



SYSTEMATIC REVIEW

# REVISÉD Options for modifying UK alcohol and tobacco tax: A rapid scoping review of the evidence over the period 1997–2018 [version 2; peer review: 2 approved]

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## Abstract

### Background:

Increased taxation is recognised worldwide as one of the most effective interventions for decreasing tobacco and harmful alcohol use, with many variations of policy options available. This rapid scoping review was part of a NIHR-funded project ('SYNTAX' 16/105/26) and was undertaken during 2018 to inform interviews to be conducted with UK public health stakeholders with expertise in alcohol and tobacco pricing policy.

### Methods:





Objectives: To synthesise evidence and debates on current and potential alcohol and tobacco taxation options for the UK, and report on the underlying objectives, evidence of effects and mediating factors.


Eligibility criteria: Peer-reviewed and grey literature; published 1997–2018; English language; UK-focused; include taxation interventions for alcohol, tobacco, or both.


Sources of evidence: PubMed, Scopus, Cochrane Library, Google, stakeholder and colleague recommendations.

## Open Peer Review

Approval Status  

	1	2
<b>version 3</b> (revision) 30 Oct 2023		
<b>version 2</b> (revision) 03 Oct 2023	 view	 view
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1. **Lana Elliott** , Queensland University of Technology, Brisbane, Australia

2. **G. Emmanuel Guindon** , McMaster University, Hamilton, Canada

Any reports and responses or comments on the article can be found at the end of the article.

Charting methods: Excel spreadsheet structured using PICO framework, recording source characteristics and content.

**Results:**

Ninety-one sources qualified for inclusion: 49 alcohol, 36 tobacco, 6 both. Analysis identified 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 products, which are hand-rolling tobacco. For alcohol and tobacco, there were options such as levies that take money from the industries to help reduce the societal costs of their products. Due to the perceived social and economic importance of alcohol in contrast to tobacco, policy options also discussed supporting pubs and small breweries.

**Conclusions:**

This review has identified a set of tax policy options for tobacco and alcohol, their objectives, evidence of effects and related mediating factors. The differences between alcohol and tobacco tax policy options and debates suggest an opportunity for cross-substance policy learning.

**Plain language summary**

Why we did it: Alcohol and tobacco cause many diseases and deaths. People who drink heavily are more likely to be smokers. People who smoke and drink heavily are more likely to get ill and die sooner. Increasing alcohol and tobacco taxes has been shown to reduce their consumption. Research was needed to understand how and why alcohol and tobacco tax might be changed. This rapid scoping review was undertaken during 2018 as part of a National Institute for Health and Care Research funded project called 'SYNTAX' (16/105/26). Its main purpose was to inform interviews to be conducted with UK public health stakeholders with expertise in alcohol and tobacco pricing policy.

Why we did it: We looked at academic papers and policy reports published between 1997 and 2018 that discussed or estimated the effects of changes to tax on alcohol and tobacco.

What we found: The results of the review summarise the options for changing alcohol and tobacco taxes that were being considered in the UK, and why.

What this means: Some options for changing tax were the same for alcohol and tobacco, but there were also differences between alcohol and tobacco, which reflected differences in how alcohol and tobacco

are viewed in society. We used the findings of the review to prepare to speak to alcohol and tobacco tax experts about the options for changing tax on alcohol and tobacco, which we did in 2018.

### Keywords

commercial influences on health, unhealthy commodities, public health

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**REVISED Amendments from Version 1**

The revised article takes into account the changing landscape of alcohol and tobacco tax policies in the UK from 2018 to 2023, with Brexit playing a significant role. It discusses recent structural reforms in alcohol taxes and possible adjustments in tobacco taxes.

In the introduction, we improved clarity by refining sentences, addressing grammar issues, defining complex terms, and adding information about changes in alcohol tax structures.

The methods section now provides a more detailed explanation for why we didn't assess the quality of studies in our rapid review, aligning with our specific scoping objectives.

In the results section, we clarified that we categorised sources into those presenting quantitative policy effects and those offering qualitative insights. While we didn't explicitly differentiate between computer model-based and real-world data studies, we enhanced the language used to describe the type of studies that the quantitative effect estimates were derived from.

In the discussion section, we added an explanation for why previous research rarely examined the combined effects of alcohol and tobacco and the potential benefits of doing so. This insight came from a workshop report involving UK academics and policy professionals. The limitations section now explicitly acknowledges the 2018 search end date as a potential limitation due to the dynamic nature of alcohol and tobacco tax policies. We briefly discuss the potential implications of Brexit on alcohol and tobacco taxation. Lastly, we included a new point about not examining non-tax price measures like minimum pricing, highlighting their importance but recognizing their distinction from tax policies.

**Any further responses from the reviewers can be found at the end of the article**

**Plain language summary****Why we did it**

Alcohol and tobacco cause many diseases and deaths. People who drink heavily are more likely to be smokers. People who smoke and drink heavily are more likely to get ill and die sooner. Increasing alcohol and tobacco taxes has been shown to reduce their consumption. Research was needed to understand how and why alcohol and tobacco tax might be changed. This rapid scoping review was undertaken during 2018 as part of a National Institute for Health and Care Research funded project called 'SYNTAX' (16/105/26). Its main purpose was to inform interviews to be conducted with UK public health stakeholders with expertise in alcohol and tobacco pricing policy.

**What we did**

We looked at academic papers and policy reports published between 1997 and 2018 that discussed or estimated the effects of changes to tax on alcohol and tobacco.

**What we found**

The results of the review summarise the options for changing alcohol and tobacco taxes that were being considered in the UK, and why.

**What this means**

Some options for changing tax were the same for alcohol and tobacco, but there were also differences between alcohol and tobacco, which reflected differences in how alcohol and tobacco are viewed in society. We used the findings of the review to prepare to speak to alcohol and tobacco tax experts about the options for changing tax on alcohol and tobacco, which we did in 2018.

**Introduction**

Alcohol and tobacco are major risk factors for a wide range of diseases<sup>1,2</sup>. To give a sense of the scale of the health burden caused by alcohol and tobacco consumption, in 2016 in England, there were 337,000 alcohol-related hospital admissions, and 484,700 tobacco-related hospital admissions<sup>3,4</sup>. Furthermore, drinking and smoking are correlated behaviours<sup>5</sup>, meaning that people who smoke tend to have higher levels of alcohol consumption, and these people consequently spend a high proportion of their budgets on alcohol and tobacco<sup>6</sup>. Of the available interventions to jointly address alcohol and tobacco related harms<sup>7</sup>, increasing taxes on alcohol and tobacco is considered among the most effective approaches to improve health<sup>8,9</sup>. In general, there is evidence that increases in product prices decrease demand<sup>10-16</sup>, especially in socio-economically disadvantaged groups<sup>17-19</sup>.

Excise taxes are those levied on selected goods produced for sale in a country or imported and sold in that country. They are imposed by governments mainly as specific excise taxes or ad valorem taxes, and are collected from the producer or manufacturer within a certain time frame (e.g., 20-30 days) after the product has left the factory<sup>20</sup>. Excise duties are commonly applied to alcohol (155 countries in 2016) and tobacco products (166 countries in 2018) worldwide<sup>21,22</sup>. As elsewhere, excise duties are applied in the UK after manufacturing. Both alcohol and tobacco products incur specific excise duties (calculated as a fixed tax per specified element of product: e.g., per litre, cigarette stick, gram). Cigarettes also incur ad valorem excise duties (calculated as a percentage of the retail price) and, since 2017, have been subject to a minimum excise duty (set at £293.95 per 1,000 cigarettes at the time that this review was conducted, but having subsequently increased). Since 2010, tobacco excise duty has been increased annually in accordance with a duty escalator of a certain percentage above inflation (the rate of increase in tobacco duty under the escalator has varied over time). The UK Government decided to remove a similar duty escalator for alcohol in 2013 (for beer) and 2014 (for other alcohol products). The report by Angus and Henney<sup>23</sup> gives model-based estimates of the impact of the decision to remove the alcohol duty escalator and of the subsequent reductions and freezes in alcohol duty. The rates of excise duties in the UK at the time that this review was conducted can be found in [Box 1](#)<sup>24,25</sup>. At that time, UK alcohol and tobacco tax options were constrained by shared European Union (EU) directives on alcohol and tobacco tax<sup>26,27</sup>, which have since been passed across into UK law. In addition to excise duties, alcohol and tobacco products in the UK are also subject to a 20% tax applied at point of sale (known in the UK as Value Added Tax (VAT)).

**Box 1. UK excise duty rates and European Union duty regulations for alcohol and tobacco (correct for January 2019)**

	UK Excise duty rates as at January 2019	European Union regulations	
<b>TOBACCO</b>			
Cigarettes	The highest of: 16.5% of the retail price plus £4.57 on a packet of 20 OR £293.95 per 1,000 cigarettes (Minimum Excise Tax)	Directive 2011/64/EU requires Member States to levy a minimum rate of excise duties on cigarettes which must consist of: <ul style="list-style-type: none"> <li>- A specific component of between 7.5% and 76.5% of the total tax burden (TTB) - expressed as a fixed amount per 1000 cigarettes</li> <li>- An ad valorem component - expressed as a percentage of the maximum retail selling price</li> </ul> In addition, the overall excise rate must be: <ul style="list-style-type: none"> <li>- At least EUR 90 per 1000 cigarettes</li> <li>- At least 60% of the weighted average retail selling price [Only applies to Member States that apply excise duty &lt; EUR 115].</li> </ul>	
Cigars	£2.85 on a 10g cigar	Directive 2011/64/EU requires Member States to levy a minimum rate of excise duties on other tobacco products. Member States can choose between applying a specific component or an ad valorem component, or if they wish, they may apply a mixture of the two. <ul style="list-style-type: none"> <li>- Fine-cut smoking tobacco: 48% (rising to 50% by 2020) of the weighted average retail selling price OR EUR 60 per kilogram*</li> <li>- Cigars and Cigarillos: 5% of the retail selling price OR EUR 12 per 1000 or per kilogram</li> <li>- Other smoking tobaccos: 20% of the retail selling price OR EUR 22 per kilogram</li> </ul>	
Hand rolling tobacco	£5.87 on a 25g packet		
Other smoking tobacco and chewing tobacco	£3.13 on a 25g packet		
<b>ALCOHOL</b>			
Beer >1.2% - ≤2.8%	8.42p per litre for each % alcohol	Hectolitre per degree Plato: EUR 0.748 OR Hectolitre per degree alcohol: EUR 1.87	
Beer >2.8% - ≤7.5%	19.08p per litre for each % alcohol		
Beer >7.5%	24.77p per litre for each % of alcohol		
Still cider >1.2% - ≤7.5%	40.38p per litre	Standard VAT rate, which cannot be less than 15%.	
Still cider >7.5% - <8.5%	61.04p per litre		
Sparkling cider >1.2% - ≤5.5%	40.38p per litre		
Sparkling cider >5.5% - <8.5%	279.46p per litre		
Still wine >1.2% - ≤4%	88.93p per litre	Wine (still or sparkling) Hectolitre of volume: EUR 0  Intermediate products (e.g. sherry or port) Hectolitre of volume: EUR 45	
Still wine >4% - ≤5.5%	122.30p per litre		
Still wine >5.5% - ≤15%	288.65p per litre		
Still wine >15% - ≤22%	384.82p per litre		
Sparkling wine >5.5% - <8.5%	279.46p per litre		
Sparkling wine >8.5% - ≤15%	369.72p per litre		
Spirits	2874p per litre of pure alcohol		Hectolitre of pure alcohol: EUR 550

[sources:

UK: <https://www.gov.uk/government/publications/rates-and-allowances-excise-duty-tobacco-duty/excise-duty-tobacco-duty-rates>; <https://www.gov.uk/government/publications/rates-and-allowance-excise-duty-alcohol-duty/alcohol-duty-rates-from-24-march-2014>,EU: [https://ec.europa.eu/taxation\\_customs/business/excise-duties-alcohol-tobacco-energy/excise-duties-alcohol\\_en](https://ec.europa.eu/taxation_customs/business/excise-duties-alcohol-tobacco-energy/excise-duties-alcohol_en); [https://ec.europa.eu/taxation\\_customs/business/excise-duties-alcohol-tobacco-energy/excise-duties-tobacco\\_en](https://ec.europa.eu/taxation_customs/business/excise-duties-alcohol-tobacco-energy/excise-duties-tobacco_en)

Since conducting this review, the UK government has decided to introduce changes to the duty structure for alcohol products, creating a standardised series of tax bands based on alcohol by volume and introducing tax relief for small producers and on products sold in the on-trade venues, such as pubs<sup>28</sup>. These reforms came into effect on 1<sup>st</sup> August 2023.

The objective of this scoping review was to synthesise evidence and debates on contemporary alcohol and tobacco taxation options for the UK, and to report underlying objectives, observed or predicted effects and mediating factors. It was undertaken to inform subsequent interviews conducted with UK public health stakeholders with expertise in alcohol and tobacco pricing policy. These interviews were undertaken in 2018 as part of the progression of research in the National Institute for Health and Care Research funded ‘SYNTAX’ project (16/105/26)<sup>29</sup>. The SYNTAX project aimed to produce the evidence required for joint policy analysis of alcohol and tobacco tax policy changes. Therefore, both existing policies and ideas for policy innovation were in scope for this review.

## Methods

### Patient and public involvement

Patients and the public were not involved in any way for this study.

### Ethics

Whilst ethical approval was not required specifically for this scoping review of the literature, this review formed part of work package 1 of the SYNTAX project, which conducted qualitative research on alcohol and tobacco tax policy interventions. Ethical approval for the qualitative research element of work package 1 was obtained from the Sheffield University, UK, Sheffield Centre for Health and Related Research Ethics Committee (ref. 017409, 2018) and confirmed by the REACH Committee at the University of Bath, UK.

### Review approach

We undertook a scoping review of alcohol and tobacco tax policy research in the UK (see Arksey and O’Malley<sup>30</sup> for a discussion of the variation in scoping review methods). We followed a modified version of the rapid review approach recommended by Tricco *et al.*,<sup>31,32</sup>. This involved searching >1 database, published and grey literature, searches limited by date and language, research scope specified by two researchers in consultation with the SYNTAX project team and a health librarian, study selection by one reviewer only, data abstraction by one reviewer and one verifier. Modifications to suit the scoping nature of our study were inclusion of grey literature (enabling us to gather wider information about tax options) and exclusion of quality appraisal, which was extraneous to the study’s research objectives: namely, to identify and describe policy options for tobacco and/or alcohol tax. Due to the scoping nature of our study, we simply distinguish studies that are qualitative from studies that present policy effect sizes, which could be effect sizes observed from statistical analyses or effect sizes predicted by computer simulation models. Whilst we acknowledge that observed and predicted effect sizes are not equivalent forms of evidence, it was outside the

scope of this study to quality appraise and synthesise the effect size evidence. This method was chosen because it simplifies the systematic review process to produce a synthesis of available knowledge more quickly ensuring feasibility and timeliness, while minimising risk of bias<sup>31,33</sup>. It was also chosen as a way to produce a briefing for policy stakeholders and support policy discussion<sup>34</sup>. For the study’s full protocol, see *Extended data*<sup>35</sup>.

### Eligibility criteria

Inclusion was restricted to peer-reviewed and grey literature, including governmental, non-governmental and alcohol and tobacco industry documents, published 1997–2018, written in English. Sources had to include a specific description and/or analysis of one or more historical, current, or prospective taxation interventions for either alcohol, tobacco, or both for the UK. Documents which had a global focus but referred briefly to the UK or referred only to non-specific interventions, such as “increase tax”, were excluded.

### Information sources

Searches were conducted in April 2018 using the PubMed, Scopus and Cochrane Library databases, supplemented by a Google grey literature search. Additional sources proposed by stakeholders and colleagues were located and screened against the inclusion criteria in December 2018.

### Search process

Search terms used were ((tobacco OR cig\* OR alcohol OR beer OR wine OR cider OR spirits) AND (tax OR taxes OR taxation OR excise OR duty) AND (UK OR “United Kingdom” OR Scotland OR England OR Wales OR “Northern Ireland” OR Britain)). Google searches also included (AND pdf) to help restrict the volume of documents arising from the search to reports, rather than webpages. The search process and terms used were discussed with a subject librarian at the University of Bath and agreed by the project team. A summary of searches undertaken and associated results can be found in *Extended data*<sup>35</sup>. Search results from databases were extracted directly to the Endnote reference management software (free alternatives such as Mendeley are available). Documents from Google searches, stakeholders and colleagues were recorded in a spreadsheet and transferred manually.

### Selection of sources of evidence

Duplicates were removed automatically using reference management software. Titles and abstracts for the remaining results were screened against the inclusion criteria. Full texts of the remaining documents were screened.

### Data charting

An excel spreadsheet structured according to the PICO framework was used to extract data. The PICO framework is a commonly used model for structuring the key elements of studies in terms of the Population, Intervention, Comparator, Outcome. JH and PB designed and tested the spreadsheet. Data were charted by JH. Charting was monitored via regular peer debriefing with PB and DG and minor modifications were made. For example, additional columns were added to record which categories of tax policy

options were referred to in sources as those categories emerged from the data.

**Data items**

Reference information (reference number, title, author, date), type of source, declared funding, aims, methods and findings were charted where information was available. The PICO framework was then used to chart data content as follows. For Population, we charted geographical context, population group and timeframe in which the intervention was posited or implemented, product type and sub-type. For Intervention, we charted the technical description of the tax intervention and objectives. For Comparator, we charted the system of taxation, or aspect of the system, that was or would be changed by the intervention. Finally, for Outcome, we charted primary effects (e.g., product price or consumer behaviour); secondary effects (e.g., on health, social and economic outcomes), differential effects among subgroups, and mediating factors which could impact effectiveness.

**Synthesis of results**

Extracted data were synthesised across the data set. Similar taxation interventions were grouped together and described in terms of their objectives, observed or predicted effects and mediating factors. JH used an inductive approach to identify categories within each of these components, and categories were refined via discussion with PB and DG. In each subsection, we report the proportion of sources that were

peer-reviewed journal articles. Due to the inclusion of published and grey literature, sources varied widely in the types of evidence they presented or cited. We sought to reflect this variation in the wording of our results by, for example, indicating where cited examples were based on evaluative or predictive studies and by using associated terms such as ‘observed’ or ‘predicted’.

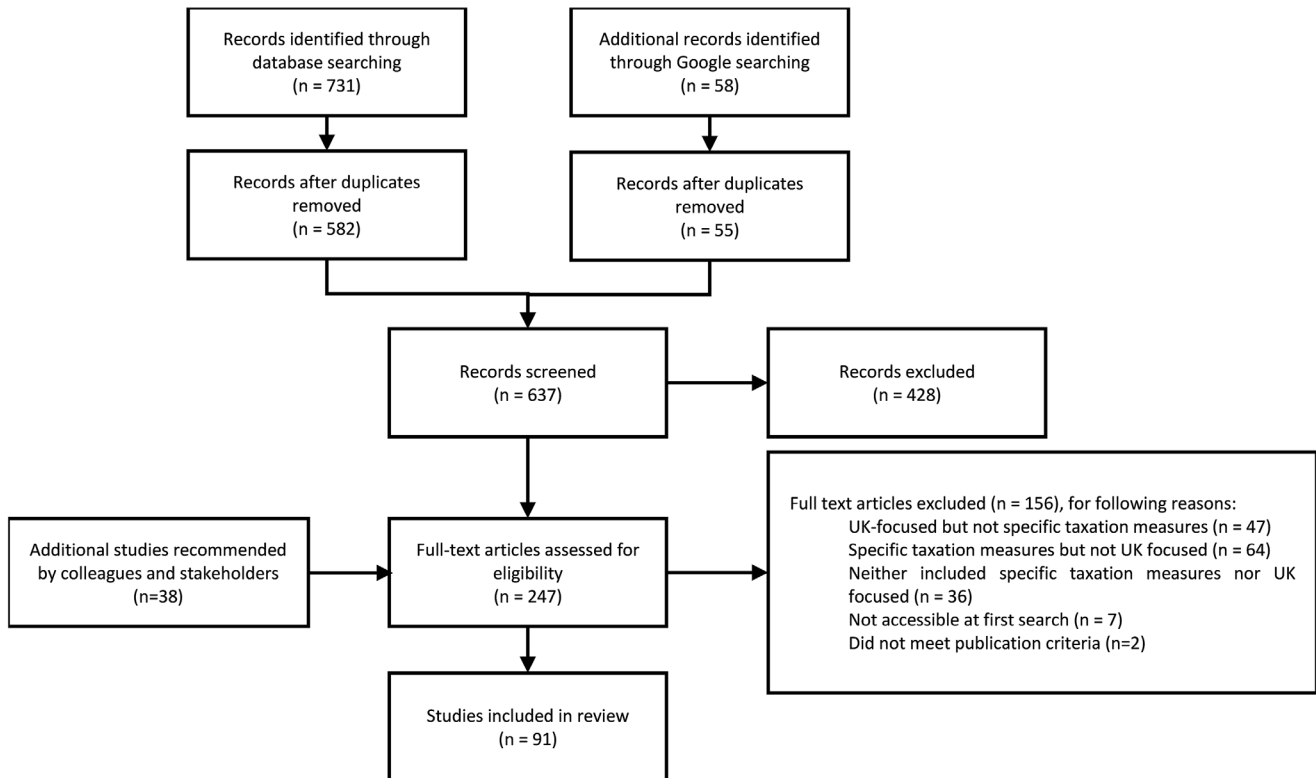
**Results**

**Selection of sources of evidence**

Figure 1 shows the source search record. Database searches returned 731 documents; the Google search returned 58 documents; a further 38 documents were identified through conversations with the project team and stakeholders. After duplicates were removed, 637 documents were screened at the title and abstract stage; and 247 full texts were screened. Of these, 91 sources met the inclusion criteria.

**Characteristics and coverage of sources of evidence**

This study’s *Extended data*<sup>35</sup> provides detailed characteristics of all sources included in the study. Included sources were published between 1997 and 2018 and comprised 33 peer-reviewed journal articles and 58 grey literature sources. Methods were described by authors in just over half of sources and were predominantly quantitative in nature (e.g., predictive modelling studies, trends analyses, descriptive analyses). Funding was declared in 62 sources: nearly half of which were funded by government or research councils and only 4



**Figure 1. Source search record.**

by industry. Alcohol was the focus of 49 sources, 36 were on tobacco, 6 on both alcohol and tobacco.

**Policy options identified**

Policy options identified were grouped thematically into four categories:

1. *Changes to excise duty* to increase product prices using existing tax structures.
2. *Structural reforms* to the tax applied to alcohol and tobacco products.
3. *Industry measures* – tax changes designed to modify the revenue or profits that the alcohol and tobacco industries gain from product sales.
4. *Hypothecation motives for changing tax* (applied to options 1 to 3 above) – increasing tax in order to spend the revenue on public benefits, especially on initiatives that further the reduction of harmful alcohol and tobacco consumption or mitigate its harmful effects.

Figure 2 and Table 1 show a breakdown of the sources that refer to each of the policy options. In Table 1, the sources indicated in bold presented policy effect sizes, which could be observed from statistical analyses of real-world policy effects or predicted by computer simulation models of policy effects. Observed or predicted effects of the policy options described in the included literature were reported in 48 sources, 23 of which were peer-reviewed journal articles. The nature and evidence of effects are summarised below.

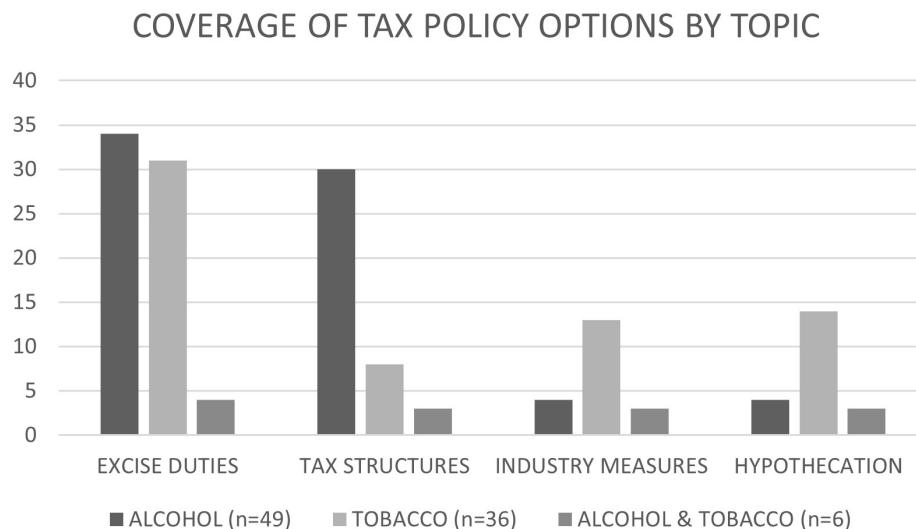
**Changes to excise duty**

**Changes to excise duty rates.** Thirty-seven sources: Potential changes discussed in the literature ranged from -2% to 34% for alcohol and 2% to 25% for tobacco. Estimates of policy effects were presented in 20 out of 37 sources: 8 alcohol, 11 tobacco and 1 cross-sector (shown in bold in Table 1).

For alcohol, examples in the literature of modelled effects of tax-led price change on population-level consumption include: a 10% price increase leading to a 4.4% reduction in consumption<sup>19</sup>; a 13.4% increase in all alcohol duty leading to a 1.7% reduction in consumption<sup>36</sup>. These two studies also examined estimated impacts on particular groups in society and showed consumption was predicted to fall most for ‘hazardous’ and ‘harmful’ drinkers, with the latter likely to incur greatest additional expenditure from the policies. The second study also estimated a shallow socio-economic gradient with those in the lowest quintile predicted to reduce consumption by 2.3% versus 1.1% for the highest quintile. Modelling also showed that tax-related price increases of 1% above inflation are likely to reduce violence-related hospital emergency department visits<sup>37,38</sup>.

For tobacco, there is observed evidence of reduced cigarette sales<sup>39</sup> and consumption<sup>40,41</sup> arising from excise duty increases. These effects occur by encouraging quitting and switching behaviours<sup>42,43</sup>, and can have a greater effect on younger consumers<sup>44</sup>. For example, a 1% increase in price was reported to reduce consumption by 0.5%<sup>41</sup> and modelling has shown that between 1998 and 2010, an estimated 31% of falling tobacco product consumption can be attributed to increased price<sup>44</sup>. As with alcohol, increased tobacco duty rates may also impact healthcare costs. A modelled tobacco duty increase of 10% in Scotland was predicted to save an estimated £17m in prevented hospitalisations over ten years if the revenue raised was subsequently hypothecated for tobacco control measures targeted at the most deprived quintile<sup>45</sup>.

**Duty escalators.** Thirty-three sources: Policy options covered in the literature were duty escalators that increase alcohol and tobacco duty annually by between 2% and 5% above inflation. Estimates of the effects of escalators were presented in 15 out of 33 sources: 10 alcohol and 5 tobacco.



**Figure 2. Coverage of tax policy options in sources, n=91.**



**Table 1. Overview of studies by tax policy option.** Bold indicates studies that presented policy effect sizes.

Category	Sub-category	No. studies	Alcohol (n=49)	Tobacco (n=36)	Alcohol/ Tobacco (n=6)
Excise duty	Excise duty rates	37	<b>19,36,37,38,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60</b>	<b>39,40,41,42,43,44,45,61,62,63,64,65,66,67,68,69</b>	<b>70,71</b>
	Duty escalators	33	<b>17,46,47,48,55,60,72,73,74,75,76,77,78,79,80,81,82</b>	<b>39,61,65,67,83,84,85,86,87,88,89,90,91,92,93</b>	94
	Product-specific excise duty	24	<b>19,46,51,53,55,58,74,78,79,80,81,95,96,97</b>	<b>64,65,83,86,87,88,90,98,99</b>	100
	Minimum excise duty	9	No data	<b>64,65,83,86,87,88,90,101,102</b>	No data
Taxation structures	Equivalent taxation (per unit, per gram)	22	<b>36,38,46,48,56,81,82,95,103,104,105,106,107,108,109,110,111</b>	<b>64,90,101,102</b>	<b>70</b>
	Multi-rate taxation (rates set according to product strength or harm)	22	<b>72,74,75,76,46,52,54,55,81,95,103,104,105,106,111,112,113,114</b>	<b>86,89,115</b>	94
	Supplementary tax (in addition to excise duty & VAT)	4	<b>36,54,116</b>	No data	<b>117</b>
Industry measures	International harmonisation (reduce cross-border price gaps)	4	49,96	40,86	No data
	Industry levy (for retailers or manufacturers)	12	No data	<b>65,86,87,88,89,118,119,120,121</b>	<b>70,117,122</b>
	Wholesale price cap (limiting profitability of manufacturers)	6	No data	90,91,101,102,118,121	No data
Hypothecation	Industry subsidy (to support particular producers or retail sectors)	3	<b>72,123,124</b>	No data	No data
	Hypothecation for prevention or treatment services or the NHS	21	<b>38,52,53,116</b>	<b>45,61,62,65,66,67,83,86,87,88,92,118,119,120</b>	<b>70,117,122</b>

For alcohol, a 2% duty escalator was in place in the UK between 2008 and 2013, enabling effects to be observed rather than modelled. The escalator reduced affordability of alcohol products by between 22% (beer) and 54% (wine)<sup>72,73</sup>, a trend which reversed after the policy ended<sup>72,74</sup>. The escalator's abolition in 2013/14 was observed to decrease alcohol duty in real terms<sup>75–77</sup>, reduce prices<sup>46,78</sup> and increase affordability (particularly of cheap strong drinks and off-trade purchases – e.g. beer was 21.8% more affordable, spirits were 14.2% more affordable)<sup>47,74,76,77</sup>. It also significantly reduced government revenue<sup>70,72,74–76</sup>. Despite this evidence, the Scotch Whisky Association predicted that scrapping the duty escalator would create jobs and generate public revenue<sup>48</sup>.

For tobacco, the duty escalator has been observed to reduce smoking rates among lower income smokers<sup>61</sup>. Modelled analysis of a 5% above inflation tobacco duty escalator from 2015 estimated that by 2035 prices would be 87.6% (for factory-made cigarettes (FM)) and 78.2% (for hand-rolled tobacco (HRT)) higher than under the existing 2% escalator<sup>83</sup>. The relative effects of duty increases and escalators were compared in 13 sources. Hospital admissions and mortality rates have been shown to be affected by both alcohol and tobacco duty rates and escalators<sup>45–47,49,62,72,73,84</sup>. These policy options also generate revenue<sup>61,63,84,85</sup> and long-term savings to society<sup>45,47,50,83</sup>.

**Change duty rates on specific products.** Twenty-four sources: Policy options for alcohol included raising excise rates on stronger and more harmful ciders, beers, spirits and wines, and alcohol products retailing at less than £0.30 per unit. For tobacco, measures included raising excise duty rates 2% above inflation for FM and 5–10% above inflation for HRT and pipe tobacco in order to close the price gap with FM. Estimates of effects were presented in 4 out of 24 sources: 1 alcohol and 3 tobacco.

For alcohol, one modelling study showed the effect of using tax to increase the price of products retailing at <£0.30 per unit by 25%<sup>19</sup>. For on-trade products, the model predicted a fall of 1.3% in overall consumption, with hazardous drinkers most affected and a small increase in spending of £3.10–£24.00 per annum per drinker. For off-trade products, the model predicted a fall of 0.6% in overall consumption, with hazardous drinkers most affected and a small increase in spending of £2.10–£37.80 per annum per drinker.

For tobacco, evidence relates to HRT: a 2011 duty increase on HRT increased prices, narrowing the price gap with FM<sup>64</sup>. This is important because increases in the UK's tax gap between FM and HRT are associated with an increase in the proportion and number of smokers who smoke HRT<sup>98</sup> and increased product price is expected to reduce smoking uptake<sup>83</sup>.

**Minimum excise tax (MET).** Nine sources: MET was introduced in the UK in 2017 for FM. It sets a minimum level of excise duty based on the weighted average price of tobacco. The intention of the policy was that the minimum level of excise duty is updated annually at every budget. At the time of our search there were no papers examining the actual effects of MET. However, 6 papers raised the possibility of introducing a

minimum consumption tax. This would extend MET to include value added tax (VAT) and would thereby impact on the price of HRT<sup>64,65,84,86–88</sup>.

### Structural reforms

**Equivalent taxation.** Twenty-two sources: Equivalent taxation is where a universal rate of duty is applied per unit for alcohol or per gram for tobacco. Estimates of effects were presented in 3 out of 22 sources: 2 alcohol and 1 cross-sector. For alcohol, a per unit tax was estimated to slightly reduce alcohol spending overall, with declines in all but those with the highest incomes<sup>36,70</sup>, although one grey literature paper estimated that the policy would raise tax revenue overall<sup>103</sup>. A per unit tax was also estimated to lead to a reduction in alcohol-related mortality among consumers, particularly those on lower incomes<sup>36,70</sup>. For tobacco, research has begun to explore a move towards a fully specific (per gram) tax structure helping to harmonise tobacco product duty rates – at the time of the review the EU Tobacco Tax Directive required that duty rates are comprised by a combination of ad valorem (percentage of retail price) and specific (per gram) taxes.

**Multi-rate tax structures.** Twenty-two sources: Multi-rate taxation structures apply different tax rates dependent on product type or strengths. Examples include scaled volumetric taxation<sup>72,75,76</sup>, strength-related tax tiers<sup>72,75,95,112</sup> and a duty band for heated tobacco products<sup>86,89,115</sup>. Taxes might also be structured to maximise revenue return<sup>51</sup>. Looking across alcohol and tobacco, one paper suggested restructuring fiscal policies for unhealthy commodities by coordinating tax and pricing policy across food, soft drinks, alcohol and tobacco<sup>94</sup>. Estimates of effects were presented in 6 out of 22 sources: 6 alcohol. For alcohol, the >7.5% Alcohol By Volume (ABV; a measure of alcoholic strength) and <2.8% ABV beer tax bands implemented in the UK in 2011 were predicted to have only a small effect on affordability due to the relatively small volume of beer sold in these duty brackets and due to the premium prices of high strength craft beers<sup>104,105</sup>. Similarly, the 2019 6.9–7.5% ABV cider tax band set at £50.71 per hectolitre was predicted to increase the price of a 3 litre bottle of cider by only 31p (or 9%)<sup>76</sup>. UK multi-rate tax structures for beer and cider were observed to have reduced the market share of high-strength products and increased that of low-strength products<sup>72</sup>. Further, modelling has shown that taxing strong spirits at a relatively high rate is an effective way to reduce alcohol volume purchased by heavy drinkers without imposing large costs on lighter drinkers<sup>95</sup>.

**Supplementary tax.** Four sources: A supplementary, or added, tax could be introduced in addition to excise duty. Estimates of effects were presented in 3 out of 4 sources: 2 alcohol, 1 cross-sector. For alcohol, a 4% ad valorem alcohol sales tax (or retail excise duty) on product value added after duty at time of purchase (i.e., applied at the same time as VAT). The 4% was predicted to prompt small changes in expenditure with little subgroup variation<sup>36</sup>. A 2p per unit ring-fenced treatment tax on off-trade sales was predicted to add 4p to a pint, 18p to a bottle of wine and 56p to a standard bottle of spirits,

raising c. £155m p.a. 2015–17, £290m p.a. 2018–20; £410m p.a. 2021–23; £520m p.a. 2024 onwards<sup>116</sup>. While a 2.5% consequential impact tax on the purchase price of ‘lifestyle self-abuse’ goods was predicted to raise £0.45bn on tobacco and £2.32bn on alcohol and a related 15% tax on advertising and sponsor spend was predicted to raise £120m<sup>117</sup>.

**International harmonisation.** Four sources: International harmonisation of tax rates and/or structure between nation states was examined in 4 sources. For alcohol, options were the introduction of minimum European tax levels on alcoholic beverages<sup>49</sup> and joining the World Wine Trade Group to harmonise standards with other wine-exporting countries and lower trade costs<sup>96</sup>. For tobacco, tax rates could be harmonised across borders, to ensure FM and HRT equivalence and implement minimum excise levels as with the UK’s MET<sup>40,86</sup>. There was also a proposal to include raw tobacco in the Tobacco Tax Directive as an excisable product<sup>86</sup>. No sources reported on observed or estimated effects of harmonisation.

### Industry measures

Three main categories of industry measures were identified, with these being discussed more frequently for tobacco than for alcohol.

**Industry levies.** Ten sources: Industry levies were discussed for tobacco and for alcohol and tobacco together. A levy is a cost levied on manufacturers or retailers of alcohol or tobacco products as a percentage of revenue or profit in addition to excise duty and VAT. For tobacco, a levy could be implemented in four ways. (1) As a surcharge on corporation tax: 28% or 33% as per banking sector, user fee, or licensing charge<sup>86,87</sup>. (2) As a profit-based levy targeted at UK market operations which might reduce industry incentives to maximise profits and invest in marketing<sup>118</sup>. (3) As a revenue-based levy, entailing a fee per stick or a proportion of total sales revenue by company<sup>118</sup>. (4) As a fixed tax revenue levy raising £500m total with proportion allocated on sales volume<sup>65,87–89,119,120</sup>. For alcohol and tobacco, a levy could comprise a 15% tax on industry spend on advertising and sponsorship, reducing industry incentives to produce and promote products and estimated to generate £194m per annum<sup>117</sup>. Or it could be introduced in the form of a public health supplement as trialled in Scotland where a 13% levy was imposed on large retailers (rateable value >£300,000) selling both alcohol and tobacco products<sup>122</sup>.

### Wholesale price cap accompanied with a rise in excise duty.

Six sources: A small group of papers introduced the novel idea of a price cap on tobacco products. This option would involve a limit placed on the wholesale price at which manufacturers can sell their products to retailers. This measure would have to be combined with an equivalent excise duty rise to prevent the retail price from falling<sup>90,91,101,102,118,121</sup>. The aim of this measure would be to reduce manufacturer profits and increase the price of the cheapest products through the rise in excise duty. It has been estimated that a system of price-cap regulation in the UK would raise around £500 million per year<sup>121</sup>.

**Subsidies.** Seven sources: For alcohol only, the literature examined the role of industry or sector subsidies implemented via the excise duty system to encourage or discourage particular businesses or products. An example of this is the existing Small Breweries Relief, where initial production of 0–5000hl attracts a 50% duty cut, with a sliding scale up to 60,000hl<sup>104,123,124</sup>. For beer, the small brewery subsidy introduced in the UK in 2002 was found to increase short- (but not long-) term profits and may have increased entry into the market, but did not have an effect on survivorship<sup>123,124</sup>. A similar duty relief for small cider producers could also be introduced<sup>72</sup>. A more novel idea is to introduce tax incentives for the on-trade, for example via a differential beer duty or lower rate of VAT for draft beer, which has been found to be likely to have a negligible or small impact on tax receipts but to impact consumption at an individual level among male drinkers aged 35+ from lower socio-economic groups<sup>46</sup>.

### Hypothecation motives for changing tax

Twenty-one sources: As with industry measures, hypothecation interventions were discussed more frequently for tobacco than for alcohol. Hypothecation would see revenue from excise duties, industry levies, or other tax ‘hypothecated’ – i.e., reserved – for a particular purpose (e.g., for spending on alcohol or tobacco treatment services or for the National Health Service (NHS)). For alcohol, options explored in the literature included the additional revenue from tax increases being hypothecated for support for families affected by alcohol use, particularly those on low incomes or to offset NHS costs of alcohol-related harm<sup>38,52,53</sup>. A more specific proposal was for the introduction of a ring-fenced treatment tax on every unit of alcohol sold off-trade to fund effective abstinence-based rehabilitation centres<sup>116</sup>. For tobacco, similarly, tobacco tax revenues could be hypothecated for the NHS or for treatment and cessation services<sup>45,62,66,67,83,86,92</sup>. Allocating tobacco duty revenue to the NHS has been shown to be likely to have positive health effects, generating additional quality-adjusted life years<sup>83</sup>. Revenue from industry levies could be hypothecated in the same way<sup>61,65,70,86–89,118–120</sup>. Finally, revenue from a cross-cutting consequential impact tax or Public Health Supplement would increase overall revenue which could be hypothecated for a specific purpose. For example, it is argued that the revenue generated by a consequential impact tax (£2.5bn p.a.) would enable the NHS to tackle costs of consumption, with potential greatest effect on lower socio-economic groups<sup>117</sup>. When implemented, Scotland’s Public Health Supplement raised £95.9m over three years, but the hypothecation element of the policy was ultimately dropped<sup>122</sup>.

### Policy objectives

Eighty-four sources referred to one or more objective for changing tax on alcohol or tobacco, of which 29 were peer reviewed journal articles. Objectives were grouped thematically into five categories (Table 2). First, changing product affordability, including price and relative price (23 sources). Second, changing consumer behaviour, including changing consumption and supporting consumers to quit or change their consumption

(47 sources). Third, changing health outcomes, including reducing and preventing harm and reducing health inequalities (45 sources). Fourth, changing economic outcomes, such as raising revenue and reducing financial costs to society, also known as externalities (40 sources). Fifth, changing industry behaviour (26 sources). This category included objectives relating to restricting industry – reducing illicit trade, industry profits and industry manipulation of pricing to reduce the intended effects of tax policy. It also included objectives which were more sympathetic to industry including supporting industry and encouraging product reformulation.

In terms of the relationship between the types of tax policy options and specific objectives, all four options were perceived as aiming to change economic outcomes and support consumers for both alcohol and tobacco (Table 2). Excise duties and structural tax reforms were perceived to change affordability and consumption, again for both substances. In relation to industry measures, objectives concerning reducing illicit trade and tackling industry pricing strategies were only mentioned in tobacco sources while objectives concerning incentivising product reformulation and supporting industry were only mentioned in alcohol sources.

**Policy mediators**

Policy mediators were identified in 81 sources (52 grey, 29 peer reviewed). We grouped these thematically into four categories: politics and society (35 sources); policy mix (36 sources); consumers (24 sources); industry (24 sources) (see *Extended data*<sup>35</sup> and described below). Much of the commentary on mediators was general. Where it is specific to alcohol or tobacco, or to a particular type of intervention, this is indicated in the text.

**Politics and society**

Thirty-five sources: Alcohol and tobacco tax policy debates and decisions were reported to be influenced by economic arguments<sup>44,73,78,106</sup>, perceptions of public acceptability and historical precedent<sup>49,50,54,67,71,72,92,94,112,121</sup>, and by narratives regarding potential regressive effects<sup>117</sup>. Public, medical and political support for tax interventions<sup>50,70,72,87,107,108,112,117,119,122</sup> and government buy-in to evidence on health benefits of tax measures<sup>113,114,116</sup> were regarded as important for policy action. For alcohol, political narratives mediate against tax increases: social importance of the pub trade<sup>79,104</sup>, political and economic importance of the industry<sup>55,78,104</sup>, need to protect the ‘moderate’ or ‘responsible’ drinker<sup>19,52,104,105</sup>, and the idea that

**Table 2. Policy objectives of tax options differentiated by product type.**

Objective category	Policy objectives	Policy options			
		Excise duties	Tax structures	Industry measures	Hypothecation interventions
Change affordability	Change product affordability				
Change consumer behaviour	Change consumption				
	Support consumers				
Change health outcomes	Reduce/prevent harm				
	Reduce health inequalities				
Change economic outcomes	Raise revenue				
	Reduce financial costs to society				
Change industry behaviour	Reduce illicit trade				
	Reduce industry profits				
	Tackle industry manipulation of tax policy				
	Support industry				
	Encourage product reformulation				

KEY.

Alcohol	Tobacco	Alcohol & Tobacco	Neither
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tax is a barrier to investment, reduces sales and costs jobs<sup>48,52</sup>. Industry influence can perpetuate these narratives and tax policy outcomes via partnerships with government (alcohol) or non-industry bodies (tobacco), lobbying, campaigns, arguments and legal action<sup>17,39,52,61,74,76,79,101,113,114,118</sup>. Brown identified industry power as “one of the biggest barriers” to tackling the affordability of alcohol<sup>17</sup>. For tobacco, political leadership and public opinion were considered to have supported sustained tax rises in the UK since the 1990s and may lead to the introduction of new measures such as levies<sup>39,92</sup>. Overall, more alcohol than tobacco sources considered politics and society to be a barrier to tax interventions (9 tobacco, 21 alcohol, 5 mixed).

### Policy mix

Thirty-six sources: Synchronising alcohol and tobacco tax changes with investment in prevention, education, enforcement of minimum age policies and treatment might increase effectiveness in reducing consumption and associated harms<sup>39,44,45,62,67,68,71,84,99,112,119</sup>. Investing in enforcement efforts and sanctions (e.g. Trading Standards Agency) can discourage illicit trade<sup>40,43,48,61,63,71,84,90,99</sup>. At the structural level, EU regulations have restricted government freedom to change alcohol and tobacco tax rates and structures or to introduce levies<sup>46,56,70,83,101,103–106,109,118,124</sup>. However, ‘Brexit’ (Britain’s exit from the European Union) may facilitate a review of these restrictions and could lead to higher prices on imported alcohol products<sup>55,70,72,96</sup>.

### Consumers

Twenty-four sources: Alcohol and tobacco tax effectiveness is dependent on consumer responses<sup>37,41–43,57,63,67,68,71,78,97,105,110</sup>. For example, demand is affected by income, prosperity, poverty, age, gender and level of drinking<sup>19,37,41,47,63,85</sup>. Demand is also affected by the wider economic context (e.g. by recession)<sup>50,69,77</sup>. Consumers may mediate excise duty changes by changing the products they consume (e.g. cheaper but not necessarily weaker alcohol products, higher tar or nicotine cigarettes, cheaper brands or forms of tobacco such as HRT, bulk buying in carton packs)<sup>19,43,63,68,90,95,98,105</sup>. Consumers may also change their purchasing practices (e.g. supermarkets not convenience stores, duty-free, social network or illicit sources, where enforcement does not limit availability)<sup>68,71,90,93</sup>. Finally, consumers may change how they consume, for example smoking less cigarettes more intensively<sup>63,68</sup>.

### Industry

Twenty-four sources: Industry mediate tax policy post-implementation via tax pass-through and pricing strategies<sup>43,56,58,61,63,80,86,98,101,102,110,113</sup>. Modifying the tax pass-through to product sales prices can take two forms: “under-shifting” in which industry decreases the profits that they make from product sales in order to mitigate the effects of tax increases on product sales prices; “over-shifting” in which industry increases the profits that they make from product sales at the same time as a tax increase, which could act to mitigate any lost profits from decreases in consumer demand (see Wilson *et al.*<sup>125,126</sup> for recent analyses of tax pass-through for alcohol and tobacco in the UK). For example, producers (and retailers for alcohol) under-shift tax onto cheaper products and over-shift

tax onto premium products, widening the gap between them<sup>47,53,64,71,79–81,83,90,100,111</sup>. Supermarkets shift alcohol tax rises onto non-alcohol products (i.e. loss-leading)<sup>53,56</sup>. Multi-national companies can offset lost profits in the UK in other markets<sup>102</sup>. Companies can reduce their duty liability by modifying their timetable for tax clearance (e.g. releasing more product for sale before a duty escalator increase)<sup>75,100</sup>. Concern was expressed that small incremental tax increases can drive industry profits as they support the industry’s pricing strategy<sup>91</sup>. For alcohol, attempts to support profitability of small and medium sized businesses via the tax system are unlikely to be successful when supply chains are dominated by more powerful businesses<sup>123</sup>. Industry also mediate tax via product reformulation and marketing<sup>72,112</sup>. For tobacco, industry over-supply of low-demand markets and poor supply chain control can facilitate availability of illicit products in the marketplace<sup>83</sup>.

## Discussion

### Summary of findings

The literature on alcohol and tobacco tax policy in the UK focuses mainly on common measures such as duty rate changes and duty escalators. However, other tax policy options, such as structural reforms, industry measures and hypothecation, are also explored. Some, such as fully ‘specific’ or equivalent tax structures – e.g., per unit or per gram – are discussed across alcohol and tobacco. Others, such as multi-rate structural reforms and industry subsidies relate mainly to alcohol, while industry levies, price caps and minimum excise taxes are mainly discussed in relation to tobacco. The explanation for this difference is likely to lie in the different configuration of objectives and mediating factors for alcohol versus tobacco tax policy in the UK. Each of them share changing affordability, improving health, reducing health inequalities and raising revenue as objectives. However, in terms of consumption, alcohol interventions are focused on reducing harmful consumption, while tobacco control aims to reduce the prevalence of smoking (i.e., encourage quitting, reduce uptake). Tax policy narratives identified as influencing policy decisions reflect this difference. Dominant alcohol narratives described in the literature focus on harmful versus moderate drinkers and relative acceptance of the role of the alcohol industry. Those for tobacco are characterised by universal acceptance of the harms of smoking and exclusion of the tobacco industry from policy debates.

Thus, a rich seam of evidence and ideas relating to alcohol and tobacco tax policy options exists for the UK. These are summarised in *Extended data*<sup>35</sup>. and have been used to directly inform the SYNTAX project: firstly, informing the development of the qualitative interview topic guide and briefing for interview participants<sup>127</sup>; second, in modelling alcohol and tobacco tax options in the later part of the SYNTAX project. In terms of gaps in the evidence base, the relatively small volume of peer-reviewed literature on industry measures and hypothecation mechanisms is worthy of note. Further, while structural reform is a common theme for discussion, the associated literature presents mainly modelling-based research, rather than real-world evidence, and reports reflect uncertainty generated by Britain’s exit from the EU (‘Brexit’). Following Brexit, the UK Government has introduced structural changes to the

duty structure for alcohol products, creating a standardised series of tax bands based on alcohol by volume and introducing tax relief for small producers and on products sold in the on-trade venues, such as pubs<sup>28</sup>. These changes to the alcohol tax system provide an opportunity to collect real-world evidence on its impacts. For tobacco tax, Brexit gives the UK more freedom to change the level and structure of tax on tobacco products, e.g. the UK could move to a fully specific system of taxation, and Brexit could also allow the UK to directly regulate tobacco pricing by the use of policies such as minimum unit pricing<sup>128</sup>.

Few sources discussed alcohol and tobacco tax-related policies in the same space, except in general policy terms, and no research has yet attempted to model the interactions between alcohol and tobacco production, consumption and tax policy in the way proposed in our previous work<sup>7</sup>. This previous work reported the findings of a workshop on the joint tobacco–alcohol policy system with UK academics and policy professionals. The findings illustrated the need to model the effects of policies that target tobacco and/or alcohol consumption in common terms because this allows fair comparisons between the effects of changes to tobacco policy and alcohol policy. Furthermore, to understand the effects of policy changes on socio-economic or health inequalities, it is important to understand how changes to tobacco and alcohol policy might affect individuals differently, thinking particularly of the characteristics of people who both smoke and drink to harmful levels. The tobacco and alcohol fields tend to operate in substance specific research which, while acknowledging the links between these two behaviours and their determinants, rarely looks at the two issues together. This is particularly important given the comorbidity and multiplicative risks of alcohol and tobacco consumption, particularly in relation to cancer<sup>129,130</sup>. It is also important give evidence of similarities between the practices and tactics of the alcohol and tobacco industries<sup>131</sup>.

From this review of the literature, there is clear demand for conceptualising and understanding tax policy within its wider context as ‘tax and spend’, rather than solely as a means of raising revenue. There is also a debate to be had about whether this is then interpreted as a Pigouvian tax system which aims to meet the costs of externalities of product use and/or as a hypothecated public health tax system which aims to invest in prevention and treatment. In order to take this debate forward, there is more work to be done to understand the more complex landscape of policy options described in this review and how they may interact with and fit with each other. At present, it is very unclear from the literature what ‘effective’ combinations of policy options might look like, and these are likely to vary depending on the policy objective(s) being prioritised.

### International relevance

Tax has been shown to be among the most effective ways to change consumption of harmful commodities<sup>132–134</sup>. For those readers interested in a global overview of alcohol and tobacco tax options, it is worth looking at Chaloupka *et al.*,<sup>135</sup>. The paper covers a similar spread of policy options and concludes

that excise taxes are a ‘powerful tool’ for reducing tobacco use and excessive drinking and that their potential to ‘significantly reduce consumption and save lives remains high’. The scope of our review was purposefully restricted to papers which focused wholly or partly on the UK. This was to ensure that the review’s findings were both relevant to the UK’s policy context and manageable within the timeframe available to deliver the review. To address this limitation, the SYNTAX project’s International Advisory Panel were invited to comment on the findings. They flagged a number of relevant complementary examples from around the world that we outline below in relation to the four policy themes identified in this review:

First, on tobacco excise duty rates, combining a high tax floor, an escalator and occasional surprise large tax increases is thought to be an effective way to reduce consumption<sup>20</sup>. Tax increases are expected to have a progressive rather than regressive impact because tobacco consumption is higher among people with lower socio-economic status who also have greater price sensitivity<sup>135</sup>.

Second, on tax structures, evidence from Sweden has shown that a shift to a tax strategy based on alcohol strength led to an increase in floor prices and a substantial reduction in consumption of the cheaper segment of the market<sup>136,137</sup>. In addition, there is evidence from Australia that the reach of differential tax rate for beers is highly dependent on the thresholds set for each tax tier<sup>138</sup>.

Third, on industry measures, taxing inputs, such as materials or labour, might also reduce industry profitability. For alcohol and tobacco, our review identified options such as levies that take money from the industries to help reduce the societal costs of their products. However, due to the perceived social and economic importance of alcohol in contrast to tobacco, policy options also discussed supporting pubs and small breweries. More work is needed to understand the influence of the price elasticity of demand for alcohol and tobacco products on the potential for industry measures to raise revenue for government given that the industry might pass the costs onto consumers. It is also unclear how tax changes on alcohol and tobacco products could affect the wider economy via impacts on the labour market and productivity across multiple sectors.

Fourth, on hypothecation, New Zealand, the USA and Canada all offer examples of hypothecation of a fixed tax on alcohol. New Zealand funded the Alcohol Advisory Council (ALAC); Washington State has funded alcohol-related research; and Québec funds Edu Alcool, a not-for-profit education and prevention organisation. There is also research on the relative acceptability of hypothecated versus across-the-board taxes showing that the former is more popular<sup>139</sup>. In terms of equity, using revenues to fund programmes that benefit the poor increases their progressive impact, as in the Philippines’ universal healthcare programme which is funded by tobacco taxes<sup>135</sup>. In terms of effectiveness, the case of tobacco shows that the market share of the illicit trade tends to be lower in jurisdictions with higher tax rates, particularly where tax administration and enforcement is effective<sup>135</sup>. This indicates that the effectiveness

of tax policy could be enhanced by hypothecating tax revenue for the enforcement of tax regulations.

### Strengths and limitations

The strengths of the study lie, first, in the rapid but systematic approach which has been rigorously followed<sup>140</sup>. This approach allowed the review to capture the extent and nature of the work that had been produced on alcohol and tobacco tax policy options relevant to the UK in 2018, which we used as part of the progression of research in the SYNTAX project. The review findings were used to prepare to speak to alcohol and tobacco tax experts about the options for changing tax on alcohol and tobacco, which we did in 2018. Thus, whilst the 2018 end date of the search is a limitation of the study because it means that the study does not capture evidence published from 2018 to the date of publishing in 2023, as the review formed part of the larger SYNTAX project, the rapid scoping review methodology instrumentally enabled progression of the research. It facilitated the project team's understanding of the literature and allowed us to consider tax options, not only in relation to their broad characteristics, but also with reference to technical detail, objectives, evidence of effects and mediators.

The SYNTAX research project's focus on tax policies meant that non-tax price measures such as minimum unit pricing fell outside the scope of the review, even though tax and non-tax price measures are often intrinsically linked in policy discussions. In terms of limitations of the methodology, the review did not critically appraise the literature and embraced a variety of sources that may have been excluded from a more traditional systematic review, e.g. policy briefings and model-based predictions. However, this decision is in line with recommended best practice for rapid scoping reviews<sup>31,32</sup>. It is mitigated somewhat in this case by the research team's recording and reporting of types of sources, research funding and methods used. In doing so, the review reflects the nature of both peer-reviewed evidence and the wider policy debate on alcohol and tobacco taxation discussed in the grey literature. It also responds to the need identified by Parkhurst and Abeysinghe to think about evidence quality in terms of appropriateness as well as rigor in relation to evidence-based policy as opposed to evidence-based medicine<sup>141</sup>.

### Conclusions

This review has clearly identified a contemporary set of policy objectives, interventions and related mediating factors that were summarised in a briefing to alcohol and tobacco tax policy stakeholders ahead of interviews for the SYNTAX project about the options for changing tax on alcohol and tobacco<sup>127</sup>. The differences between alcohol and tobacco tax interventions and debates suggest an opportunity for cross-policy learning. There is currently little literature/evidence which considers joint effects of tax options for alcohol and tobacco, despite evidence that co-consumption multiplies risks to health. Modelling the impact of these alcohol and tobacco policy options to better understand their relative impact would provide information to help decide among the available options.

### Data availability

#### Underlying data

Figshare: SYNTAX Rapid Scoping Review: PRISMA Scoping Review checklist and Supplementary Information

<https://doi.org/10.15131/shef.data.22032644><sup>35</sup>

This project contains the following underlying data:

- Supplementary Information - SYNTAX Rapid Scoping Review.pdf
- PRISMA checklist - SYNTAX Rapid Scoping Review.pdf

#### Reporting guidelines

Figshare: PRISMA checklist for 'Options for modifying UK alcohol and tobacco tax: A rapid scoping review of the evidence over the period 1997–2018'. <https://doi.org/10.15131/shef.data.22032644><sup>35</sup>.

Data are available under the terms of the [Creative Commons Attribution 4.0 International license \(CC-BY 4.0\)](#).

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# Open Peer Review

Current Peer Review Status:  

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## Version 2

Reviewer Report 18 October 2023

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 **G. Emmanuel Guindon** 

McMaster University, Hamilton, Ontario, Canada

The authors have adequately addressed all my initial comments. I have two additional minor comments:

“ Fourth, changing economic outcomes, such as raising revenue and reducing financial costs to society, also known as externalities.”

- First, economic outcomes and financial outcomes are not necessarily the same. What is being described are financial outcomes, not really economic outcomes. Similarly, there are different types of externalities, financial externalities being only one type (other types include paternalistic (caring) externalities and option-value externalities). Second, raising revenue has little to do with externalities.

“Tax increases are expected to have a progressive rather than regressive impact because tobacco consumption is higher among people with lower socio-economic status who also have greater price sensitivity.”

- It's worth clarifying what is meant by “regressive/progressive.” Regressive/progressive in health? Regressive/progressive in income? I believe clearly progressive in health but not necessarily progressive in income.

Minor formatting issue:

Politics and society, policy mix, consumers, and industry are subsections of “Policy mediators”

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Health economics; economics of health behaviours

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Reviewer Report 10 October 2023

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**Lana Elliott** 

Queensland University of Technology, Brisbane, Queensland, Australia

The authors have addressed concerns raised in my initial review and should be congratulated on their insightful paper.

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Health taxes, commercial determinants of health & political economy analysis

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

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## Version 1

Reviewer Report 14 September 2023

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**G. Emmanuel Guindon** 

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This is a well written study on an important topic.

### **Modelling studies.**

Modelling studies assume that prices decrease demand, and as such, do not provide any evidence that prices affect demand. Throughout the article, modelling studies seem to be conflated with studies that quantitatively examined the relationship between prices and demand using real-world data. This article would greatly benefit from a discussion and clear distinction between the two types of studies. As it stands, many statements are simply not supported by the evidence presented.

Similarly, causal language is used throughout and at times, not supported by the evidence presented.

Examples include:

- P3 *"This is supported by evidence that increases in product prices decrease demand<sup>9-14</sup>, especially in socio-economically disadvantaged groups<sup>15-17</sup>."*
- P6 *"Evidence of policy effects was presented in 20 out of 37 sources: 8 alcohol, 11 tobacco and 1 cross-sector (shown in bold in Table 1)."*
- Table 1

### **Modelling the interactions between alcohol and tobacco production, consumption and tax policy.**

- Recent evidence does not suggest meaningful cross-price elasticities between alcohol and tobacco. See for example: [https://doi.org/10.1016/S0140-6736\(16\)32420-5](https://doi.org/10.1016/S0140-6736(16)32420-5)<sup>1</sup> and <https://doi.org/10.1111/add.15966><sup>2</sup>

### **Non-tax price measures**

- The omission of non-tax price measures such as minimum pricing should be discussed as a limitation as they are often intrinsically linked in policy discussions.

### **Brexit:**

- A short discussion of the Brexit implication for alcohol and tobacco taxation would be helpful.

### **Minor comments/edits:**

- PICO framework:
  - Consider briefly describing the PICO framework the first time it is mentioned.
- P4: [Only applies to Member States apply excise duty < EUR 115].
  - A word seems to be missing.
- Acronyms:
  - Spell out acronyms the first time it appears (e.g., NHS)

### **References**

1. Burton R, Henn C, Lavoie D, O'Connor R, et al.: A rapid evidence review of the effectiveness and cost-effectiveness of alcohol control policies: an English perspective. *Lancet*. 2017; **389** (10078): 1558-1580 [PubMed Abstract](#) | [Publisher Full Text](#)
2. Guindon GE, Zhao K, Fatima T, Garasia S, et al.: Prices, taxes and alcohol use: a systematic umbrella review. *Addiction*. 2022; **117** (12): 3004-3023 [PubMed Abstract](#) | [Publisher Full Text](#)

### **Are the rationale for, and objectives of, the Systematic Review clearly stated?**

Yes

### **Are sufficient details of the methods and analysis provided to allow replication by others?**

Yes

### **Is the statistical analysis and its interpretation appropriate?**

Not applicable

**Are the conclusions drawn adequately supported by the results presented in the review?**

Partly

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Health economics; economics of health behaviours

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.**

Author Response 18 Sep 2023

**Duncan Gillespie**

Dear Dr Guindon,

Many thanks for your review of our article "Options for modifying UK alcohol and tobacco tax: A rapid scoping review of the evidence over the period 1997–2018". We found the comments very helpful and tried hard to act on each of them fully. Below we describe our responses (in bold) to your comments (in italics).

Yours sincerely,  
Duncan Gillespie

Comments from the reviewer:

*This is a well written study on an important topic.*

*Modelling studies.*

*Modelling studies assume that prices decrease demand, and as such, do not provide any evidence that prices affect demand. Throughout the article, modelling studies seem to be conflated with studies that quantitatively examined the relationship between prices and demand using real-world data. This article would greatly benefit from a discussion and clear distinction between the two types of studies. As it stands, many statements are simply not supported by the evidence presented.*

**Thank you for highlighting that more clarification is needed here. The distinction between studies that we focus on in our presentation of results is whether or not a study presented any quantitative policy effect sizes vs. whether it was a purely qualitative paper/report. It is important to acknowledge that modelling studies are often based on a range of empirical evidence, including price elasticities of demand estimated using real world data. In the manuscript text we have clarified that due to the scoping nature of our study, we simply distinguish studies that are qualitative from studies that present policy effect sizes, which could be effect sizes observed from statistical analyses or effect sizes predicted by computer simulation models.**

*Similarly, causal language is used throughout and at times, not supported by the evidence presented.*

**The paper has now been reviewed for this causal language and edited, see below for edits to the examples mentioned.**

*Examples include:*

*P3 "This is supported by evidence that increases in product prices decrease demand<sup>9-14</sup>, especially in socio-economically disadvantaged groups<sup>15-17</sup>."*

**This is now edited to: "In general, there is evidence that increases in product prices decrease demand,<sup>9-14</sup> especially in socio-economically disadvantaged groups.<sup>15-17</sup>"**

*P6 "Evidence of policy effects was presented in 20 out of 37 sources: 8 alcohol, 11 tobacco and 1 cross-sector (shown in bold in Table 1)."*

**This is now edited to: "Observed or predicted estimates of policy effects were presented in 20 out of 37 sources: 8 alcohol, 11 tobacco and 1 cross-sector (shown in bold in Table 1)."**

*Table 1*

*Modelling the interactions between alcohol and tobacco production, consumption and tax policy. Recent evidence does not suggest meaningful cross-price elasticities between alcohol and tobacco. See for example: [https://doi.org/10.1016/S0140-6736\(16\)32420-5](https://doi.org/10.1016/S0140-6736(16)32420-5) [1] and <https://doi.org/10.1111/add.15966> [2]*

**Thank you for pointing to these two evidence reviews. We were aware of both and have now included them as references. We would not conclude that there is "no suggestion of meaningful cross-price elasticities between alcohol and tobacco". Rather we conclude that there is an absence of good studies on the topic. The two evidence reviews are basically pointing to a lack of robust studies.**

**This is exactly why, as part of the SYNTAX project, we have produced new estimates of own- and cross-price effects for 10 alcohol products and 2 tobacco products for the UK, leading to a new 12x12 price elasticity matrix (currently under review).**

*Non-tax price measures*

*The omission of non-tax price measures such as minimum pricing should be discussed as a limitation as they are often intrinsically linked in policy discussions.*

**Thank you for highlighting this - text has now been added to the limitations in the Discussion.**

*Brexit:*

*A short discussion of the Brexit implication for alcohol and tobacco taxation would be helpful.*

**Thank you for highlighting this - text has now been added to the Discussion that gives a brief update on the situation for tobacco and alcohol policy.**

*Minor comments/edits:*

*PICO framework:*

Consider briefly describing the PICO framework the first time it is mentioned.

**Thank you for this suggestion - The following sentence has now been added to the "Data charting" section of the methods. "The PICO framework is a commonly used model for structuring the key elements of studies in terms of the Population, Intervention, Comparison, Outcome(s)."**

*P4: [Only applies to Member States apply excise duty < EUR 115].  
A word seems to be missing.*

**This is now edited in Box 1 to "Only applies to Member States that apply excise duty < EUR 115]."**

*Acronyms:*

Spell out acronyms the first time it appears (e.g., NHS)

**The paper has now been reviewed for acronyms to ensure that they are spelled out the first time they appear.**

*References*

1. Burton R, Henn C, Lavoie D, O'Connor R, et al.: A rapid evidence review of the effectiveness and cost-effectiveness of alcohol control policies: an English perspective. *Lancet*. 2017; 389 (10078): 1558-1580 PubMed Abstract | Publisher Full Text
2. Guindon GE, Zhao K, Fatima T, Garasia S, et al.: Prices, taxes and alcohol use: a systematic umbrella review. *Addiction*. 2022; 117 (12): 3004-3023 PubMed Abstract | Publisher Full Text

**Competing Interests:** No competing interests

Reviewer Report 27 June 2023

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**Lana Elliott**

<sup>1</sup> Queensland University of Technology, Brisbane, Queensland, Australia

<sup>2</sup> Queensland University of Technology, Brisbane, Queensland, Australia

Thank you for the opportunity to review this incredibly interesting research paper. The paper is well written, methodically sound and the authors should be commended on their comprehensive analysis. I have outlined below some overarching and section-by-section suggestions for strengthening this body of work:



**Overarching comments:**

- Given Brexit and substantial changes in the health taxes space between 2018 and 2023, I wonder if updating this search would be benefit. If not, I think it's important for the authors to outline what specific lessons still hold from 2018 and what may have shifted given changes over the last 5 years. This could be done in a similar manner to which the 'international relevance' subsection has been written.

**Abstract:**

- The paper's abstract is clear and well-constructed.

**Keywords:**

- I would suggest including 'commercial determinants of health' as an additional key word

**Plain language summary:**

- Under "Why we did it", I would suggest adjusting the sentence that begins 'Increasing alcohol tax...' to 'Increasing alcohol and tobacco taxes has been shown to reduce their consumption.'

**Introduction:**

- P1: 'Policy system' feels a little bit odd. I would suggest the authors amend this sentence to read 'Of the available interventions to jointly address alcohol and tobacco related harms, increasing is considered among the most effective.'
- P2: 'after manufacture' should read 'after manufacturing'
- A brief clause explaining why the duty escalator on alcohol was removed would be beneficial to understanding dynamics in this paragraph.
- Please include the VAT rate in the final sentence of P2.

**Methods:**

- Review approach: It's a little unclear as to whether you're summarising a modified Tricco approach in the sentence beginning 'This involves'. Adjusting it to state 'This involved...' would clarify that it is the process your paper followed if this is the intention of the sentence.
- My understanding of scoping reviews is that quality appraisal isn't typical so I'm a little unclear as to why it's been outlined as a specific modification.

**Results:**

- An in-text breakdown of how many studies were predictive/modelling vs. those based on observed/empirical evidence would be helpful.
- 'Change duty rates on specific products' subheading P3: HRT and FM have already been outlined in full in the previous subsection so acronyms alone would suffice
- 'Multi-rate tax structures' subheading: Can the authors please provide an explanation of the acronym ABV
- Table 2: This table is really helpful in understanding the alignment between policy options, objectives and categories. Switching the colour of the 'alcohol and tobacco' category however would help slightly with readability.

- 'Policy mix' subsection: Can the authors provide an update on whether there has been any review of these measures in light of Brexit?
- 'Industry' subheading: an more in-depth explanation of what is meant by under- and over-shifting tax may be helpful to readers with less familiarity of this area.

**Discussion:**

- Some detail on the forthcoming structural reforms to alcohol duties in the UK would be beneficial to this section to understand the types of data that would be considered valuable and how they may be fed into future changes in this space.
- The observation that little research has considered alcohol and tobacco in the same space is interesting but could use some further unpacking. The authors have highlighted why this may be a good idea but it would also be worth including a couple of sentences of perhaps why this hasn't been done to date.

**Strengths and limitations:**

- I would have expected to see the 2018 end date of the search included as a potential limitation given the changes that have occurred globally, nationally and in the health taxes space between now and then.

**International relevance:**

- I would suggest shuffling this subsection to before the study's strengths and weaknesses so its relevance can be reflected on as a strength/weakness.
- It may be worth summarising Chaloupka et al.'s work more concisely and seeing if it can be integrated into the paragraph above a little more. They're really interesting arguments to summarise but, at the moment, it almost reads as if this paper is finishing with a summary of another paper. Reflecting on each point in relation to what this paper adds (or doesn't) in relation to these arguments may be another way to go about it.

**Are the rationale for, and objectives of, the Systematic Review clearly stated?**

Yes

**Are sufficient details of the methods and analysis provided to allow replication by others?**

Yes

**Is the statistical analysis and its interpretation appropriate?**

Not applicable

**Are the conclusions drawn adequately supported by the results presented in the review?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Health taxes, commercial determinants of health & political economy analysis

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have**

**significant reservations, as outlined above.**

Author Response 18 Sep 2023

**Duncan Gillespie**

Dear Ms Elliot,

Many thanks for your review of our article "Options for modifying UK alcohol and tobacco tax: A rapid scoping review of the evidence over the period 1997–2018". We found the comments very helpful and tried hard to act on each of them fully. Below we describe our responses (in bold) to your comments (in italics).

Yours sincerely,  
Duncan Gillespie

Comments from the reviewer:

*Overarching comments:*

*Given Brexit and substantial changes in the health taxes space between 2018 and 2023, I wonder if updating this search would be benefit. If not, I think it's important for the authors to outline what specific lessons still hold from 2018 and what may have shifted given changes over the last 5 years. This could be done in a similar manner to which the 'international relevance' subsection has been written.*

**Thank you for giving us the opportunity to improve the paper in this regard. As this paper is published as a record of research undertaken in the SYNTAX project, on which subsequent parts of that project were built, we will not be updating the search undertaken in 2018. We have improved the explanation of this in the Introduction and Discussion.**

**In addition, we agree that it is important to outline relevant recent changes to the context for tobacco and alcohol tax policy.**

**For alcohol in the UK, there has been a major tax policy change in the intervening period - the reform of duty structure for alcohol products. This has created a standardised series of tax bands based on alcohol by volume and has introduced tax relief for small producers and on products sold in the on-trade venues, such as pubs. This policy change is highlighted in the Introduction and we have now also added text to the Discussion.**

**For tobacco, there is an active policy debate about changes to tobacco taxation in the UK, but no major changes have yet been introduced. We have added text and a new reference to the Discussion that outlines the policy debate.**

*Keywords:*

*I would suggest including 'commercial determinants of health' as an additional key word*

**Thank you - a note to the editors has been made to change the keyword of**

**“commercial influences on health” to “commercial determinants of health”.**

*Plain language summary:*

*Under “Why we did it”, I would suggest adjusting the sentence that begins ‘Increasing alcohol tax...’ to ‘Increasing alcohol and tobacco taxes has been shown to reduce their consumption.’*

**This change has now been made in the manuscript and the online submission system.**

*Introduction:*

*P1: ‘Policy system’ feels a little bit odd. I would suggest the authors amend this sentence to read ‘Of the available interventions to jointly address alcohol and tobacco related harms, increasing is considered among the most effective.’*

**This change has now been made.**

*P2: ‘after manufacture’ should read ‘after manufacturing’*

**This change has now been made.**

*A brief clause explaining why the duty escalator on alcohol was removed would be beneficial to understanding dynamics in this paragraph.*

**Thank you for pointing out the need for clarification here – we have added this clause and a new reference. The removal of the duty escalator on alcohol came about due to a political decision by the UK Government. The reference added gives further explanation of the context and model-based estimates of the health and economic impacts of the decision to remove the duty escalator.**

*Please include the VAT rate in the final sentence of P2.*

**The VAT rate of 20% has been added.**

*Methods:*

*Review approach: It’s a little unclear as to whether you’re summarising a modified Tricco approach in the sentence beginning ‘This involves’. Adjusting it to state ‘This involved...’ would clarify that it is the process your paper followed if this is the intention of the sentence.*

**“Involves” has now been changed to “involved” to clarify that this is the process that our paper followed.**

*My understanding of scoping reviews is that quality appraisal isn’t typical so I’m a little unclear as to why it’s been outlined as a specific modification.*

**Thank you for highlighting the need for clarification on the review approach. We have now edited the Review approach section and added a new reference. The methodology used for scoping studies is highly variable – the new reference explains this “Arksey H, O’Malley L. Scoping studies: towards a methodological framework.**

**International journal of social research methodology. 2005;8(1):19-32.” Our study used a modified rapid review approach drawn from two papers cited in the article by Tricco et al. The Tricco et al papers show that most of the rapid review methods did conduct quality appraisal. However, due to the scoping nature of our review that had the objective of identifying policy options for tobacco and/or alcohol tax, quality appraisal was not needed. The exclusion of quality appraisal is therefore outlined as a specific modification to the Tricco et al rapid review approach.**

*Results:*

*An in-text breakdown of how many studies were predictive/modelling vs. those based on observed/empirical evidence would be helpful.*

**Thank you for suggesting this – however, we feel this is a difficult distinction to make in relation to the broad objectives of our scoping review study and because models are often based on a range of empirical evidence. The distinction between studies that we focus on in our presentation of results is whether or not a study presented any quantitative policy effect sizes vs. whether it was a purely qualitative paper/report. We have clarified this in the manuscript text at the first mention of Table 1 in which a breakdown of sources is presented.**

*‘Change duty rates on specific products’ subheading P3: HRT and FM have already been outlined in full in the previous subsection so acronyms alone would suffice*

**This change has now been made.**

*‘Multi-rate tax structures’ subheading: Can the authors please provide an explanation of the acronym ABV*

**This has now been clarified by adding “Alcohol By Volume (ABV; a measure of alcoholic strength)” at the first mention of the acronym ABV.**

*Table 2: This table is really helpful in understanding the alignment between policy options, objectives and categories. Switching the colour of the ‘alcohol and tobacco’ category however would help slightly with readability.*

**Thank you for highlighting this as an issue – we have made a note to the editors to change the colour scheme.**

*‘Policy mix’ subsection: Can the authors provide an update on whether there has been any review of these measures in light of Brexit?*

**Please see our response to your overarching comment above.**

*‘Industry’ subheading: an more in-depth explanation of what is meant by under- and over-shifting tax may be helpful to readers with less familiarity of this area.*

**Thank you for highlighting this – a brief explanation and further references have been**

**added to this section.**

*Discussion:*

*Some detail on the forthcoming structural reforms to alcohol duties in the UK would be beneficial to this section to understand the types of data that would be considered valuable and how they may be fed into future changes in this space.*

**We agree that this is interesting, however there is not the space in this paper to give a proper treatment of this issue. Our research team has developed a large-scale project to evaluate the impacts of the structural reforms to alcohol duties, which covers a wide range of interconnected data sources.**

*The observation that little research has considered alcohol and tobacco in the same space is interesting but could use some further unpacking. The authors have highlighted why this may be a good idea but it would also be worth including a couple of sentences of perhaps why this hasn't been done to date.*

**Thank you for suggesting we expand on this. We have added text that explain the findings of a workshop that we held with UK academics and policy professionals to understand why alcohol and tobacco research has not often been considered in the same space and why doing so might be desirable.**

*Strengths and limitations:*

*I would have expected to see the 2018 end date of the search included as a potential limitation given the changes that have occurred globally, nationally and in the health taxes space between now and then.*

**The strengths and limitations section has now been edited to clarify this issue and to explain why the study is limited in having a 2018 end date of the search. Also see our response to your overarching comment above.**

*International relevance:*

*I would suggest shuffling this subsection to before the study's strengths and weaknesses so its relevance can be reflected on as a strength/weakness.*

**This section has now been moved to above the strengths and limitations section.**

*It may be worth summarising Chaloupka et al.'s work more concisely and seeing if it can be integrated into the paragraph above a little more. They're really interesting arguments to summarise but, at the moment, it almost reads as if this paper is finishing with a summary of another paper. Reflecting on each point in relation to what this paper adds (or doesn't) in relation to these arguments may be another way to go about it*

**This text is now referred to more concisely and integrated with the paragraph on international relevance. The new paragraph structures the arguments in relation to the four main policy options identified by our review.**

***Competing Interests:*** No competing interests

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