alcohol Policy Model

Overview of Sheffield Tobacco and Alcohol Policy Model approach

Finally, WP4 developed and uses the price policy modelling component of the STAPM to estimate the potential impact of alcohol and tobacco tax policies. The policy options that the model should be able to appraise were informed by the research of WP1, as well as an analysis of the proposed changes to alcohol taxes in the UK Government's October 2021 consultation document.⁴⁶ The most important paper from this work is published in *Lancet Public Health* – 'Estimating the effect of transitioning to a strength-based alcohol tax system on alcohol consumption and health outcomes: a modelling study of tax reform in England'.⁴¹

The paper describes the development and application of the Tobacco and Alcohol Tax and Price Policy Simulation (TAX-sim) components of the STAPM (v2.2).⁴⁷ A supplementary appendix to the paper provides 59 detailed pages on the methods used in the STAPM model as it has been applied by our research team to the alcohol tax reform undertaken by the UK Government and implemented in August 2023⁴⁸ (see also [Report Supplementary Material 2](#)).

Here we provide a brief overview of the model approach (see also [Figure 2](#)).

The model incorporates the probabilities of initiation, quit and relapse in tobacco smoking as well as participation and levels of alcohol consumption for population subgroups defined by age, sex and quintiles of the Index of Multiple Deprivation (IMD). The model accounts for recent trends in tobacco and alcohol participation and consumption and generates a forecast of future patterns which is based on the 'natural history' of trends given recent tax policies. In

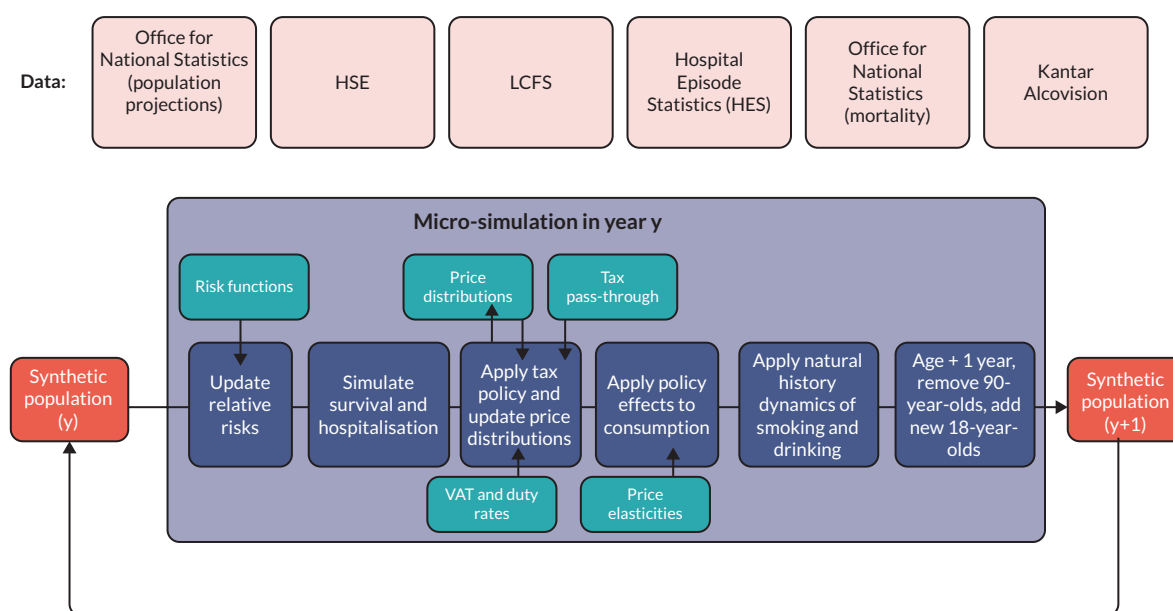


FIGURE 2 Schematic of the TAX-sim component of the STAPM platform. This figure is reproduced with permission from Morris *et al.*⁴¹ This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) licence, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <https://creativecommons.org/licenses/by/4.0/>. The figure includes minor additions and formatting changes to the original text.

particular, this forecast incorporates a tobacco duty tax steadily increases above inflation). For the past decade, there has been a 2% rise above inflation for the specific part of tobacco taxation and in our forecast, we assume it will continue and that past and future reductions in smoking reflect it.

Tobacco products are disaggregated into FM cigarettes and hand-rolled tobacco (HRT) (RYO, with 1 hand-rolled cigarette stick assumed to contain 0.5 g tobacco). Alcohol products are distributed into 10 categories – beers, ciders, wines, spirits and ready to drinks (alcopops), which are further split by off-trade (bought in supermarkets and shops) and on-trade (bought in pubs bars and restaurants, etc.). The model incorporates the evidence on patterns of purchase and consumption from WP2, and on industry tax pass-through and consumer response price elasticities from WP3.

The model integrates existing understanding of the epidemiology regarding the relative risk of incidence/mortality for 84 different diseases (defined using International Classification of Diseases 10 diagnosis definitions) given level of tobacco and alcohol consumption, with existing evidence on baseline England population levels (by age, sex and IMD quintile) for hospitalisation with respect to each of these defined diseases, and mortality for each disease.

Applying STAPM to estimate the likely impact of the August 2023 alcohol duty reforms

In applying the STAPM Model (v2.4.2) to the alcohol duty reform (ADR) programme we undertook several steps. First, we used the STAPM dynamic micro-simulation to examine the population of England aged 18–89, beginning in 2017 and progressing in 1-year steps until 2042, tracking individuals' trajectories in alcohol consumption as they age. In each year, changes to alcohol duty cause changes in consumption through changing the price of alcohol allowing for tax pass-through and price elasticities. Intervention arms are compared to a control arm in which the pre-2023 duty structure is maintained. Alcohol duty rates increase by Retail Price Index (RPI) inflation each year after 2023. Changes in consumption are then used to calculate revised rates of hospital admission and mortality from 84 different diseases for each of the 800 stratified population subgroups (defined by age, sex, IMD quintile), five categories of tobacco consumption (including non-smoker), and four levels of weekly drinking (including abstainer). Health outcomes modelled are deaths (from all causes) each year, total years of life lost (YLLs) due to deaths, hospital admissions, and the costs of those admissions.

We modelled four interventions, the first of which is the Government's implemented policy. The exact numbers used for the duty rates used for each category of alcohol

TABLE 1 List of publications which are the threaded publications for this NIHR report

Code	Title	Journal	DOI
RA2	Mapping alcohol and tobacco tax policy interventions to inform health and economic impact analyses: a United Kingdom based qualitative framework analysis ³⁵	<i>International Journal of Drug Policy</i>	https://doi.org/10.1016/j.drugpo.2023.104247
RA3	Do dual purchasers behave differently? An analysis of purchasing data for households that buy both alcohol and tobacco in the United Kingdom ³⁶	<i>Addiction</i>	https://doi.org/10.1111/add.15430
RA5	The effect of alcohol tax changes on retail prices. How do on-trade retailers pass-through tax changes to consumers? ³⁸	<i>The European Journal of Health Economics</i>	https://doi.org/10.1007/s10198-020-01261-1
RA6	Quantile regression of tobacco tax pass-through in the UK 2013–2019. How have manufacturers passed through tax changes for different tobacco products? ³⁹	<i>Tobacco Control</i>	https://doi.org/10.1136/tobaccocontrol-2020-055931
RA7	Estimation of integrated price elasticities for alcohol and tobacco in the United Kingdom using the living costs and food survey 2006–2017 ⁴⁰	<i>Drug and Alcohol Review</i>	https://doi.org/10.1111/dar.13773
RA8	Estimating the effect of transitioning to a strength-based alcohol tax system on alcohol consumption and health outcomes: a modelling study of tax reform in England ⁴¹	<i>Lancet Public Health</i>	https://doi.org/10.1016/S2468-2667(24)00191-9

under each scenario modelled are available in table 1 of the Morris *et al.* publication.⁴¹ The four interventions are:

1. 'Duty reform' models the ADR as implemented in August 2023.
2. 'No draught relief' removes draught relief for beer and cider.
3. 'Cider escalator' incrementally raises cider duty at 3.5–8.4% alcohol by volume (ABV) by implementing an increase of 2% above RPI inflation to the duty rates for cider in each year after 2023, which would close the gap after 40 years.
4. 'Equalisation' increases duty rates for beer and cider at 3.5–8.4% ABV to equal those for wine and spirits immediately in 2023.

See also [Report Supplementary Material 3](#).

Work on tobacco duty escalator policy implemented in UK Government's November 2023 autumn statement

In autumn 2023, the Government announced that on Tobacco duty: it planned to increase duty on Hand Rolling Tobacco by RPI + 12% from 6 p.m. on 22 November 2023.⁴⁹

We have now used the STAPM Model developed in our project to examine the estimated impact of this policy and three other policy options assuming they start in 2024.

1. 'Autumn statement' models the impact of the reformed duty structure as implemented in the November 2023 autumn statement.
2. 'Equalised Duty Rate' replicates policy (1) as well as escalates the duty rate of HRT by 10% above RPI

inflation per year from 2024 to 2030 such that identical rates are set for HRT and FM cigarettes in 2030. That is, if RPI is 3% each year, this would mean that HRT duty would increase by 13% each year.

3. '7 years of autumn statements' implements a persistent increase of duty rates for HRT at 12% above RPI inflation, as applied in the November autumn statement, every year until 2030.
4. 'Equalised Mean Price' seeks to equalise the mean price of HRT and FM cigarettes by 2030, by implementing a calibrated duty rate of 18.2% above RPI inflation duty escalator every year to HRT in addition to the autumn statement.

STAPM v2.5.0 has been used to estimate the impact of these policy options for increasing duty on Hand Rolling Tobacco products.

Earlier version of STAPM used in the project for exploratory policy analyses on 33 policies

An earlier version (2.1.0) of the STAPM model was used during the lifetime of our project to undertake analysis of 33 different potentially proposed tax policies in 3 broad categories of policy. The purpose of these analyses was to develop and quality assure the new model as a resource for modelling subsequent proposals for policy change.

The categories of policy explored were:

1. simple one-off duty rises and escalators for alcohol and tobacco
2. tobacco escalator, MET and removal of tobacco ad valorem policies
3. alcohol strength tax policies.

Policies were explored in terms of their potential impact on participation, consumption and harms in the population. These analyses were originally submitted to NIHR in the form of a large final report on the project. After the decision taken to shift to a threaded publication for this work, we now present a selection of these analyses as supplementary material. The technical detail developed during this model development is presented in the technical documentation for the resultant TAX-sim model.⁴⁷

The full details of the specification of the policies explored are given in [Report Supplementary Material 4](#).

Results summary

Results for work package 1 on policies

The results from the WP1 literature review thematic analysis,⁴² and from qualitative research with interviewees,³⁵ developed descriptions of a set of alcohol and tobacco tax related policies, their effects and related mediating factors. Readers interested in the detailed review results may wish to examine table 1 in the rapid review publication, which lists 91 papers examining different categorised tax policies for alcohol, tobacco and both products together.⁴²

There was significant common ground between alcohol and tobacco tax policy. They share common objectives, of which reducing harm, improving health and reducing consumption were the most important alongside the

obvious direct effect of raising tax revenues ([Table 2](#)). The set of policy options was common to both tobacco and alcohol: increasing duty rates, duty escalators, multi-rate tax structures, industry levies and revenue hypothecation ([Table 3](#)). Seventy factors in seven themes were identified which affect policy development, implementation and outcomes. The 7 themes were evidence (6 factors); evidence gaps (8 factors); pre-implementation mediators (10 factors); intended effects (21 factors); effects to avoid (13 factors); consumer switching behaviours (6 factors) and other post-implementation mediators (6 factors). The publication details logic models for the factors relevant to each different policy. Participants in the qualitative interviews agreed that policy-makers and the public view the harms caused by alcohol and the alcohol industry very differently to those for tobacco. As a result, while there is strong interest in co-ordinating alcohol tax and tobacco tax, it might be that priorities for action on tobacco tax could be different than for alcohol tax.

Results for work package 2 on subgroups purchasing and expenditure patterns for tobacco and alcohol

The results from WP2 on population subgroups consumption show, first of all, that households that spent money on both alcohol and tobacco (dual purchasing households) spent more on each than their single-purchasing counterparts.³⁶ Dual purchasers spent £51.34 on average per week on alcohol and tobacco (12.78%

TABLE 2 Twenty policy objectives of alcohol and tobacco tax-related policies which were identified through qualitative research

Objectives	Both alcohol and tobacco taxes	Alcohol tax only	Tobacco tax only
Most important objectives	1. Reduce harm 2. Improve health 3. Reduce consumption	12. Reduce consumption of particular groups (e.g. middle aged, middle class, heavy drinkers, children, young people)	16. Reduce smoking prevalence 17. Increase price
Secondary objectives	4. Meet externalities (health/non-health) 5. Change consumer behaviour (e.g. harm reduction products; consumption venues) 6. Change affordability 7. Reduce health inequalities ^a 8. Raise revenue ^{a,b}	13. Encourage industry product reformulation	18. Encourage industry investment in other products 19. Reduce industry profits
Third party	9. Reduce working life-years lost, absenteeism, presenteeism	14. Prevent negative impacts on economic development and competitiveness	
Outcomes to avoid	10. Increasing health inequalities 11. Passing on costs to consumers that negatively affect living standards	15. Undermining industry	20. Supporting industry

a One participant proposed this as among the most important objectives, but this was not the consensus across participants.
b Also suggested as a third-party objective.

Source
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TABLE 3 Eleven categories of alcohol and tobacco tax policy options for the UK which were identified through qualitative research

#	Policy	Description	Alcohol	Tobacco
Change excise duty rates				
1	Large increase in duty by > 10%	Ad hoc duty increase of up to 20% for all alcohol and tobacco products	✓	✓
2	Moderate increase in duty by up to 10%	Ad hoc duty increase of up to 10% for all alcohol and tobacco products	✓	✓
3	Reinstate/raise duty escalators	Annual duty increase of 2–5% above inflation on alcohol and/or tobacco products	✓	✓
4	MET	Minimum total excise duty threshold, rising 2% annually above inflation (RPI). Minimum consumption tax (including VAT element also discussed)	✓	✓
Change tax structure				
5	Multi-rate duty structure based on strength/harm	Tiered or scaled duty structure across all alcohol and/or tobacco products to reflect relative harm or strength of products	✓	✓
6	Fully specific tax structure for tobacco	Retain specific excise duties (per stick or gram) and remove ad valorem excise duties (% of retail price)	✗	✓
7	Tax on and off-trade alcohol differently	Change the structure of the tax system so that on- and off-trade alcohol purchases incur different total taxes	✓	✗
8	Change international duty structures	Change international tax structures to ensure harmony of duty rates across borders	✓	✓
Industry measures				
9	Industry levy	Levy on the alcohol and/or tobacco industries, retail and/or manufacturing	✓	✓
10	Wholesale price cap – tobacco	Price cap measure for tobacco products restricting the price at which manufacturers can sell to wholesalers and bridging the gap with a duty increase	✓	✓
Hypothecation				
11	Hypothecate revenue from taxes/levies	Hypothecate alcohol and/or tobacco duty and/or levy revenue for funding specific health and non-health services	✓	✓

Source

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of their household budget; see table 1).³⁶ We compared dual purchasing households across income subgroups. This showed that lower-income dual purchasing households spent less on both alcohol and tobacco than higher-income dual purchasing households. However, as a proportion of their total household expenditure, dual purchasing households in the lowest income quintile spent considerably more (8.02% of their total household budget on alcohol and 8.48% on tobacco) than their highest income quintile dual purchasing counterparts (5.55% for alcohol and 4.16% for tobacco; see table 2).³⁶ This means that tax rises could have a larger impact on the consumption and health of lower-income dual purchasing households than on other subgroups in the population. This aligns with a key ‘outcome to avoid’

identified in WP1 of passing on costs to consumers that negatively affect living standards, which could occur if tax is increased simultaneously on tobacco and alcohol products.

In our second planned paper from this WP (unpublished as yet), we focused on how much tax is paid by different subgroups. The broad headlines were as follows. For alcohol, individuals drinking over the Chief Medical Officer alcohol consumption guidelines make up roughly ¼ of the population yet consume around 80% of all alcohol and contribute around 80% of specific alcohol duty and 70% of alcohol VAT, respectively. For tobacco, the burden of tax is predominantly faced by those in the lowest income quintile and highest IMD quintile.

Results for work package 3 on tax pass-through

The research team had already conducted analyses of tax-pass through for off-trade alcohol,²³ which had been used to inform the previous SAPM analysis. This project extended those methods to on-trade alcohol and tobacco.

The results from WP3 on industry response to tax rises show that on-trade alcohol taxes are passed through to consumer faced prices, but that there exists significant differences in tax pass-through across the price distribution.³⁸ *Figure 4* shows the headline results. On-trade alcohol retailers appear to 'undershift' cheaper beverages (prices rise by less than the tax increase) and subsidise this loss in revenue with an 'overshift' in the relatively more expensive products. We further tested sensitivity of the findings to structural assumptions of the analysis by disaggregating outlets into seven outlet types. For all seven broad beverage categories, we find that there exists significant differences in tax pass-through across the price distribution (see figure 2a–g in Wilson *et al.*).³⁸

For tobacco tax pass-through, there is clear evidence of overshifting across almost the whole of the price distribution for both FM and RYO. *Figure 5* shows that the extent of the overshift in tax is much higher for more expensive products in the price distribution than it is for less expensive products. This was consistent for both FM and for RYO. The analysis further suggests that the introduction of standardised packaging did little to change how the tobacco industry responded to tax increases (figure 3 in the published reference shows little difference in overshifting in the eras before and after standardised packaging).³⁹ The findings show that the tobacco industry applies techniques to keep the cheapest tobacco cheaper relative to the more expensive products when passing on tax increases to smokers.

Results for work package 3 on price elasticities

Most important for WP3, new analyses extend the literature by, for the first time, estimating joint price elasticities for 10 alcohol product categories and 2 tobacco products in an integrated way using generalised two-stage Tobit model.⁴⁰ This means that we estimate change in use of tobacco products when a change in price occurs in alcohol products and vice versa.

In the workup of our study, we investigated four different econometric models. Only the results from the generalised two-stage Tobit model are in the main publication.⁴⁰ Work published elsewhere is provided in the supplementary material to this report. *Report Supplementary Material 1* discusses the results from the four approaches and shows

the elasticity matrices for each different model. This shows their regression coefficients and a figure comparing some of the results. The results across the four models for substitution and complementarity relationships were broadly consistent, for example on-trade beer purchasing is estimated to fall when off-trade beer prices increase (complements), but rise when FM cigarette prices go up (substitutes). For reasons of both goodness of fit and the logical rationale of its structural assumptions which enable calculation of both participation and conditional consumption elasticities, the generalised two-stage Tobit model is the preferred specification.

Table 4 shows the results from the preferred specification generalised two-stage Tobit model. The supporting information in the Pryce *et al.* publication (table S1⁴⁰) shows the detailed results for the two-stage Tobit main and selection regression coefficients used to estimate the participation and conditional consumption elasticities for each of the 13 product models (10 alcohol categories, FM, HRT and all tobacco) estimated. The key findings are as follows.

There are statistically significant own and cross-price elasticities for both participation and conditional consumption for each of the 12 products.

The own price participation elasticities for the 10 alcohol products and 2 tobacco products range from –0.012 (on-trade RTDs) to –0.314 (off-trade wine) that is a 1% increase in the price of a product category results in an estimated reduction in participation in purchasing (and implicitly in consuming) that product of between –0.012% and –0.314% depending on the product. The own price conditional consumption elasticities range from –0.144 (on-trade RTDs) to –1.197 (off trade beer).

The cross-price elasticities for tobacco participation and for conditional consumption elasticities both suggest that FM cigarettes and RYO are complements, for example a 1% increase in FM is estimated to produce a –0.135% reduction in RYO participation, and for those people that remain participating in RYO, a –0.222% reduction in conditional consumption of RYO tobacco. It is important to note that while these are our best estimates of effects, the cross-price elasticities between FM and HRT tobacco are not statistically significant. In modelling work, it can be useful to analyse scenarios with and without such effects to examine uncertainty and sensitivity.

There are also significant cross-effects across alcohol and tobacco. For example, a 1% increase in FM cigarette price produces an estimated –0.045% reduction in participating in off-trade beer and a –0.164% reduction in consumption

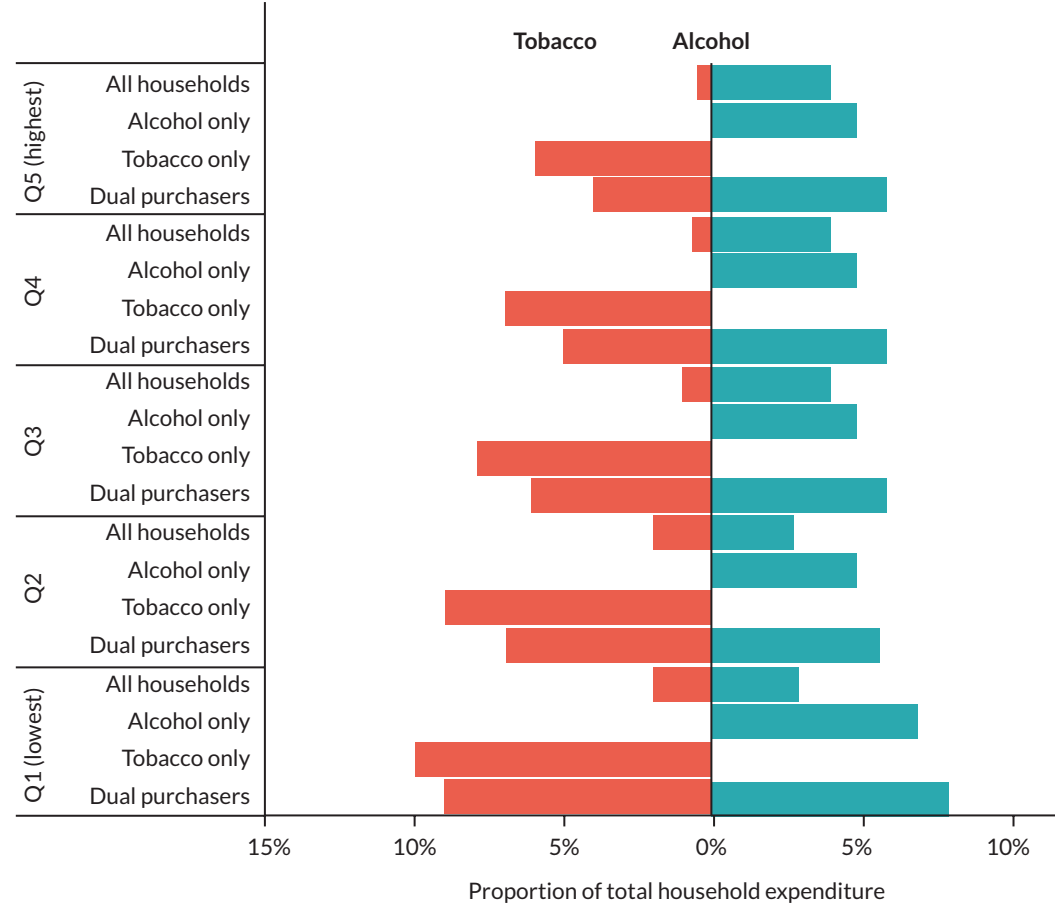


FIGURE 3 Proportion of equivalised total expenditure spent on alcohol and tobacco by household type. This figure is reproduced with permission from Wilson *et al.*³⁶ This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) licence, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <https://creativecommons.org/licenses/by/4.0/>. The figure includes minor additions and formatting changes to the original text.

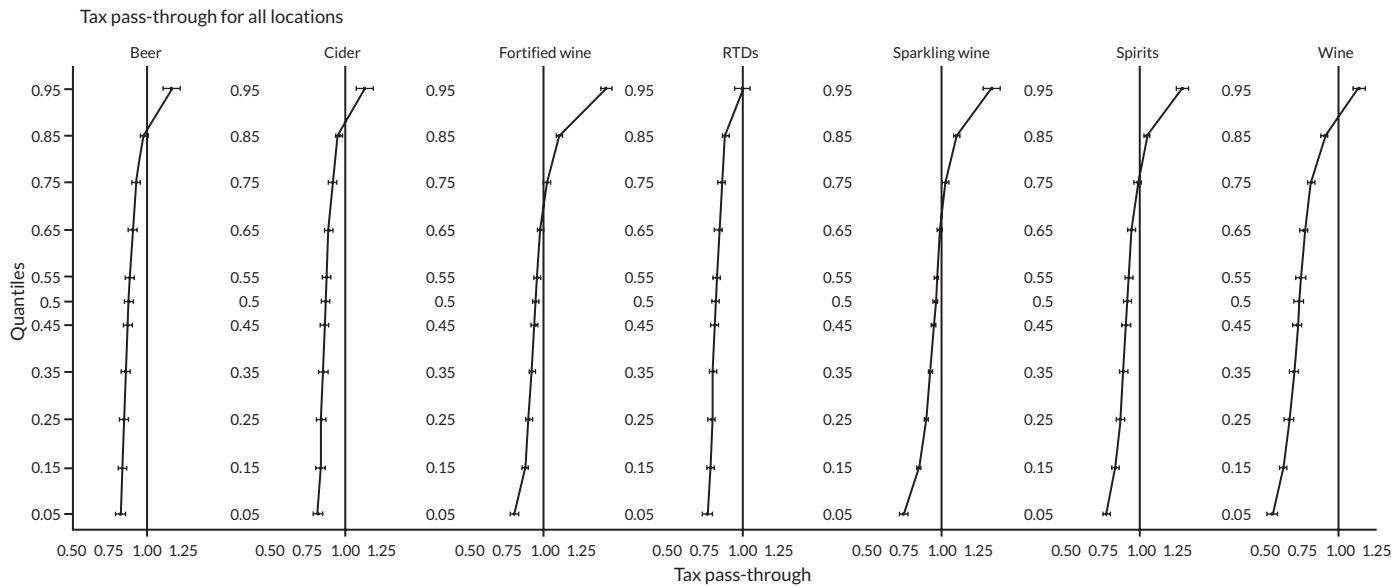


FIGURE 4 Result for on-trade alcohol tax pass-through summary for all types of outlet combined (based on analysis of CGA data 2007–17). This figure is reproduced with permission from Wilson *et al.*³⁸ This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) licence, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <https://creativecommons.org/licenses/by/4.0/>. The figure includes minor additions and formatting changes to the original text.

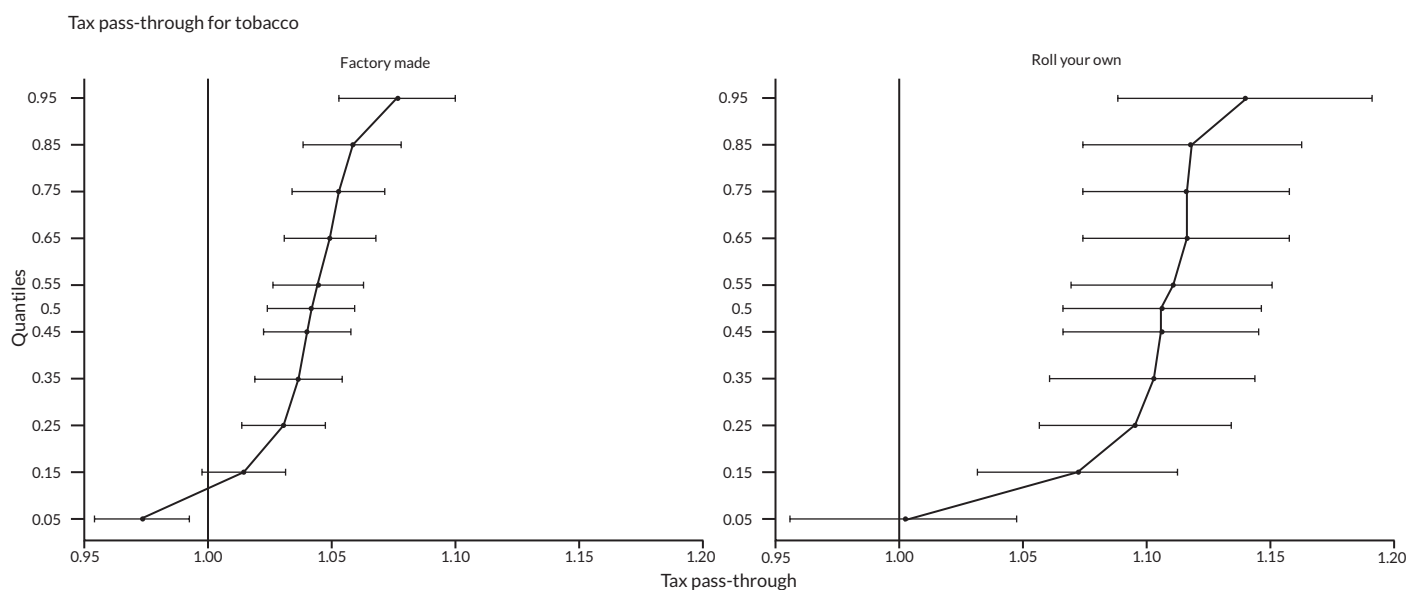


FIGURE 5 Results for tobacco-specific tax pass-through estimates for all FM cigarettes and RYO tobacco. This figure is reproduced with permission from Wilson *et al.*³⁹ This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) licence, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <https://creativecommons.org/licenses/by/4.0/>. The figure includes minor additions and formatting changes to the original text.

for those who continue to drink off-trade beer. A 1% increase in off-trade cider prices produces an estimated -0.025% reduction in participating in FM cigarettes and a -1.021% reduction in consumption for those who continue to smoke FM cigarettes. However, a 1% increase in off-trade spirits prices produces an estimated $+0.015\%$ increase in participating in FM cigarettes and a $+0.358$ increase in consumption for those who continue to smoke FM cigarettes.

Finally, in this paper, we undertook some comparison of our newly calculated elasticities with those used by HMRC for alcohol (by Sousa),²⁸ and for tobacco (by Czubek and Johal 2015).³¹ For alcohol, price changes in all 10 of the individual alcohol products have larger estimated effects when using the new two-stage Tobit elasticity estimates than when using the current HMRC elasticities. A 1% price rise in all 10 alcohol products produces estimated changes consumption that are around 2.7 times larger for all 10 alcohol products together (-1.23% c.f. -0.45%), with larger differences for all five off-premise products collectively – a 2.9 times larger effect (-1.23% c.f. -0.43%), than for on-premise products a 2.4 times larger effect (-1.23% c.f. -0.52%). For tobacco, the differences between our results and HMRC are smaller – a 1% price rise in both products at the same time would produce a change in FM cigarette consumption of -0.89% (c.f. -0.58%), and a change in RYO of -0.69% (c.f. -0.58%).

Interpretation: If the price of off-premise cider increases by 1%, we estimate an own price conditional consumption elasticity that is for the people still purchasing off-premise

cider their estimated percentage reduction in volume of units purchased is -1.136% . We also estimate cross-price conditional consumption elasticities. For example, if the price of off-premise cider increases by 1%, for the people still purchasing off-premise beer, their estimated reduction in volume of units purchased is -0.072% .

Results for work package 4 on policy modelling

The first part of this section covers findings for the original 33 tax policies analysed in our project.

The second part of this section covers the findings for the estimated impact of the August 2023 ADRs. These are the most important structural reforms to the alcohol tax system for many years. The UK Government proposed these reforms in 2021, near to the end of our original project timelines. We utilised the evidence generated from this project's WPs and the WP4 STAPM model framework to apply it to this important change in alcohol taxes. We updated the analysis after the official project end date, when the exact specification of the implemented government reforms was set out.

The third section briefly covers some further work done after the official end date of the project on the estimated future impact of tobacco duty escalator policies that were implemented in 2023 and alternative extensions to these which could be considered between 2024 and 2030. At the time of publishing this report, that work is in submission to a peer-reviewed academic research journal.

TABLE 4 Results for two-stage Tobit elasticities (a) own- and cross-price participation elasticities and (b) conditional consumption elasticities estimated using LCFS data 2006–17

Price/ quantity	Beer off	Cider off	Wine off	Spirits off	RTD off	Beer on	Cider on	Wine on	Spirits on	RTDs on	FM	RYO	All tobacco
<i>Part a: Own and cross price elasticities for participation</i>													
Beer off	-0.247***	-0.04	0.001	-0.047***	-0.011	-0.028***	-0.005	0.023	-0.002***	-0.004	-0.045***	-0.024*	-0.059***
Cider off	-0.033*	-0.116***	-0.02***	-0.043***	-0.002	0.003	-0.014***	0	0.022	-0.002	-0.02	-0.019	-0.028
Wine off	-0.064	-0.041	-0.314***	-0.033***	-0.009	-0.022	-0.014	0.004**	-0.009	-0.004**	-0.039	-0.008	-0.045
Spirits off	-0.057	-0.042	-0.047	-0.195***	-0.018	0.002	-0.004	-0.007	-0.017	-0.009	-0.028	-0.015	-0.038
RTD off	0.004	0.004	-0.027***	-0.03***	-0.031***	0.025	-0.004	-0.006	0.009	0.01	0	0.013*	0.009**
Beer on	-0.039	-0.003	0.054**	-0.013***	-0.004	-0.288***	-0.015*	0.094***	-0.014	-0.008	-0.089***	-0.03	-0.101***
Cider on	0.006	-0.021**	0.008	-0.014***	0.007	-0.002	-0.086***	0.011	-0.023	-0.012	-0.004	0.005**	0.009
Wine on	-0.023***	-0.01	-0.069*	-0.021***	-0.008**	-0.115	-0.022	-0.235***	-0.013**	-0.007	0.004	0.005	0.006
Spirits on	-0.026	-0.012	-0.009**	-0.03***	-0.001	-0.123***	-0.027***	-0.001	-0.176***	-0.025	-0.017	-0.016**	-0.024
RTDs on	0.003	0.003	0.005	-0.023***	0.007	0.013	0.01	0.025	-0.011	-0.012**	0.02	-0.007	0.014
FM cigs	0.042*	-0.025***	0.301**	0.015***	-0.026	0.213**	0.016	0.121*	0.062	-0.005	-0.169***	-0.135	-0.15***
RYO cigs	-0.039	0.024	-0.013	-0.05***	0.004	0.051	-0.007*	0.015	0.009	0	-0.08	-0.089*	-0.127***
<i>Part b: Conditional consumption own and cross price elasticities</i>													
Beer off	-1.197***	-0.049	-0.041	-0.105***	-0.075	-0.123***	-0.112	-0.044	-0.209***	--0.035	-0.164***	-0.112*	-0.184***
Cider off	-0.072*	-1.136***	-0.125***	-0.100***	0.022	-0.071	-0.333***	0.049	0.074	0.008	0.031	-0.003	-0.025
Wine off	-0.003	0.053	-0.342***	-0.063**	0.063	0.005	0.045	0.062**	0.031	0.221**	-0.05	0.061	-0.007
Spirits off	0.017	0.022	0.011	-0.221***	-0.071	-0.036	-0.082	0.056	-0.063	0.004	0.023	0.018	0.024
RTD off	0.002	-0.021	-0.108***	0.004	-0.486***	-0.017	0.047	-0.044	-0.062	-0.071	0.055	0.161*	0.122**
Beer on	-0.045	0.036	0.08**	0.045	0.009	-0.803***	-0.131*	0.149***	0.018	-0.153	-0.179***	-0.106	-0.242***

TABLE 4 Results for two-stage Tobit elasticities (a) own- and cross-price participation elasticities and (b) conditional consumption elasticities estimated using LCFS data 2006–17 (*continued*)

Price/ quantity	Beer off	Cider off	Wine off	Spirits off	RTD off	Beer on	Cider on	Wine on	Spirits on	RTDs on	FM	RYO	All tobacco
Cider on	0.089	-0.169**	-0.049	0.084	0.092	-0.066	-0.342***	0.006	0.041	0.032	0.001	0.31**	0.104
Wine on	0.074***	0.043	-0.04*	-0.002	0.188**	-0.037	0.027	-0.387***	0.059**	-0.073	0.025	0.014	0.037
Spirits on	-0.008	-0.03	0.062**	0.013	-0.015	-0.181***	-0.174***	-0.014	-0.777***	-0.055	-0.009	0.143**	-0.013
RTDs on	-0.017	-0.079	-0.034	-0.004	-0.103	-0.016	0.111	0.048	0.026	-0.144**	-0.029	0.001	-0.035
FM cigs	-0.285*	-1.021***	0.4**	0.358**	0.364	0.451**	-0.225	0.397*	0.378	-0.504	-0.513***	-0.222	-0.64***
RYO cigs	-0.095	0.041	-0.005	0.007	-0.335	0	-0.425*	0.121	-0.018	0.283	-0.08	-0.226*	-0.352***

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Note

Red numbers are significant negative effects, that is a price rise is associated with a participation reduction. Red numbers are significant negative effects, that is a price rise is associated with a consumption reduction. Green numbers are significant positive effects, that is a price rise is associated with a participation increase. Black numbers are non-significant coefficients. Interpretation: If the price of off-premise cider increases by 1%, we estimate that participation in purchase of off-premise cider decreases by -0.116% (own price participation elasticity), and that participation in purchase of other products is also affected for example participation in off-premise beer falls by -0.033% (cross-price participation elasticity).

Results using version 2.1.0 of STAPM for exploratory policy analyses on 33 policies

Version 2.1.0 of the STAPM model was used during the lifetime of our project to undertake analysis of different potentially proposed tax policies in three broad categories of policy. None of these have been published as part of our threaded publications work because the most important priority for journal publication was the actual policies proposed by government – especially the ADR now implemented.⁴¹ However, these analyses were instrumental in ensuring that the structure of the model developed was suitable to appraise the full range of tax policy options, and the process was vital for quality assuring the findings. The learning from these analyses is reflected in the technical documentation for the model.⁴¹

The details for the exploration of policy results summarised below are shown in [Report Supplementary Material 5](#).

The results examine four broad categories of policy: (1) simple one-off duty rises and escalators for alcohol and tobacco; (2) tobacco escalator, MET and removal of tobacco ad valorem policies; (3) alcohol strength tax policies. We also undertook some early work on (4) a version of the proposed alcohol duty system in the government's October 2021 consultation document, but these have been superseded by the work undertaken on the actual implemented policy that we have now published.⁴¹

Overall, the results show that when alcohol duties rise then there would be a reduction in population-level alcohol consumption, and that this leads to reductions in incidence and prevalence of alcohol attributable diseases, NHS costs and ultimately to reductions in the numbers of people dying of alcohol-related conditions. When tobacco duties rise, the modelling estimates a similar set of consequences occur – a reduction in population-level smoking participation and consumption, a consequent reduction over time in incidence and prevalence of tobacco attributable diseases, NHS costs of hospital admissions and ultimately a reduction in deaths.

There are interactions between simple duty rises on alcohol and tobacco and their impact on both behaviours jointly. Analyses of increasing the duty by 1% on tobacco products only (policy 1c) show that this would be estimated to reduce tobacco participation, but because of cross-price effects, very slightly increase alcohol consumption (people switching some of their saved expenditure on tobacco to alcohol). Analysis of increasing the duty by 1% on alcohol products only (policy 1b)

shows the opposite; however, in this case, the effect is to reduce alcohol consumption and at the same time also marginally reduce tobacco participation. For a sense of scale on the health effects, policy 1a – a 1% duty rise in all alcohol and tobacco products is estimated to reduce the number of deaths in England over the next 20 years (compared with the no change to current policy scenario) by –1893, while smaller reductions are estimated for just doing a 1% duty rise in all alcohol (policy 1b, –1658), or just doing a 1% duty rise in all alcohol (policy 1c, –457). In contrast, a 10% duty rise in all products is estimated to achieve a reduction of –18,008 deaths. Generally across the policies, the higher the tax rise the greater the public health benefit.

In almost all cases, the effects of tax rises are to reduce health inequalities, with larger reductions in health harms for people living in more deprived areas and larger effects for males than females. Much of the scale of effect is driven by impacts on three consumption groups: people who smoke and drink to high-risk levels, people who smoke and drink to increasing-risk levels and people who do not smoke but drink to high-risk levels.

Continuing the current tobacco duty escalator and reinstating the previously abandoned alcohol duty escalator (policies 2a to 2e) would lead to benefits accruing over the long term, with higher rates of escalation generating larger harm and inequalities reductions. Particularly large effects are estimated if a faster duty escalator is applied to RYO tobacco in order to reduce the price gap with FM cigarettes (e.g. policy 3d, –18,120 deaths).

The forecast of smoking participation rates given current policy in the modelling is to achieve a prevalence of smoking among adults aged 16+ in England as at 2030 of 10.94%, substantially above the government target of 5.0%. Most of the policies examined only make a marginal change to this trajectory, for example, policy 1d a 10% duty rise for all products would achieve an estimated prevalence of 10.79%. Of the potential tax policies examined in this study, the ones which would have the largest impact involve substantially transforming the tax structure for the cheapest and least taxed products – cider and HRT. For example, policy 4e, which adds a MET and adds an ad valorem component to RYO tobacco, making a substantial difference to its purchase price, is estimated to reduce smoking participation by 2030 to a rate of 8.01%, and as a consequence of this large reduction in exposure to tobacco also produces a very large estimated impact on deaths over a 20-year period of –107,348.

Category 3, the hypothetical strength-based alcohol tax policies have potentially large-scale impacts. This is because such policies would see large increases in the duty on cider, which currently has a much lower duty per unit of alcohol than other alcohol products. For example, policy 5a, which would implement a hypothetical strength-based tax system that would increase cider duties and prices but not affect the overall tax revenue collected by government over the next 5-year 'scorecard period' by very much, would still achieve an estimated initial difference in alcohol consumption of –6.81% fewer mean weekly units consumed per population, which is estimated to produce a 20-year deaths reduction of –26,312.

Sensitivity analyses for one policy (policy 1a) used alternative elasticities. The results suggest findings in terms of direction and relative impact on inequalities are robust. The scale of estimated effect overall would be somewhat smaller if one utilised the elasticities previously published by HMRC using older data sources than WP3, although incorporating the HMRC long-run elasticities for tobacco produces a very similar order of magnitude result to the base case.

Category 4 was hypothetical exploration of the Government's proposed reforms on the alcohol duty system using the rates set out in their consultation document.⁴⁶ The exploratory modelling results suggested that the reforms would have very small impacts on alcohol consumption. The proposed new duty system incorporating draught relief (policy 8b) is estimated to cause a –0.33% decrease in mean weekly units consumed per population (control arm consumption 10.40 units per person vs. 10.37). The estimated difference in deaths over the next 20 years between the new proposed duty system and the previous duty system is –789. Excluding the draught relief would make a very small difference, producing a very slightly larger reduction in consumption and mortality. The modelling suggests that a much larger difference to consumption and harms could come from policy moves to increase the duty rate on cider, which in the strength band ABV 3.5% to 8.4% has a proposed duty that is just over one-third of that for beer or spirits in the same band. For example, policy 8d, which models immediately increasing cider duties to a similar rate per litre of pure alcohol as for beer and spirits, produces an estimated change in mean weekly units of –9.52%, and a reduction in deaths over 20 years of –33,816.

Full details of these results can be seen in [Report Supplementary Material 6](#).

These category 4 findings were then superseded by the work done on the actual implemented ADR with the broad shape of the findings remaining consistent between this earlier work and the final publication on the actual implemented policy.⁴¹

Results for estimated impact of the August 2023 ADRs (STAPM v2.4.2)

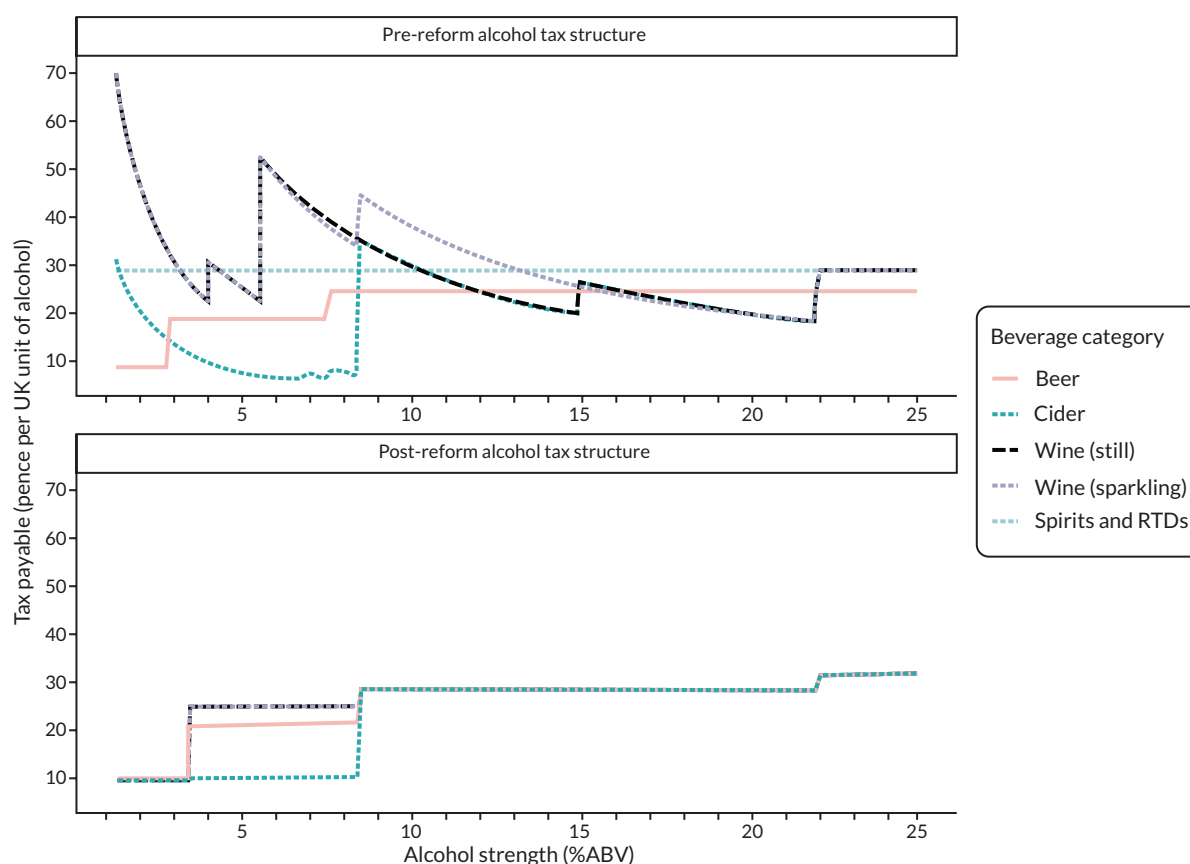
[Figure 6](#) shows how the duty payable per unit of alcohol has shifted from the previous system (top chart) to the ADR (bottom chart). The new structure significantly reduces disparities in taxation both across and within beverage categories and ensures products with higher alcohol content are higher in duty and likely to be more expensive (after tax pass-through effects).

[Figure 7](#) shows that overall the total tax paid per unit of alcohol is only marginally increased in the move from the previous tax system to the new ADR strength based tax system. This masks some products that have increased tax (wine in both off-trade and on-trade), and others that have decreased (notably on-trade beer and on-trade cider). In modelling the reform, we have accounted for these differential changes to the different product categories.

[Table 5](#) shows modelled outcomes in the baseline year of 2023 with no policy change.⁴¹ Mean weekly alcohol consumption per drinker is estimated at 14.5 units. Consumption is 3.4% higher in the most deprived quintile (15.0 units) than the least deprived (14.5 units), and people who smoke drink more than people who do not smoke among hazardous and harmful drinkers. Two and a half million adults (5.8%) drink at harmful levels, and this is patterned by IMD quintile, and differentially for people who smoke and those who do not smoke. Tax revenue to government from alcohol is estimated at £17.9B for the year, and revenue to retailers is £31.5B.

[Table 6](#) shows the policy impact results.

For the Government's implemented policy – the ADR – the estimates show no change in alcohol consumption (to one decimal place) per drinker. Some impacts are found for the three least deprived groups of –0.1 units per drinker (–0.6%) compared to no effect for the most deprived. There would be an estimated reduction in deaths of approximately –2307 over 20 years, hospitalisations of –11,510, and associated cost savings of £29M. Five-year government revenues from alcohol duty and VAT are estimated to increase marginally by £0.22B (0.24%).



Note: 1 UK unit = 10 ml / 8g of pure alcohol. Source: HM Revenue & Customs

FIGURE 6 The UK alcohol duty system before and after the duty reform. This figure is reproduced with permission from Morris *et al.*⁴¹ This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) licence, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <https://creativecommons.org/licenses/by/4.0/>. The figure includes minor additions and formatting changes to the original text.

The hypothetical policy of removing draught relief would have relatively small impact. Compared with ADR as implemented, removing draught relief is estimated to prevent approximately 1441 additional deaths and 14,247 hospital admissions over 20 years. Draught relief would affect revenues for the on-trade, with 5-year cumulative revenues to retailers £0.97B (−0.8%) lower without it. Removing draught relief is estimated to have a marginal effect on government alcohol tax revenue of approximately +£0.55B (+0.6%).

The hypothetical cider duty escalator (compared to ADR as implemented) is estimated to have small effects on Government tax receipts and retail revenues over 5 years. The escalator would, however, deliver substantially improved health outcomes over the longer term, preventing approximately 8257 additional deaths and 72,966 hospitalisations compared to the ADR.

Finally, the more immediate hypothetical policy of rate equalisation in 2023 results in much larger and more

immediate estimated impacts on consumption and health. Alcohol consumption is estimated to decrease by around 2.5 units per drinker per week (−17.2%) relative to the ADR. This scenario would yield substantial public health and health inequality benefits, with approximately −74,465 additional deaths and 707,216 hospitalisations prevented. The most deprived quintile of the population would see the largest benefits. The policy would impact retailer revenue over 5-year substantially (off-trade −£7.64B, −17.4%; on-trade −£3.85B, −3.3%). It is also estimated to result in significantly less alcohol tax revenue over 5 years (−£5.87B, −6.4%). This is due to the elastic (larger than one) own-price conditional consumption elasticities for both beer and cider (see WP3 results in [Table 4](#)).

Work on tobacco duty escalator policy implemented in UK Government's November 2023 autumn statement (using STAPM v2.5.0)

In addition, a further paper arising out of the project work has been published by Chen *et al.*³⁷

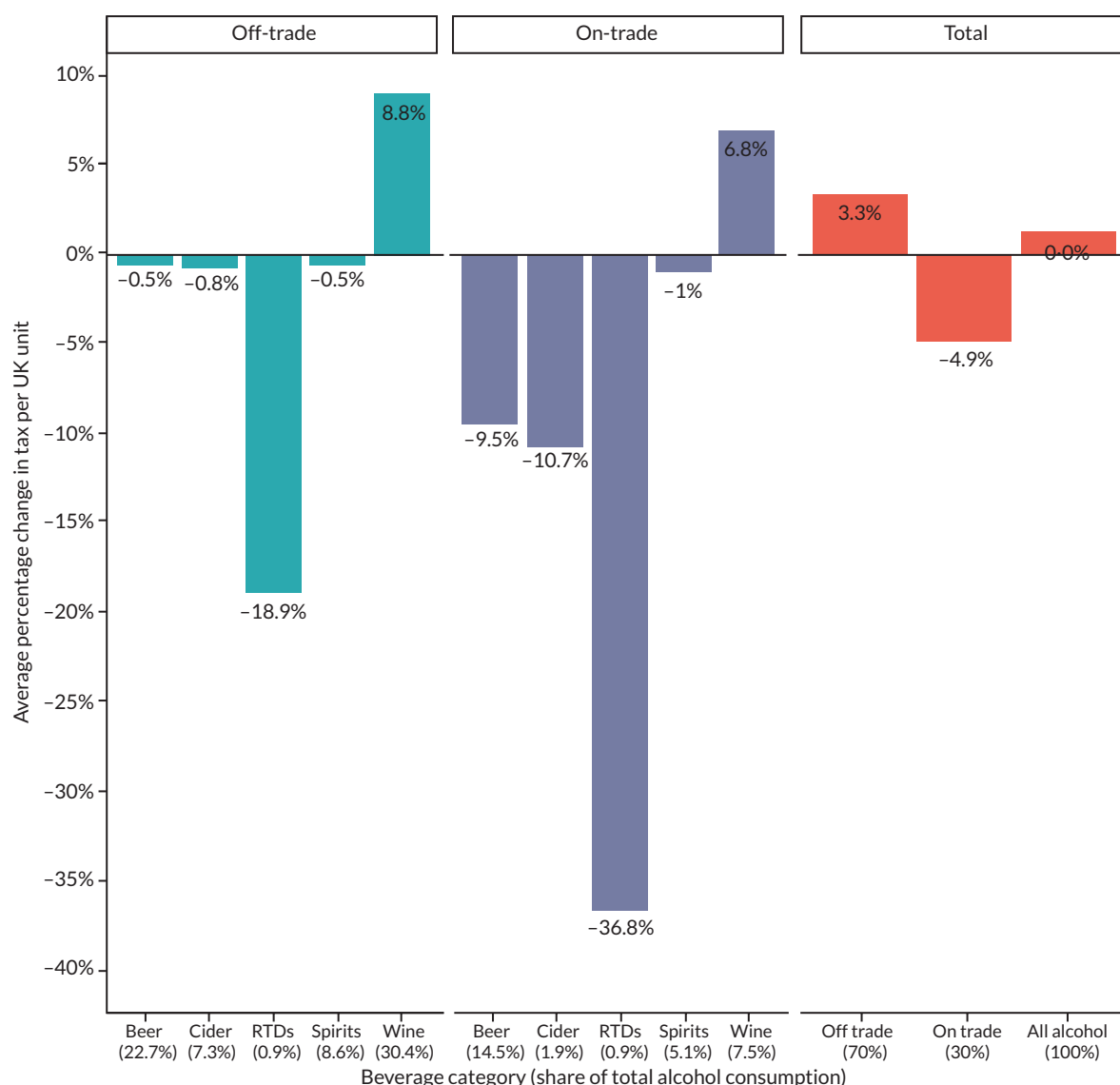


FIGURE 7 Impact of the UK ADR on duty per unit in 2023 by beverage category. This figure is reproduced with permission from Morris *et al.*⁴¹ This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) licence, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <https://creativecommons.org/licenses/by/4.0/>. The figure includes minor additions and formatting changes to the original text.

This work has used a further extended version of the model (STAPM v2.5.0). The analysis examines a business-as-usual scenario for the duty on HRT, which reflects recent years before Autumn 2023 that is 2% increase in the duty above RPI inflation annually. The paper first compares business-as-usual with the implemented policy which, as announced in the government's autumn statement 2023, set

- a new one-off duty rise in 2024 for HRT of 12% above RPI inflation.

Next, the paper compares three potential extensions to this:

- a RPI+ 10% increase annually (which would mean hand-rolled duty per stick would match FM cigarette duty per stick by 2030)
- a RPI+ 12% increase annually; and
- a RPI+ 18% increase annually (which would equalise the average retail prices HRT and FM cigarettes by 2030).

Detailed results are not presented here, but the main messages of the work are that these policies are estimated to prevent deaths, add life-years and save NHS costs, with greater gains for those living in deprived areas. Larger sustained duty increases on cheaper tobacco products, especially faster duty escalators on HRT, could deliver

TABLE 5 Baseline population characteristics in 2023; mean weekly alcohol consumption, mean weekly spending, annual revenues to retailers and government and health outcomes

	Moderate drinkers, ^a non-smokers	Moderate drinkers, ^a smokers	Hazardous drinkers, ^b non-smokers	Hazardous drinkers, ^b smokers	Harmful drinkers, ^c non-smokers	Harmful drinkers, ^c smokers	All drinkers
Number of drinkers (millions)							
Number	20.8	3.4	7.3	1.5	1.9	0.6	35.5
% of population	(47.9%)	(7.8%)	(16.7%)	(3.5%)	(4.3%)	(1.5%)	(81.7%)
Alcohol consumption (units^d per drinker per week)							
All drinkers	4.9	4.9	24.6	25.9	69.3	76.9	14.5
IMDQ1 – least deprived	5.2	5.8	24.2	26.0	66.0	74.4	14.5
IMDQ5 – most deprived	4.5	4.4	25.1	26.1	72.4	78.3	15.0
Alcohol spending (£ per drinker per week)							
All drinkers	13.61	13.57	43.35	45.73	92.4	97.66	26.75
Annual tax and retail revenues (£ billion)							
Retail revenue to off-trade alcohol (£ billion)	1.62	0.25	3.28	0.64	2.27	0.76	8.82
Retail revenue to on-trade alcohol (£ billion)	8.57	1.38	7.05	1.63	2.95	1.11	22.69
Tax revenue – alcohol duty and VAT (£ billion)	4.57	0.76	6.06	1.35	3.78	1.42	17.94
Alcohol and tobacco attributable health outcomes (rates per 100,000 drinkers)							
Deaths	45	510	99	357	380	639	142
Hospital admissions	251	1526	860	1543	2995	3973	765

IMDQ, Index of Multiple Deprivation quintile.

a Moderate drinkers = < 14 units per week,

b Hazardous drinkers = 14–35 (female) or 14–50 (male) units per week,

c Harmful drinkers = > 35 (female) or 50 (male) units per week.

d 1 UK unit = 10 ml/8 g of pure ethanol.

Source

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substantially greater public health gains and further reduce health inequalities.

Discussion/interpretation

Principal findings and contributions to existing knowledge

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This project has delivered an array of new evidence which build upon previous literature on these topics. It has also produced a reusable modelling resource that can be adapted to respond to policy developments in tobacco and alcohol tax, as illustrated by the responsive modelling conducted to inform the ADR.

TABLE 6 Impact of modelled policy scenarios on alcohol consumption, alcohol retailer and tax revenues, and health outcomes

	Control (no policy change)	Intervention arms (absolute difference ^a)			
		vs. control	vs. duty reform intervention		
		Duty reform	Duty reform + no draught relief	Duty reform + cider escalator	Duty reform + equalisation
Alcohol consumption in 2023 (units^b per drinker per week)					
Population	14.5	0	0	0	-2.5
IMDQ1 (least deprived)	14.5	-0.1	0.0	0	-2.0
IMDQ2	14.4	-0.1	0.0	0	-2.2
IMDQ3	14.3	-0.1	0.0	0	-2.4
IMDQ4	14.7	0.0	-0.1	0	-2.8
IMDQ5 (most deprived)	15.0	0.0	-0.1	0	-3.3
Mean spending in 2023 (£ per drinker per week)					
All alcohol	26.75	0.14	-0.03	0	-1.8
Cumulative 5-year impact (2023–7) on retail and tax revenues (£ billion)					
Retail revenue off-trade alcohol	44.24	-0.37	0.04	-0.14	-7.64
Retail revenue on-trade alcohol	116.47	1.56	-0.97	0.00	-3.85
Alcohol duty + VAT	90.86	0.22	0.55	-0.08	-5.87
Cumulative 20-year impact (2023–42) on health outcomes					
Total deaths	9,413,863	-2307	-1441	-8257	-74,465
Total deaths IMDQ1 (least deprived)	1,724,199	-674	-177	-1103	-9549
Total deaths IMDQ2	1,871,894	-765	-141	-789	-11,730
Total deaths IMDQ3	1,955,447	-641	24	-1462	-13,115
Total deaths IMDQ4	1,919,957	424	-719	-2620	-18,192
Total deaths IMDQ5 (most deprived)	1,942,365	-651	-429	-2282	-21,879
YLL	139,963,334	-34,756	-45,781	-225,711	-2,178,114
Hospital admissions	40,079,449	-11,510	-14,247	-72,966	-707,216
NHS admissions costs (£ million)	73,604	-29	-27	-147	-1410

IMDQ, Index of Multiple Deprivation quintile.

^a Note that the three 'Duty reform +' scenarios are compared to the 'Duty reform' scenario rather than no policy change.^b 1 UK unit = 10ml/8 g of pure ethanol.**Source**

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Work package 1 provided a set of understandings of the potential policy landscape and the rationale for different tax policies. The rapid review identified four policy themes.⁴² These were changes to excise duty within existing tax structures, structural reforms, industry measures and hypothecation of tax revenue for public benefits. For alcohol, policy options focused on raising the price of

cheap, high-strength alcohol. For tobacco, policy options focused on raising the price of all tobacco products, especially the cheapest hand-rolling tobacco. Levies that take money from the industries to help reduce the societal costs of their products were also identified; due to the complexity of how these operate, their effects will be explored in further extensions to the modelling. Due to

the perceived social and economic importance of alcohol in contrast to tobacco, policy options also discussed supporting pubs and small breweries.

The qualitative study combined a novel joint interview data collection method with structured framework analysis.³⁵ The results advance knowledge of the UK's alcohol and tobacco tax policy context. The research elicited participants' expert views on the relative priority of tax policy objectives. Reducing harm, improving health and reducing consumption were ranked most highly with many other objectives perceived as contributing to these overarching goals. The research also refined understanding of excise duty rates, tax structures, industry measures and hypothecation interventions available to policy-makers. In doing so, our study elicited specific policy options which could be appraised using health economic modelling. Our knowledge of the policy context also progressed, beyond a list of possible mediators, to a fuller and policy-specific description of the system of complex influencing factors in which alcohol and tobacco tax reside. Finally, we articulated the uncertainty felt by participants regarding tax co-ordination across alcohol and tobacco. This uncertainty is characterised by a perceived gap between alcohol and tobacco harm which in turn influences feasibility of different policy options.

Work package 2 provides new evidence on the joint patterns of alcohol and tobacco purchasing across socio-economic and risk groups.³⁶ The examination of dual purchasing households showed that they spend a much greater share of their total expenditure on tobacco or alcohol than households who buy only one of these commodities. This is particularly the case for dual purchasers in the lowest income group. Increasing the price of alcohol or tobacco could have the biggest absolute impact on purchasing for the higher-income dual purchasers, but the biggest relative impact on the lowest income dual purchasers. The potential for increases in spending and economic burden on users of both alcohol and tobacco is an outcome that WP1 showed was an important part of the considerations for stakeholders when considering tax rises as a public health policy.

Work package 3 provides new evidence on the responses of retailers and industry to tax changes in terms of tax pass-through for tobacco and for on-trade alcohol, and most crucially new evidence on integrated price elasticities for alcohol and tobacco products including participation price elasticities and conditional consumption price elasticities.

The tax pass-through for on-trade alcohol market paper found a clear difference, with the cheapest alcohol categories being undershifted most and the more expensive overshifted.³⁸ This was new evidence – only one other study in Alaska examines on trade.⁵⁰ In contrast to the literature on the off-trade,²³ we find that on-trade undershifting occurs in almost all of the quantiles across the price distribution, with retailers only overshifting in the highest quantiles. This suggests that our results may not be generalisable beyond the UK; indeed the CGA data are only for the eight regions of England. A possible explanation as to why we find highly prevalent undershifting of tax in the on-trade, especially when evidence in the off-trade shows evidence of overshifting to various magnitudes,^{50,51} could be due to the pressure on pubs and bars to not further widen the price differential between off-trade and on-trade, which has widened recently with the off-trade being considerably cheaper. This is important to take into consideration as evidence has shown that consumers swap to cheaper products.²⁷

The tobacco tax pass-through analysis found that the tobacco industry predominantly overshifts tax in the form of higher than expected prices, with the magnitude of the overshift is greater at the more expensive end of the price distribution, relative to the cheaper products available.³⁹ This is consistent for both FM and RYO. Research conducted pre-standardised packaging in the UK found that the industry uses a variety of strategies to keep the cheapest FM cigarettes and RYO tobacco cheap.^{52–55} Our results are consistent with this previous literature. We also showed that the rates of tax pass-through for branded versus standardised packaging did not differ significantly since the implementation of standardised packaging, with our longer-term follow up data again consistent with previous evidence showing the initial introduction of standardised packaging did not lead to a decline in cigarette prices.⁵³

The most important analysis from WP3 is on joint price elasticities.⁴⁰ We calculate, for the first time, own- and cross-price elasticities for disaggregated alcohol and tobacco products within the same generalised two-stage Tobit model framework. There are statistically significant own and cross price elasticities for both participation and conditional consumption for each of the 12 products. These new results show variation across products and small but important cross-elasticity effects – enabling us to analyse the effects of changing alcohol prices on tobacco use and vice versa. When we increase tobacco price by 1%, we estimate a very small increase in alcohol

consumption by 0.03%.⁴⁰ When we increase alcohol price by 1%, we reduce tobacco use by 0.12%.⁴⁰ Most importantly, when we increase both tobacco and alcohol price together, we get a bigger impact than if we do both separately. For example, a 1% price rise in both tobacco and alcohol would cause tobacco consumption is estimated to reduce by 0.89% compared to 0.80% with a rise in the price of tobacco alone.⁴⁰ The model comparison work found our new results showing larger price responsiveness for alcohol than the estimates previously published and used by HMRC,²⁸ while the new results for tobacco were considerably closer to those used by HMRC.³¹

Work package 4 synthesises all of these findings into a new version of the STAPM (version 2.1.0), which we first used to enable analysis of 33 different possible policy options, and analyse the detailed interactions between different variants and combinations of alcohol and tobacco tax policies. This broadly showed that combined taxes generate additional benefits, that larger taxes generate larger reductions in health harms and deaths, and that tax policies focused on increasing prices for cheaper alcohol (e.g. cider) and cheaper tobacco (e.g. HRT) tend to reduce inequalities in health more than general tax rises. Then with some updates (to v2.4.2), we undertook a detailed published policy appraisal of the UK government's new alcohol tax system – the ADR.⁴¹ This study demonstrated that the public health impact of the ADR is likely to be broadly neutral, with limited impacts on average alcohol consumption, while reducing deaths by approximately 2300 over 20 years compared to the retaining the previous duty system. Our alternative policy show that removing draught relief would not deliver substantially greater public health benefits, a cider escalator would deliver substantially improved outcomes, and equalising duty rates across all beverage types between 3.5% and 8.4% ABV would lead to much greater and more immediate impacts, with around 74,000 fewer deaths over 20 years. Addressing the exceptional status of cider in terms of its duty rates could deliver significant public health benefits. Our findings do differ somewhat from the Government's own policy impact assessment,⁵⁶ which predicted a small reduction in revenue from alcohol duty and VAT, in comparison to the small increase in our results. This was probably due to using different price elasticities. In a similar way, addressing cheaper tobacco, through for example faster increases in the tobacco duty escalator on HRT than on FM cigarettes.

This infrastructure will provide a platform for many further policy analyses in future research grants and policy appraisal exercises with government bodies and other stakeholders.

Strengths and limitations of the study/in relation to other studies

Each sub-study has some limitations, most of which are around data sets available and used in the analysis and modelling. There are many strengths in the data sets used and together they provide a network of evidence that can be integrated to enable analysis of the potential impact of tax policies.

The WP1 rapid review has strengths in terms of a rigorously followed process,⁵⁷ thus capturing the published work on alcohol and tobacco tax policy options relevant to the UK. It included sources that may have been excluded from a more traditional systematic review in line with recommended best practice for rapid scoping reviews^{58,59} and so reflects both peer-reviewed evidence and the wider policy debate in grey literature. The WP1 qualitative work has strengths in its solid theoretical foundation, based on previous research which showed the importance of engaging policy-makers in health economics,^{60–63} and in its rigorous methodological foundation in qualitative framework analysis.⁶⁴ The bespoke joint interview data collection methodology ensured that we elicited a cross-product conversation about how alcohol and tobacco, their associated industries and tax policies relate to each other.⁴⁵ With respect to weaknesses, the study could potentially have benefitted from an even broader cross-section of participants.

The WP2 dual purchasers study strengths are the detailed six calendar years LCFS data set on 26,021 households and our novel analysis of dual purchasing and inequalities by income group. The limitation of the 2-week diary window includes missing rare purchasing and large purchases which are stockpiling. One further limitation lies in the lack of LCFS data on the purchasing of electronic cigarettes, though we were able to analyse some separate Smoking Toolkit Study data (see supporting information in reference).³⁶ Evidence has shown that these devices can be complements or substitutes to smoking tobacco products,^{65,66} and their use in the UK has increased over time.⁶⁷ Further work on e-cigarette data sets, sales and pricing would be useful.

The WP3 on-trade alcohol tax pass-through study has strengths in having detailed data on 'stock keeping units' (SKUs) over an 11 years 2007–17 period. There are some limitations with the data – notably with the classification of SKU for on-trade wine because there are many more wine brands sold compared to other alcohol types, so that some assumptions were necessary to combine them. We did not examine the supply side cost base of the on-trade

premises because of a lack of available confidential commercial financial accounting data. Nor did we compare undershift or overshift directly with non-alcohol related products– this would require obtaining data on the sales of and prices of other products which on-trade venues earn revenue from including, food, soft drinks, gaming activities and so on.

Another strength of our analysis is our use of quantile regression for panel data to estimate the rate of tax pass-through in the market for tobacco. Unlike previous analyses which used a price segmentation approach via a commercial literature review, we were able to break the market into consistent, exogenously defined, quantiles. That both approaches revealed similar findings provides triangulation.

The WP3 tobacco tax pass-through study has similar strengths in the scale and duration of the real-world data on prices. In terms of limitations, due to commercial sensitivity, we are unable to obtain the exact ad valorem rate payable or recommended retail price for each SKU in the Nielsen data but were able to adapt methods from previous literature^{52,54,55} and conversations HMRC analysts to estimate the ad valorem tax for each SKU.

The WP3 integrated elasticities work has strengths in terms of developing joint analyses that enable the effects of price changes on both participation and conditional consumption to be analysed. The work is not without data limitations. Assumptions were necessary regarding the strength and size of some of the products purchased as these characteristics are not captured in the data set. The data are repeated cross-sectional data meaning that households are not observed over time – an ideal data set would have longitudinal analysis of the same households over several months and years. The 2-week diary period also introduces problems around stockpiling; this paper has assumed that households not purchasing a product type during the 2-week diary window do not purchase through the rest of the year.

The WP4 modelling of the ADR has several strengths. The detailed modelling allows for population heterogeneity by subgroups, capturing the interaction between alcohol and smoking, and analysis of a comprehensive analysis of consumption, health and economic outcomes. One limitation is the lack of a single comprehensive individual-level data set on alcohol and tobacco consumption, and purchases and prices paid including product ABVs. We have integrated several key data sets to achieve this, but it does mean our analyses may not fully capture how preferences for different strength products differ between

population subgroups. Our economic analyses are limited in only quantifying tax revenues and hospital admissions costs, and hence underestimate the total societal savings from reduced alcohol consumption including, for example, other costs to the health service, reduced work absenteeism and reductions in alcohol-related crime. There may be non-price market responses to the new duty system which we have not accounted for, for example, introduction of new products, reformulation of existing products or changes in marketing strategies; some evidence of non-price response was found in the evaluation of minimum unit pricing (MUP) in Scotland, for example.⁶⁸

We have been unable to fully quantify the uncertainty around the modelled estimates for example, via a probabilistic sensitivity analysis, because it is both computationally demanding given our modelling of hundreds of thousands of individuals, and because we have incomplete data on the uncertainty around all key parameters required. The most important uncertainties have been examined, that is the structural uncertainty around the different sources of available evidence on price elasticities.

On the financial and economic impact side, our study focuses on effects upon NHS costs, consumer spending, government tax revenue and retailer revenues. Several important other aspects were not covered. These include work absence and productivity losses which have been modelled for alcohol and tobacco previously.⁶⁹ There are also broader social costs from crime related to alcohol,⁷⁰ which we have not incorporated into the latest versions of STAPM. In addition our research team has been working in other projects on developing methods to quantify impacts on different sectors in the economy to answer for example, using input-output tables to examine how if demand for tobacco and alcohol falls, then where might consumers spend the money elsewhere, and which sectors would benefit. Our work has excluded these policy benefits and so is in a sense underestimating overall scale of effects.

For the tax on smoking, the effects estimated could potentially be larger than we have modelled if it were assumed that there is a long-lasting permanent effect of the tax change. Such an assumption could be more in keeping with the HMRC's long-run price elasticity estimate.³¹ We apply the policy effect as a one-off change to smoking prevalence within the year, rather than permanently adjusting smoking transition probabilities that would then carry the effect to all future years. Some aspects of long lasting effect are factored in: new 18 years olds are assigned prevalence and consumption characteristics that are adjusted for policy effects, and conditional consumption of remaining as smokers is reduced based on past tax rises.

The final main limitation of the project as a whole is also a strength. We have analysed the ADR, and we have undertaken detailed earlier work on 33 detailed tax policy options, but there remain many more variants of these tax policies that could be modelled and for which results would be useful.

Take-home messages

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Our project aims were as follows: We aim to investigate how tobacco and alcohol taxation can be changed to improve health for all. We will talk with consumers, policy-makers and experts and use survey and sales data to look at how tobacco and alcohol tax can work together: to change consumer behaviour and health; to benefit disadvantaged communities and to reduce NHS costs at a time of limited budgets.

Key points for policy and practice

The rapid literature review clearly identified a contemporary set of policy objectives, interventions and related mediating factors for alcohol tax policy and for tobacco tax policy.⁴² Policy-makers around either alcohol or tobacco should understand that these similarities and important differences between alcohol and tobacco tax interventions and debates because they provide an opportunity for cross-policy learning (see [Table 2](#)).

For policy-makers and those undertaking impact assessment prior to policy decisions or alongside implementation, the qualitative study with expert stakeholders highlighted three primary questions that impact analysis should address.³⁵ What is the combined effect of alcohol and tobacco tax policy change on health outcomes, including on health inequalities, due to the combined effect of tax changes on the consumption of alcohol and tobacco? What is the combined effect on the tax revenue to government from alcohol and tobacco products? What is the combined effect on economic inequalities in society due to the effects of tax changes on the prices of alcohol and tobacco products and in particular the impacts on the financial burden on consumers who are already economically poor?

The study on dual purchasing patterns identified important policy messages.³⁶ Dual purchasing households are particularly exposed to large effects of pricing policies on their purchasing because a large part of their total expenditure is spent on alcohol and tobacco, and this could also generate larger health gains in this group because they have greater budget constraints and may therefore lower consumption.

When policy-makers consider tax changes, the evidence that tax is passed through to consumer prices more for the expensive products and much less (under-shifting) for cheaper products needs to be taken into account. Our new results confirm that tax increases do lead to increases in the price of on-trade alcohol and for tobacco across the price distribution, and therefore support the extensive evidence on the effectiveness of duty increases on reducing alcohol consumption, tobacco consumption and prevalence of smoking.^{38,39} However, the undershifting of tax for on-trade retailers' cheapest products undermines the effectiveness of the public health intervention because heavier drinkers and especially those with lower incomes are at greater risk of harm from their drinking tend to purchase cheaper alcohol and cheaper tobacco.⁷¹ Similarly, smokers on lower incomes tend to purchase cheaper tobacco products more, and therefore the differential shifting of tax across the price distribution for tobacco means that prices increase more for higher-income smokers than low income smokers.³⁹

Our joint elasticities study has developed novel estimates of the price elasticity of alcohol and tobacco products and their interaction in the UK association, which should be considered for use in policy analysis and impact assessment.⁴⁰ Because it estimates cross-price elasticities for alcohol and tobacco at a disaggregated level, the work can be used in policy impact assessment by Government as a sensitivity analysis to compare against the elasticities that are currently used. Another key message from the paper is that price has an effect on both the participation and consumption decisions. This adds value because for tobacco, it is the participation effects that matter most for policy – reducing the number of smokers – while for alcohol policy there need is to address consumption reductions among different drinker population subgroups.

The results of our modelling of the 2023 ADR could be considered for future policy.⁴¹ Our results find that the policy implemented is likely to result in only small public health benefits. However, the new UK system has lower rates of duty per unit of alcohol for beer than for other beverage categories and particularly low rates for cider, which is

favoured by the heaviest drinkers.⁷² As our results show, if 'cider exceptionalism' were removed, the reformed system could deliver substantial public health benefits.

Finally, and fundamentally, the key take home message of this project is that there is an interaction between alcohol tax policy and tobacco tax policy. The exploration of 33 different policy options showed that there are interactions between simple one-off duty rises, duty escalators for alcohol and tobacco, MET and tobacco ad valorem, and of course, duty related to alcohol strength tax policies. The STAPM (versions 2.4.2 and beyond) provides a platform for rapid and consistent impact assessment and policy appraisal tool for UK alcohol and tobacco tax policy. This research has broadly shown that combined taxes generate additional benefits, larger taxes generate larger reductions in health harms and deaths, and that tax policies focused on increasing prices for cheaper alcohol (e.g. cider) and cheaper tobacco (e.g. HRT) tend to reduce inequalities in health more than general tax rises.

Key points for the research community

Further work in other countries to examine the generalisability of the findings here would be useful – on drivers of policies,^{35,42} on the patterns of dual purchasing for population subgroups,³⁶ on rates of tax pass-through,^{38,39} and especially on integrated price elasticities for alcohol and tobacco.⁴⁰

Our price elasticities estimation approach is generalisable and future work could consider the growth of alcohol and tobacco substitutes such as e-cigarettes and no/low alcohol products. Future work could also extend the knowledge around infrequent purchase and consumption by using panel data such as Kantar World panel, though this data only captures off-trade purchasing.

On the specific policy of the 2023 UK ADR, the authors will be carrying out a large-scale evaluation study which will produce evidence for validation of this study as post-reform data becomes available – see 'Reducing alcohol harms during a cost-of-living crisis: Evaluating the impact of ADRs across Great Britain' <https://fundingawards.nihr.ac.uk/award/NIHR156679>

Other countries could usefully undertake both policy appraisal (before implementation) and policy evaluation (after implementing) if they make changes towards a similar structure of taxing by alcohol content, which our modelling in England suggests could produce substantial public health benefits.

Methodologically, there are also some important priorities for getting a wider understanding of the impact of such policies. It would be useful to develop methods to answer questions such as: What are the further knock-on effects of the health impacts of tax policies to tax revenue and economic inequalities, for example, income, employment and tax revenue gains due to healthier people being better able to work and be economically productive? What are the knock-on effects in terms of reconfiguration or adjustment of local businesses and the prosperity of local communities of which those businesses are a part, for example, due changes in the demand and supply of alcohol and tobacco, shifts in purchasing to and from other products that consumers buy, and changes to overall to business revenues?

The main and final priority for research is to generate more evidence on the joint effects of tax options for alcohol and tobacco in the UK or internationally, and to utilise the modelling infrastructure developed through our project to continue to examine the impact of alcohol and tobacco tax policy options in terms of health and economic consequences. Detailed modelling is required to assess combined effects because there is a complicated series of effects due to socio-demographic patterns in purchase and consumption,³⁶ own and cross-price elasticities that differ across products,⁴⁰ differential tax pass-through^{38,39} and health harms and death rates that differ substantially by age/sex/deprivation groups.⁴¹

Challenges faced and reflections on the project

The final structure and plans for the whole shape and delivery of the project reflect very closely the original project plan, aims and objectives.

There were challenges in terms of data limitations and particularly the processes for estimation of elasticities. *Report Supplementary Material 1* details the fact that our original regression model structure using a pseudopanel approach did not come to fruition. We further investigated alternative regression structures and finalised our estimations to use in the policy analysis using the generalised two-stage Tobit elasticities, which provide the benefit of participation elasticities separated from condition consumption elasticities.⁴⁰

The other two main challenges for the project lay in the WP4 policy analysis. The first was the sheer number of policy options that could be examined. Here it was extremely useful to have undertaken the WP1 work

with expert stakeholders, which helped to structure and prioritise different categories of policy. In the end, we identified and ran 33 different policies to estimate and compare their effects. This also has substantial computational burden because any one policy model run requires simulation of thousands of individuals taking usually an overnight computer run over several hours. We also had to build spreadsheets to achieve the capability of summarising the results of each model run and then an overarching policy comparison spreadsheet to compare across policies.

The second main challenge for WP4 policy analysis was the moving nature of the actual proposed policy decisions by the UK Government on taxes. For tobacco the main evolution of policy was around the tobacco duty escalator, which over several years had been operating as a 2% above inflation increase in specific duty, and after the end of our project, we had a much larger rise in November 2023. For alcohol, we undertook analysis of strength based alcohol policies before the Government made its suggestions for a policy change in terms a proposed ADR. Late in our project timetable, the government produced its formal proposal for consultation, and we were able to rapidly analyse the potential impact of the proposals. These results were submitted to Treasury and HMRC as part of the formal consultation. After our project had finished, the Government finalised its specific plans for the 2023 ADR, and we were able then to model the likely long-term impact of the actual proposals as now implemented and compare them with possible extensions to the policy particularly around duty on cider.⁴¹ This final and most important publication from the work so far was only possible because the staff involved in the research project had been returned in the university funded through other related follow on research grants.

Engagement with partners and stakeholders

The two important areas and processes for engagement with partners and stakeholders were the beginning and the end of the project. We have described in detail the formal qualitative work with stakeholders as part of WP1 – see [Methods for work package 1 on tax policies](#) and [Results for work package 1 on policies](#) and the full published paper.³⁵ This process, which involved anonymity for the stakeholders and paired stakeholders reflecting together, enabled a tremendously rich understanding of the drivers and constraints on possible policies and their structure.

Near to and after the end of the project, the main engagement was through formal consultation on the actual implemented policy of the ADR.

Members of the research team have also maintained communication channels with Government Departments, including Treasury, HMRC and Department of Health and Social Care (DHSC) to enable them to understand our ongoing work and to allow them to ask questions about the evidence.

Individual and institutional capacity-strengthening

The members of the research team developed skills, methods and know-how in relation to the project objectives. All but one of the research team remain in academia and in public health research, many with promotions within their own or new institutions, and we are working together on a range of grants around public health, economics, alcohol, tobacco and wider commercial and environmental determinants of health and inequalities.

Members of the team have been part of two large UK Prevention Research Programme grants [Shaping Public hEalth poliCies To Reduce ineqUalities and harM (SPECTRUM), and Systems science in Public Health and Health Economics Research (SIPHER)], are members of the NIHR School for Public Health Research, have successfully bid to be the new DHSC Policy Research Unit in Addictions, and are part of new UKRI Public Health Cluster grants on commercial determinants of health.

Perhaps most importantly, the project facilitated the further development of the Sheffield Tobacco and Alcohol Model as a modelling platform, by which we mean a set of version controlled, reusable, adaptable and extendable code. The STAPM platform has increased the institutional capacity to conduct fast response modelling of the potential effects of tax policy changes. For example, the team has currently developed a programme of using the modelling to produce brief reports of the health and economic effects of Government budget announcements of tobacco and alcohol.

Patient and public involvement

Patient and public involvement or community engagement, and involvement

Two patient and public involvement (PPI) sessions were held in the course of proposal development, and three sessions were held during the project. Further sessions are planned after the project end date to support the development of the dissemination strategy and materials. Three public panels were consulted, focused on smoking, drinking and addiction.

Panel members discussed issues ranging from tobacco tax, alcohol tax, the relationship between tobacco and alcohol, inequalities, switching to other substances, illicit products and cross-border purchasing, and e-cigarettes. PPI discussions influenced the project in two main ways: (1) how the project quantified inequalities in the effects of tax policy change and (2) the policy scenarios investigated. Key learning points for involvement of PPI in public health modelling projects included the practicalities of engaging with established panels; managing sessions effectively and dealing with project changes.

The PPI panels provided valuable insight into the perspectives of smokers, drinkers and people with substance dependence on the current market for tobacco and alcohol in the UK, and their potential responses to price rises. Their input informed how the project investigated inequalities in the outcomes of tax policy changes on tobacco and alcohol, and the scenarios for tax policy changes that were investigated.

See appendix D of the WP1 interviews paper.³⁵

Dissemination to participants and related patient and public communities: to include information on dissemination plan

The main participants and public community engagement of the project is discussed in [Patient and public involvement or community engagement, and involvement](#), and the key stakeholder engagement is covered in [Engagement with partners and stakeholders](#).

All published papers are open access.

The STAPM detailed description and key components of the code are publicly available for researchers to understand and examine through GitLab (<https://stapm.gitlab.io/>). Some of the data sets are however not publicly available for information governance reasons. Therefore, researchers would need permissions to access data sets in order to fully run the code and models that have been undertaken by our project team.

Equality, diversity and inclusion

Language and terminology

Plain English has been used as far as possible in the course of the project, both in reports and meetings and in engagement through patient and public involvement – see [Patient and public involvement or community engagement, and involvement](#). Some parts of the project are necessarily technical in terms of description of mathematics, statistical and econometric approaches used for the analysis.

Consideration of the disease burden, and outcomes for population subgroups

The population subgroup analysis across the project had differentiated groups by age, sex, IMD quintile, and/or income group, together with characterising subgroups in terms of current smoking status, and current level of alcohol use (abstaining, moderate, increasing risk and high risk).

The data sets and population subgroups have not been analysed by other protected characteristics under the Equality Act such as ethnicity/race/country of origin, marital status, religion, sexual orientation, gender reassignment or disability status.

Generalisability and transferability of evidence

The specific findings from our modelling work are related to England. Most of the data used to estimate parameters and form the basis of the policy modelling was up to 2019. Updates to the parameters are able to be done as new data accrues for example to the HSE or from Hospital Episode Statistics.

The specific findings on patterns of consumption, dual use and purchasing of alcohol and tobacco, tax pass-through, price elasticities and indeed the policy analysis results are all dependent on that context.

The findings should not be assumed to apply to other countries without careful thought and consideration of the similarities and differences in that context.

Also importantly, the COVID-19 pandemic effects on patterns of purchasing and consumption and indeed the impacts on population structure and the competing risk of other cause mortality for different population subgroups have not been addressed in our study here because the data sets used and planned were not yet all available for the pandemic and post-pandemic periods.

Participant representation and diversity

Full details of our PPI processes are discussed in [Patient and public involvement or community engagement, and involvement](#).

The research team has reflected on the population characteristics for our study, active steps taken to optimise participation of relevant people, and how inclusive was the participant population. And how were gaps in prior evidence/data identified and addressed. How have we made sure text and pictures, used as part of participant and public engagement, were inclusive and accessible and not discouraging

to under-represented groups? The results of these reflections are as follows.

In the modelling and analysis of secondary data sources, a whole population approach has been taken. This means that in one sense, all population subgroups are represented in most of that analysis. However, one important under-represented group in national surveys of health experience (HSE) and of purchasing alcohol and tobacco (LCFS) would be people with severe alcohol addiction. In the PPI, the research programme carefully designed PPI activities to include the impact of policies on this group. One of our three PPI panels specifically focused on including people with their own or family lived experience of addiction and addiction recovery. This highlighted the potential value of our RQs on people with severe addiction. Other data sets for example mortality data or hospital admissions data are whole population orientated and do not suffer from under-representation.

Full details of our PPI processes are discussed in [Patient and public involvement or community engagement, and involvement](#) and these detail for example the strong steps made to ensure text and figures were inclusive and accessible.

Reflections on our research team and wider involvement

The research team has also reflected on its own make up. Did our team include those from groups who are generally under-represented in the field of study? Was there a range of experience and expertise across the research team? How were development opportunities provided, particularly for more junior members of the team?

The research team is made up of highly qualified academic researchers. There is a balanced gender mix but ages are only between around 25–55. There were no people from Black and ethnic minorities in the team, no people smoked or drank heavily. Historically the team had a range of backgrounds across socioeconomic groups from their childhood experiences. It cannot however be claimed that the team is representative of the general population or the groups of specific interest. More junior members of the team have continued to work on related projects after the end of the SYNTAX project including new projects around health economic analysis of tobacco and alcohol policies and moving into areas around unhealthy foods. The original project plan set out to involve on PPI representative on the project management group. Attempts were made on this but this did not come to fruition as originally intended. There were reasons for this, including COVID-19-related issues and project and management, but reflecting back

now we would put more effort into ensuring greater engagement in this aspect. Finally, it is important to emphasise the departmental and institutional support for innovations around EDI in research. The research team has been engaged in the policies and training around this, including mandatory training on unconscious bias and PPI in research. See, for example, the University of Sheffield policies and training programme here: www.sheffield.ac.uk/scharr/equality-diversity.

Impact and learning

What difference has been made already?

Original anticipated output of research/impact

Use of evidence to support decisions

The impact that we were aiming for was for our research outputs to be used to inform decisions about changes to tax on tobacco and alcohol for example through submission to government consultations and a continuation of the research team's engagement with decision-makers. The evidence produced by the project could show how tax as an intervention can improve health and reduce inequalities in health versus other outcomes that have a bearing on tax change. The reason for investigating tobacco and alcohol together is that their consumption jointly affects the outcomes considered and therefore the evidence would be incomplete – especially on differential social impacts – if considered singly. The reason for our qualitative research in WP1 was to ensure that we model relevant tax interventions across tobacco and alcohol, that we understand the rationale of different stakeholders for these interventions and in doing so explore the challenges for tax as a tool to improve health. For example, part of the reason for lower tax on alcohol than tobacco is because it is seen as a less harmful substance and government therefore tends to work cooperatively with the alcohol industry. Our outputs aimed to provide an objective comparison of alternative tax changes across tobacco and alcohol.

Scientific understanding of tax as a public health intervention

There is a need for greater understanding of how public health interventions generally might effectively reduce the accumulated health harms from multiple behavioural risk factors. A further related gap is how combinations of interventions across risk factors might reduce social differentials in health. Our outputs aimed to further the scientific understanding of these questions with a focus

on tax interventions across tobacco and alcohol. Our technical contribution was aiming at developing methods that allow the fair comparison of interventions and outcomes across risk factors. Our planned outputs in conferences and peer-reviewed papers aimed to cover the qualitative comparison of stakeholder perspectives (WP1), the use of national-level data on consumer behaviour (WP2), the behavioural economics of industry and consumer responses to tax change (WP3) and the synthesis of evidence using mathematical modelling to provide evidence that is useful for decision-support (WP4).

Informing public debate

A further output aim was to inform the public conversation about tax on tobacco and alcohol alongside the stakeholders engaged in the project.

Real-world impact/potential impact

The papers produced on the structure of policy options,^{35,42} patterns of dual purchasing,³⁶ tax pass-through^{38,39} and price elasticities⁴⁰ are now available for the research community and policy analysis community to use – both in the UK and internationally. They are already being cited, with particular interest in the tax pass-through work.

The most important impact of the work will be for policy analysis purposes. Some of this work can be done as published academic research such as our main paper from the project on the ADR.⁴¹ HM Treasury was aware of this paper and the earlier work on the topic from the project through our submission to the consultation on ADR and subsequent communications to them. The work is also being utilised by stakeholders such as Alcohol Health Alliance.

Much policy analysis is done 'in-house' by Government analysts in various departments and will not necessarily become public domain knowledge. That said, impact assessments undertaken can sometimes cite the methods and policy analysis papers produced by academic researchers, and for example, there is a trail of citation for the UK Government where they utilised the natural history modelling of smoking initiation, quit and relapse from the STAPM platform to assess the impact of proposed changes to the age of sale of tobacco.⁷³

Results from the project were also used to inform the ASH submission of evidence to the Health and Social Care Committee (Oral evidence: Prevention in health and social care, HC 141, Tuesday, 6 February 2024; <https://parliamentlive.tv/Event/Index/85a852e8-85e9-493e-9c27-9a4931ebbcd6>).

What longer-term impact might there be? For example economy, efficiency, effectiveness, equity and environmental impact

This project has enabled integrated analysis of tax policies for alcohol and tobacco in the UK. Its impact longer term will be as a platform and methodology to appraise the potential impacts of policies before they are implemented. The research itself has been chiefly secondary analysis of data sets and computational modelling, so there was some environmental impact from stakeholder meetings travel, but most environmental impact has been office-work and computer analysis related.

Tax changes will and do directly affect Government revenues, changing consumption and also generating health benefits and reducing health inequalities. Some effects on the economy – in terms of revenues to government and to retailers – are already directly examined within our analytical framework. Others effects on the economy such as the longer-term effects of improved health on labour market outcomes, reduced retirement through ill-health and increased productivity and in the end changes to the gross domestic product are able to be conceived, and, although not specified as requirements and objectives of our project, they are planned as future developments of the model over the coming years.

Lessons learnt for future research

Priorities for further research are identified for each of the sub-studies and are summarised in [Key points for the research community](#).

Related work, collaborations and further funding

The following research grants and collaborations involving members of the project team are directly or indirectly related to the study in terms of being concerned with using methods or the STAPM to assess the public health and wider economic effects of alcohol, tobacco and/or taxes on unhealthy products

Further dissemination plans

The original aims for stakeholder engagement were as set out below

The stakeholder communities

Stakeholders include public health charities and governmental organisations (originally Public Health England and National Institute for Health and Care Excellence). We planned to present our project and findings in an accessible way, such as through presentations and short briefings, to generate conversations and develop pathways to impact. Originally, we planned to disseminate

TABLE 7 Selected list of related ongoing research grants

Evaluating and responding to the public health impact of no and low alcohol drinks: A multi-method study of a complex intervention in a complex system 1 July 2022–31 December 2026 Grant NIHR Evaluation Trials and Studies Coordinating Centre (Southampton, GB) URL: https://app.dimensions.ai/details/grant/grant.13046744 GRANT_NUMBER: NIHR135310 Project aims to understand how increasing no- and low-alcohol (no/lo) drinks affects public health and health inequalities in Great Britain. The study uses multiple methods to evaluate changes in alcohol-related harm, economic impacts and the strategies of the no/lo drinks industry, providing evidence for policy-makers on how to manage these shifting consumption patterns. Project will incorporate no/lo alcohol into STAPM. UKPRPICA: SPECTRUM: Shaping Public hEalth poliCies To Reduce IneqUalities and harM 31 August 2019–30 August 2024 Grant Medical Research Council (London, GB) URL: https://app.dimensions.ai/details/grant/grant.9054810 GRANT_NUMBER: MR/S037519/1 SPECTRUM was dedicated to shaping public health policies to reduce inequalities and harm from unhealthy commodity industries, including alcohol, tobacco and highly sweetened foods and drinks. By understanding and countering industry tactics, generating economic and other evidence and evaluating interventions, SPECTRUM aimed to prevent non-communicable diseases and build fairer health systems Health Hub: Systems Approaches to Commercial Determinants of Health and Equity • Funder reference: MR/Y030753/1 • Funder name: UK RESEARCH AND INNOVATION • Title: Health Hub: Systems Approaches to Commercial Determinants of Health and Equity • Award date: 22 April 2024 Project focuses on understanding and confronting strategies by corporations that harm health, aiming to develop and evaluate large-scale interventions that improve public health and equity at the local government level in England. Project is developing a local version of STAPM Reducing alcohol harms during a cost-of-living crisis: evaluating the impact of ADRs across Great Britain. Funder reference: NIHR156679 • Funder name: National Institute for Health and Care Research Project aims to evaluate the impact of reforms to the UK alcohol tax system, increases to alcohol tax rates, and the current cost-of-living crisis on alcohol consumption, associated harms and health inequalities. Project will develop a new version of STAPM and compare observed effects with model results. Targeting multiple levels of 'the smoking cessation system' using novel scientific approaches • Funder reference: PRCRPG-Nov21\100002 • Funder name: CANCER RESEARCH UK • Title: Targeting multiple levels of 'the smoking cessation system' using novel scientific approaches Project is developing and applying novel scientific approaches to increase the population rate of smoking cessation, targeting multiple levels by: integrating theory and data from population surveys and experimental studies in computational models. This includes building an agent-based model of tobacco cessation, and incorporating aspects of vaping/e-cigarette use, as well as linking analyses to long-term modelling of intervention effects using STAPM. Neighbourhood differentials in tobacco pricing across England, Wales and Scotland • Funder reference: PPRCTAGPJT\100011 • Funder name: CANCER RESEARCH UK
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continued

TABLE 7 Selected list of related ongoing research grants (*continued*)

- Title: Neighbourhood differentials in tobacco pricing across England, Wales and Scotland
- Award date: 23 August 2022

Project aimed to understand how and why tobacco prices vary between different neighbourhoods in the UK, particularly by factors like neighbourhood deprivation, retail availability and urban/rural location, in order to inform public health policies and efforts to reduce smoking.

Health Economic Analysis incorporating effects on Labour outcomes Households Environment and Inequalities (HEALTHEI) for food taxes
1 October 2022–31 March 2025 | Grant

NIHR Evaluation Trials and Studies Coordinating Centre (Southampton, GB)

URL: <https://app.dimensions.ai/details/grant/grant.13046708>

GRANT_NUMBER: NIHR133927

Project aims to identify the most effective food tax strategies by analysing their impact on health, labour outcomes, household finances, the environment and inequalities within the UK food system. It includes estimating price elasticities for food categories and estimating health and inequality impact of tax policies.

final results via academic papers, technical reports and government-focused briefings. We are now combining the latter two into short briefing reports for policy stakeholders on government tax changes.

Reports: <https://sarg-sheffield.ac.uk/publications/>

Budget briefings: <https://sarg-sheffield.ac.uk/research/modelling/stapm/budget-briefing-notes/>

The scientific community

To reach a wide scientific audience, we planned to present at major international alcohol (Kettil Bruun Society) and tobacco (Society for Research on Nicotine and Tobacco) conferences, as well as national public health conferences. However, due to the COVID-19 pandemic, we prioritised journal articles over conferences. We have submitted and published research papers in peer-reviewed scientific journals, with two more in preparation. All papers are open access through pre-print versions on the White Rose repository (<http://eprints.whiterose.ac.uk/>) and by paying journal fees.

Public focused media

Our original plan was to partner with stakeholders and members of our public involvement panels to present and explain our findings in an engaging, consumer-focused way.

Patient and public involvement

We planned and did engage with members of each of our three PPI panels [the UK Centre for Tobacco and Alcohol Studies (UKCTAS) smokers and drinkers' panels, and the Sheffield Addiction Recovery Research Panel].

Study Steering Committee

We established a Study Steering Committee (SSC) of international experts in public health and economics related to

tobacco and alcohol (see [Table 8](#) in [Appendix 1](#)). Its international composition aimed to strengthen the project's independence from potential industry questioning. We intended for the SSC to meet primarily via teleconference, with occasional opportunistic meetings and e-mail advice. However, the committee's role was very limited, mostly due to the COVID-19 pandemic and its impact on the research was limited.

The main dissemination has been through published papers, submission to Government tax policy consultation, and making stakeholders (especially with Alcohol Change UK, ASH and DHSC) aware of the products and results of our work. Stakeholders in Scotland and Welsh Governments have commissioned the University of Sheffield separately to model potential changes to MUP for alcohol. Scotland has also commissioned work on MUP for tobacco.

Further dissemination

The project's findings have been published in open-access, peer-reviewed journals, with more submissions planned. Results will also be shared through national and international conferences. Collaborators' membership in UKCTAS and in the SPECTRUM programme grant enables the dissemination of plans, progress and results, including a lay summary. The study's plans were published on the UKCTAS website, featuring collaborator and NIHR logos, promoting accessibility to partners and the public.

Further dissemination will be led by the University of Sheffield and supported by Bath. Both research groups have extensive experience ensuring their findings have high scientific, policy and public impact, which will be used to reach a wide range of national and local stakeholders. The University of Sheffield media team will also ensure high public awareness via press releases and commentaries for online projects like The Conversation.

Reporting on climate, health and sustainability

The programme of research did not focus on climate or sustainability aspects. Clearly, the main thrust of the work is that increased taxation on both alcohol and on tobacco and in combination can have beneficial health effects.

Implications for decision-makers

This body of research and the infrastructure developed to undertake further policy analysis is now available for decision-makers to utilise and for stakeholders to specify or commission further model runs.

The estimated impacts of tax policies are clear and need to be considered by policy-makers. They include the reduced incidence and prevalence of more than 60 diseases associated with alcohol consumption and tobacco smoking, reductions in deaths, NHS cost savings and the impact on inequalities. Combined taxes generate additional benefits, larger taxes generate larger estimated reductions in health harms and deaths, and tax policies focused on increasing prices for cheaper alcohol (e.g. cider) and cheaper tobacco (e.g. HRT) tend to reduce inequalities in health more than general tax rises.

The infrastructure developed and used in this project has now been collected together to provide a basis for very rapid response impact analyses when new national alcohol and tobacco tax policy options or decisions are made. Within a couple of days, the research team is now able to estimate the potential impact of alcohol and tax policy changes. Our rapid response analysis of combined effects of the Autumn 2024 changes to alcohol and tobacco duties can be seen in table 2 of our online briefing for decision-makers⁷⁴ (briefings are at <https://sarg-sheffield.ac.uk/research/modelling/stapm/budget-briefing-notes/>).

Research recommendations

Further research to deepen understanding and knowledge on these topics would be useful. The research team has identified the following topics in priority order:

1. Further tax policy analysis research: the policy analyses in WP4 represent a broad and important set of policies for stakeholders, but there are many more variants of these policies. Policy-makers and research funders in the UK can capitalise on the STAPM platform to commission both rapid response

analysis, and deeper policy research on tax and pricing options for tobacco and alcohol. Some further research studies are ongoing (see [Related work, collaborations and further funding](#)).

2. Adding vaping to the analysis: research funding to add e-cigarettes to the modelling would be particularly useful because there have been large rises in e-cigarette use particularly among younger people and these represent an important shift in behaviours with uncertain long-term consequences. The relationship between availability and prices of vapes and purchasing and use of tobacco is crucial to understand. Price elasticities for vapes are not yet well understood. And the long-term trends on health outcomes and inequalities of trends in vape use and the combined impact of policies focused on vape use, and HRT and FM cigarettes are a priority for investigation.
3. Incorporating interactions between mental health and use of alcohol and tobacco: Because use of tobacco is particularly high for people living with mental health conditions, it would also be useful to add an understanding of mental health conditions, and the interaction between smoking, mental health and diseases and also work productivity over the life-course.
4. Behavioural research and agent based modelling: some work is ongoing (see [Related work, collaborations and further funding](#)) and further work is needed to hypothesis and test mechanisms that affect probability of undertaking a tobacco quit attempt and the probability of the attempt being a success. Theoretical and data-led approaches to understanding and quantifying these mechanisms, including peer influence and social networks, can be incorporated into an agent based modelling framework using, for example the COM-B (capability, opportunity, motivation and behaviour) framework. Testing such theory based models against more empirical observations, can then lead to utilising the models to discover targets for intervention.
5. Generalisability of evidence on price elasticities: the new findings on price elasticities estimated jointly for alcohol and tobacco are particularly important. It would be useful to see whether researchers in other countries could adopt these or similar methods to investigate the generalisability of these findings in other areas of the world. It would also be useful to utilise other data sources on alcohol and tobacco purchases, for example to be obtained from market research companies, to generate analogous estimates of joint price elasticities for alcohol and tobacco.

6. STAPM data updates: the modelling developed in WP4 has been implemented with the latest data sets available for each component. The infrastructure is set up to enable fairly smooth updating of these data sources on consumption, purchasing, prices, hospitalisations and mortality as time progresses and this will be a priority for the research team moving forward.

Conclusions

Key findings

Work package 1: policy review findings

Stakeholder and evidence review identify four policy themes: changes to excise duty within existing tax structures, structural reforms, industry measures, and hypothecation of tax revenue for public benefits.

For alcohol, policy options focused on raising the price of cheap, high-strength alcohol. For tobacco, policy options focused on raising the price of all tobacco products, especially the cheapest hand-rolling tobacco.

Reducing harm, improving health and reducing consumption were ranked most highly with many other policy objectives perceived as contributing to these overarching goals.

Work package 2: purchasing patterns

'Dual purchasing households' of both alcohol and tobacco spend a much greater share of their total expenditure on tobacco or alcohol than households who buy only one of these commodities, particularly so in the lowest income group.

Increasing prices of alcohol or tobacco could have the biggest relative impact on the lowest income dual purchasers.

Work package 3: tax pass-through

On trade alcohol tax pass-through: when tax is increased for on-trade alcohol, retailers pass less of the tax on to price rises for consumers of the cheapest alcohol categories ('undershifting') and more of the tax onto the more expensive products 'overshifting'. Undershifting occurs in almost all of the quantiles across the price distribution, with retailers only overshifting in the highest price quantiles.

Tobacco tax pass-through: the tobacco industry predominantly overshifts tax in the form of higher than expected prices, with the magnitude of the overshift is greater at the more expensive end of the price distribution. This is consistent for both FM cigarettes and HRT. Rates of tax

pass-through for branded versus standardised packaging did not differ significantly since the implementation of standardised packaging.

Work package 3: price responsiveness evidence

We calculate, for the first time, own- and cross-price elasticities for disaggregated alcohol and tobacco products within the same generalised two-stage Tobit model framework.

There are statistically significant own and cross price elasticities for both participation and conditional consumption for each of the 12 products.

There is variation across products and small but important cross-elasticity effects – enabling us to analyse the effects of changing alcohol prices on tobacco use and vice versa. Most importantly, when we increase both tobacco and alcohol price together, we get a bigger impact than if we do both separately.

Our new results for alcohol estimate somewhat larger price responsiveness than those previously published by HMRC, while our new results for tobacco are considerably closer to those used by HMRC.

Work package 4: policy modelling

We have developed a new version of the STAPM (version 2.1.0).

Analysis of 33 different possible policy options shows detailed interactions between different variants and combinations of alcohol and tobacco tax policies. This broadly finds that combined taxes generate additional benefits, that larger taxes generate larger reductions in health harms and deaths, and that tax policies focused on increasing prices for cheaper alcohol (e.g. cider) and cheaper tobacco (e.g. HRT) tend to reduce inequalities in health more than general tax rises.

A detailed appraisal of the UK Government's new ADR using STAPM v2.4.2 demonstrated that the public health impact of the ADR is likely to be broadly neutral, with limited impacts on average alcohol consumption, while reducing deaths by approximately 2300 over 20 years compared to the retaining the previous duty system.

A hypothetical cider duty escalator policy (compared to ADR as implemented) is estimated to deliver substantially improved health outcomes, with approximately 8300 more deaths prevented compared to the ADR.

It is further estimated that a hypothetical policy of immediately equalising duty rates – across all beverage types between 3.5% and 8.4% ABV – could yield substantial public health and health inequality benefits, with approximately 74,500 more deaths prevented compared to the ADR.

The infrastructure developed provides a platform for many further policy analyses in future research grants and rapid response policy appraisal exercises with government bodies and other stakeholders.

Summary conclusion

This research provides a series of developments in the evidence base to enable integrated analysis and policy appraisal for tobacco and alcohol jointly. Because their purchase and use is correlated across socioeconomically defined subgroups and risk groups in the population, there is a need to analyse the effects of changes in their use, and policies that change their use, particularly tax policies.

This research report provides a step change for the research community and for policy-makers, enabling further understanding and appraisal of tax policies and their consequences in terms of consumption, spending and retailer revenues, government fiscal impact, health harm reduction and the socioeconomically patterned health inequalities.

Additional information

CRediT contribution statement

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Writing – reviewing and editing (supporting), Visualisation (supporting), Supervision (supporting), Funding acquisition (supporting).

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Work package 1: Jenny Hatchard (Research Fellow, Bath) led and Penny Buykx (Senior Research Fellow, Sheffield and then in Newcastle Australia) contributed to the qualitative methodological development, data collection and analysis. Jenny Hatchard provided expertise in qualitative research on tobacco and alcohol and interdisciplinary research consulting stakeholders. Penny Buykx provided expertise in mixed-methods research and integration of findings.

Work package 2: Colin Angus (Research Fellow, Sheffield) led and Rosemary Hiscock (Research Associate, Bath) supported data preparation tasks and methodological development for the analysis. Colin Angus provided expertise in the analysis of pricing policies and commercial data for alcohol using health economic modelling. Rosemary provided expertise in the socioeconomic inequalities in tobacco consumption, commercial tobacco data and policy implications. Luke Wilson undertook the operational analysis work and led the development of the two main journal article submissions from this WP.

Work package 3: Rob Pryce (Research Fellow, Sheffield) led the methodological development and analysis of price elasticities with support from Alan Brennan and Colin Angus. Rob provided expertise in the economic analysis of the relationship between product price and demand (price elasticities). Brennan and Angus contributed methodological expertise from their experience of estimating price elasticities for alcohol. Luke Wilson was also heavily involved in the price elasticity analysis. Rob Pryce led the writing of the elasticities paper reporting the result of the generalised Tobit modelling. Luke Wilson also developed and undertook the quantile regression methods to analyse tax pass-through and produce the two papers on this topic.

Work package 4: Duncan Gillespie (Research Fellow, Sheffield) led the methodological development and analysis of the policy modelling, with support from Colin Angus and Alan Brennan and Rob Pryce and Damon Morris (Research Associate, Sheffield). Duncan Gillespie provided expertise on population demographic modelling as well as on the development and application of the tobacco extension to the SAPM funded by the UK Centre for Tobacco and Alcohol Studies and more recently by the UKPRP SPECTRUM collaboration. Damon Morris conducted the final

analyses and is leading the development of further extensions to the tax policy modelling.

Alan Brennan acted as the PI and Chair the Project Management Group. Duncan Gillespie was responsible for the day-to-day project management and co-ordination. John Holmes (Professor, Sheffield), Petra S Meier (former Professor of Public Health, Sheffield, now with Glasgow university) and Anna Gilmore (Professor of Public Health, Bath) provided oversight on project management and co-ordination, expertise on all WPs with input on methods and analysis, and contributed to stakeholder engagement and dissemination.

We also need to acknowledge the role of Laura Webster (former Research assistant, Sheffield, now with Public health England), who undertook much of the data preparation, R coding and unit testing of the STAPM in partnership with Duncan Gillespie.

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Intellectual property

The University of Sheffield owns the background IP to the substantial SAPM and to the STAPM. The Sheffield modelling team has developed further adaptations to the STAPM model through this grant. The University of Sheffield retains ownership of the IP to the STAPM.

Data-sharing statement

This study is mainly a secondary research project, bringing together and synthesising evidence from a range of sources. The terms under which consent was sought and obtained mean that the raw data are only able to be seen and analysed by named researchers and cannot be shared with any other persons. Further information can be obtained from the corresponding author.

Ethics statement

Ethical approval for qualitative work in WP1 provided by University of Sheffield. Date: 19 June 2018. Project title: Work package 1 of SYNTAX project – Integrated evidence synthesis

for joint appraisal of tobacco and alcohol tax interventions for harm reduction in the UK. Reference Number: 017409. Approval letter signed by Charlotte Claxton, on behalf of the ScHARR Research Ethics Committee.

Information governance statement

Information governance was undertaken in line with University of Sheffield Policies and with the agreement of each data provider. As an example, the research team has used the Living Costs and Food Survey data within the UK Data Service Secure Lab, which means that the raw data are only able to be seen and analysed by named researchers and cannot be shared with any other persons.

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Disclosure of interests

Full disclosure of interests: Completed ICMJE forms for all authors, including all related interests, are available in the toolkit on the NIHR Journals Library report publication page at <https://doi.org/10.3310/PLFR8463>.

Primary conflicts of interest: Petra S Meier is a member of the PHR Research Funding Board and is a remunerated scientific adviser to the Institute of Alcohol Studies. Colin Angus and John Holmes have received funding related to commissioned research from Systembolaget, the Swedish government-owned alcohol retail monopoly.

Department of Health and Social Care disclaimer

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This synopsis was published based on current knowledge at the time and date of publication. NIHR is committed to being inclusive and will continually monitor best practice and guidance in

relation to terminology and language to ensure that we remain relevant to our stakeholders.

Study registration

This study is registered as researchregistry3814.

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Award publications

This synopsis provided an overview of the research award *Integrated evidence synthesis for joint appraisal of tobacco and alcohol tax interventions for harm reduction in the UK*.

Other articles published as part of this thread are:

Hatchard J, Buykx P, Wilson L, Brennan A, Gillespie D. Mapping alcohol and tobacco tax policy interventions to inform health and economic impact analyses: a United Kingdom based qualitative framework analysis. *Int J Drug Policy* 2023;**122**:104247. <https://doi.org/10.1016/j.drugpo.2023.104247>

Wilson LB, Angus C, Pryce R, Holmes J, Brennan A, Gillespie D. Do dual purchasers behave differently? An analysis of purchasing data for households that buy both alcohol and tobacco in the United Kingdom. *Addiction* 2021;**116**:2538–47. <https://doi.org/10.1111/add.15430>

Wilson LB, Pryce R, Angus C, Hiscock R, Brennan A, Gillespie D. The effect of alcohol tax changes on retail prices: how do on-trade alcohol retailers pass through tax changes to consumers? *Eur J Health Econ* 2021;**22**:381–92. <https://doi.org/10.1007/s10198-020-01261-1>

Wilson LB, Pryce R, Hiscock R, Angus C, Brennan A, Gillespie D. Quantile regression of tobacco tax pass-through in the UK 2013–2019: how have manufacturers passed through tax changes for different tobacco products? *Tobacco Control* 2020;**30**:e27–32. <http://dx.doi.org/10.1136/tobaccocontrol-2020-055931>

Pryce R, Wilson LB, Gillespie D, Angus C, Morris D, Brennan A. Estimation of integrated price elasticities for alcohol and tobacco in the United Kingdom using the living costs and food survey 2006–2017. *Drug Alcohol Rev* 2024;**43**:315–24. <https://doi.org/10.1111/dar.13773>

Morris D AC, Gillespie D, Stevely AK, Pryce R, Wilson L, Henney M, et al. Estimating the effect of transitioning to a strength-based alcohol tax system on alcohol consumption and health outcomes: a modelling study of tax reform in England. *Lancet Public Health* 2024;9:e719–28. [https://doi.org/10.1016/S2468-2667\(24\)00191-9](https://doi.org/10.1016/S2468-2667(24)00191-9)

For more information about this research please view the award page (www.fundingawards.nihr.ac.uk/award/16/105/26).

Additional outputs

Hatchard J, Buykx P, Brennan A, Gillespie D. Options for modifying UK alcohol and tobacco tax: a rapid scoping review of the evidence over the period 1997–2018 [version 3; peer review: 2 approved]. *NIHR Open Res* 2023;3:26. <https://doi.org/10.3310/nihropenres.13379.3>

Hatchard J, Buykx P, Wilson L, Brennan A, Gillespie D. Mapping alcohol and tobacco tax policy interventions to inform health and economic impact analyses: a United Kingdom based qualitative framework analysis. *Int J Drug Policy* 2023;122:104247. [doi:10.1016/j.drugpo.2023.104247](https://doi.org/10.1016/j.drugpo.2023.104247)

Chen RKL, Morris D, Angus C, Gilmore A, Hiscock R, Holmes J, et al. Reducing the exceptional affordability of hand-rolling tobacco using tax escalators: a health and economic impact modelling study for England. *Tobacco Control* Published Online First: 6 January 2026. <https://doi.org/10.1136/tc-2025-059670>

Earlier versions of these works were also submitted to the following conferences

Wilson L, Pryce R, Angus C, Hiscock R, Brennan A, Gillespie D. *The Effect of Alcohol Tax Duty Changes on On-trade Retail Prices: How Do Retailers Respond?* The Health Economists' Study Group Winter 2019 Meeting, Centre for Health Economics, University of York. 2019. URL: <https://hesg.org.uk/meetings/winter-2019-university-york/>

Wilson L, Angus C, Pryce R, Brennan A, Gillespie D. *Socioeconomic variation in the relationship between household spending on alcohol and tobacco and overall household expenditure in England*. Kettil Bruun Society conference, Utrecht, Netherlands, 2019. URL: www.kbs2019utrecht.nl/

Hatchard J, Buykx P, Wilson L, Brennan A, Gillespie D. *Mapping Alcohol and Tobacco Tax Interventions for Health in the UK: A Qualitative Framework Analysis*. Poster presented at the Public Health Science conference, London. 2019. [https://doi.org/10.1016/S0140-6736\(19\)32848-X](https://doi.org/10.1016/S0140-6736(19)32848-X)

See the poster here: https://figshare.shef.ac.uk/articles/poster/Mapping_alcohol_and_tobacco_tax_interventions_for_health_in_the_UK_A_qualitative_framework_analysis/24541606

Hatchard J, Gillespie D, Buykx P. Using Framework Analysis Deductively: A Case Study from Alcohol and Tobacco Tax Policy and Modelling Research. In Clift B, Gore J, Bekker S, Costas Batlle I, Chudzikowski K, Hatchard J, editors, *Myths, Methods and Messiness: Insights for Qualitative Research Analysis*: Edited Proceedings of the Fifth Annual Qualitative Research Symposium. Bath: University of Bath; 2019. URL: <https://researchportal.bath.ac.uk/en/publications/myths-methods-and-messinessinsights-for-qualitative-research-ana>

About this synopsis

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List of supplementary material

Report Supplementary Material 1

Additional material on price elasticities methods and results

Report Supplementary Material 2

Additional details on technical description of methods to model the dynamics of tobacco and alcohol consumption and related mortality and morbidity outcomes in the STAPM microsimulation as at July 2022

Report Supplementary Material 3

Additional material on methods for modelling tax intervention effects as at July 2022

Report Supplementary Material 4

Details of policies to model and price elasticities sensitivity scenarios to use

Report Supplementary Material 5

Results for WP4 exploratory modelling of different policies using STAPM version 2.1.0

Report Supplementary Material 6

Results of modelling the new proposed alcohol duty system (using STAPM version 2.1.1)

Supplementary material can be found on the NIHR Journals Library article page (<https://doi.org/10.3310/PLFR8463>).

Supplementary material has been provided by the authors to support the article and any files provided at submission will have been seen by peer reviewers, but not extensively reviewed. Any supplementary material provided at a later stage in the process may not have been peer reviewed.

The supplementary materials (which include but are not limited to related publications, patient information leaflets and questionnaires) are provided to support and contextualise the publication. Every effort has been made to obtain the necessary permissions for reproduction, to credit original sources appropriately, and to respect copyright requirements. However,

despite our diligence, we acknowledge the possibility of unintentional omissions or errors and we welcome notifications of any concerns regarding copyright or permissions.

Glossary

High-risk drinkers High-risk drinking is classified as drinking more than 35 units per week for females and 50 units per week for males.

Increasing risk drinkers Increasing risk drinking is classified as drinking more than 14 units per week both females and for males.

Minimum unit price A minimum unit price of 50p per unit means that alcohol cannot be sold below that price for example if a can of lager contains 2 units of alcohol, its sale price must be £1 or above.

Off-trade/off premise Alcohol bought in shops and supermarkets to be drunk elsewhere.

On-trade/on premise Alcohol bought in pubs bars and restaurants and so on to be drunk on the premises.

Participation A person in the simulation model can either be a current, former or never smoker. Participation in smoking a model year for example in 2023, means that the person does smoke factory-made or hand-rolled (roll-your-own) tobacco in that year. A person who has quit smoking becomes a non-participant. A person who relapses after quitting returns to being a participant. The same principles apply to alcohol. Simulated people in the model can participate in drinking alcohol or not in a particular model year. They can also participate in using a particular category of alcohol for example participate in drinking off-trade wine but not participate in drinking on-trade spirits. For someone to stop being a participant in alcohol or tobacco consumption due to a tax rise, they would have to respond to the tax rise by stopping their participation in each type of alcohol or tobacco they currently consume, accounting for possible switching between product types as a response to price rises.

'Scorecard period' Term used by UK government for 5 years ahead period – in the case of the modelling here we mean 1 April 2022–31 March 2027.

Unit of alcohol 10ml of pure ethanol.

List of abbreviations

ABV	alcohol by volume
ADR	alcohol duty reform
ASH	Action on Smoking and Health
CGA	Consumer Growth Associates
DHSC	Department of Health and Social Care
FM	factory-made (cigarettes)
HMRC	His Majesty's Revenue and Customs
HRT	hand-rolled tobacco
HSE	Health Survey for England
IMD	Index of Multiple Deprivation
LCFS	Living Costs and Food Survey
MET	Minimum Excise Tax
MUP	minimum unit pricing
PPI	patient and public involvement
RPI	Retail Price Index
RQ	research question
RTD	ready-to-drink alcohol
RYO	roll-your-own tobacco
SAPM	Sheffield Alcohol Policy Model
SKU	stock keeping unit
SPECTRUM	Shaping Public Health policies To Reduce inequalities and harm
SSC	Study Steering Committee
STAPM	Sheffield Tobacco and Alcohol Policy Model
TAX-sim	Tobacco and Alcohol Tax and Price Policy Simulation
UKCTAS	UK Centre for Tobacco and Alcohol Studies
VAT	value-added tax
WP	work package
YLL	years of life lost

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Appendix 1 Study steering group: original proposed membership

TABLE 8 Study steering group – original proposed membership

Proposed steering Committee member	Affiliation	Reason for suggested inclusion
Tim Stockwell	Director, Centre for Addictions Research, British Columbia, University of Victoria, Canada	Leading expert on alcohol pricing interventions
Bill Ponicki	Research Scientist, Pacific Institute for Research and Evaluation, USA	Leading expert on econometric and statistical methods for the analysis of the effects of alcohol pricing interventions
Harold Holder	Senior Scientist Emeritus and former Director of Prevention Research Center, Pacific Institute for Research and Evaluation, USA	Leading expert on the effects of alcohol pricing interventions
Mats Ramstedt	Head of Research, The Swedish Council for Information on Alcohol and Other Drugs (CAN), Sweden	Leading expert in the analysis of alcohol policy impacts
Thor Norstrom	Professor, Swedish Institute for Social Research, Sweden	Leading expert on statistical methods for the evaluation of alcohol policy impacts
Pia Makela	Professor, National Institute for Health and Welfare, Finland	Leading expert on alcohol policy and health inequalities
Professor Frank Chaloupka	Research Professor, Institute for Health Research and Policy, University of Illinois, USA	Leading expert on the economics of tobacco
Corne van Walbeek	Professor, School of Economics, University of Cape Town, South Africa	Leading expert on price elasticities of tobacco and socioeconomic variation in response to price changes
Hana Ross	Principle Research Officer, School of Economics, University of Cape Town, South Africa	Leading expert on the economics of tobacco control policy
Evan Blecher	Senior Economist, Economic and Health Policy Research, American Cancer Society, USA	Leading expert on the economics of tobacco control policy
David Abrams	Professor, Bloomberg School of Public Health, Johns Hopkins, USA	Leading expert on the translation of scientific evidence on tobacco policy into evidence
David Jernigan	Associate Professor, Bloomberg School of Public Health, Johns Hopkins, USA	Leading expert on alcohol policy
Franco Sassi	Professor, Business School, Imperial College, UK and Senior Health Economist, Organisation for Economic Cooperation and Development, Paris	Leading expert on public health policy modelling